Stories of Innovations by IGNOU Students

Edited by
Dr. Oum Prakash Sharma

इंदिरा गाँधी राष्ट्रीय मुक्त विश्वविद्यालय
Indira Gandhi National Open University

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National Centre for Innovation in Distance Education
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068, INDIA

Stories of Innovations
by IGNOU Students

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Cover Page Designing and Laser Typesetting :

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March, 2023

ISBN : 978-93-5568-749-4

Published on behalf of Indira Gandhi National Open University, New Delhi by the Director, National Centre for Innovation in Distance Education, New Delhi.

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THE PEOPLE'S UNIVERSITY

FOREWORD

The National Education Policy (NEP)-2020 aims at fostering creativity, critical thinking, research and innovation among the students thereby transforming India into a knowledge and self-reliant society. Accordingly, a number of initiatives are being taken all over the country for encouraging an environment of research and innovation, and thus creating an innovation ecosystem in Higher Education Institutes by way of setting up start-up incubation centers, industry-academic linkages, providing hand holding support for nurturing innovative ideas of students and helping them in converting their ideas into successful startups.

In order to implement the National Education Policy-2020, the Indira Gandhi National Open University (IGNOU) has taken several innovative initiatives in terms of curriculum design, study material development, pedagogy, and learner support and assessment system. At the same time, IGNOU is making special efforts to create an innovation ecosystem in the University aimed at promoting, supporting and nurturing innovative practices by the students as well the teachers. For this purpose, IGNOU has a dedicated Centre "National Centre for Innovations in Distance Education" (NCIDE) for promoting, supporting, re-engineering and disseminating innovations and innovative practices in Open and Distance Learning (ODL) system which is the only one of its kind in any higher education institute in the country. In view of the NEP-2020, NCIDE has organized a number of activities and programmes for promoting innovation, entrepreneurship and startup, and thus creating a culture of innovation in the university.

We know that a number of IGNOU students are doing excellent work in the field of innovation and startups. In order to identify such potential innovator students, IGNOU had instituted a scheme of "Best Student Innovation Award" in 2018. Since then, the selected innovator students from across the country are given the best innovation awards every year. The shortlisted potential innovators are further guided, supported and nurtured to take their innovation to the next level. So far more than 30 such potential innovators have been identified and provided mentorship from time to time. Many of these identified innovator students of IGNOU are getting recognized and awarded by several other agencies including the Ministry of Education.

I am happy that the NCIDE has compiled the stories of the innovations by IGNOU students in the form of this book. I am sure, it will not only give wide recognition to the selected innovators, but it will also encourage and motivate the other students towards innovation.

I congratulate the NCIDE for bringing out such an inspiring book "Stories of Innovation by IGNOU Students" and I hope in future too the NCIDE will continue with similar commitment to promote and support innovation and startup in the University.

Nageshwar

(Prof. Nageshwar Rao)
Vice Chancellor
22/3/23

कुलपति कार्यालय
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MESSAGE FROM THE PRO-VICE CHANCELLOR

Fostering creativity, research and innovation in Higher Education Institutes, is one of the major priority of the National Education Policy (NEP)-2020. Besides emphasizing on creating a culture for innovation in HEIs, the policy recommends for identifying, supporting and nurturing the students and faculty towards innovation and startups. In this context, the Indira Gandhi National Open University (IGNOU) has taken several innovative initiatives to create an innovation ecosystem in the University aimed at promoting, supporting and nurturing innovation by the students. The "National Centre for Innovations in Distance Education" (NCIDE) is very dedicatedly working towards creating and strengthening the culture of innovation and startup in the university. NCIDE has organized a number of activities and programmes for promoting innovation, entrepreneurship and startup, and thus creating a culture of innovation in the university. A number of activities aimed at promoting the culture of innovation; identifying and recognizing innovators and entrepreneurs; incubating and nurturing innovations; finding innovative teaching-learning solutions; encouraging and empowering faculty for innovation; documentation and dissemination of innovations, and networking and collaboration with innovators, are some of the major activities undertaken by the NCIDE.

Recognizing the importance of research and innovation in the overall growth and development of the country, the IGNOU has been emphasizing on the recognition and promotion of the innovator students in different fields from across the country. In order to identify, recognize and nurture the innovator students, the NCIDE at IGNOU invites entries for the Student Innovation Award every year. In this process, the best innovator students are identified and awarded with the prizes as an incentive, whereas the other potential innovators are provided various kinds of training and support to take their Innovations to the next level. Some of these innovator students are participating at the National level competitions also where they are doing very well. There innovative work is being recognized by different organizations including the Ministry of Education. These innovator students are certainly inspiration to the other students of IGNOU.

NCIDE's initiative to compile the stories of their innovative work in the form of the Book, is a very good initiative. I am sure that this kind of documentation of the innovations, particularly by the IGNOU students will be highly motivating and encouraging to other students.

I congratulate the NCIDE and its team for identifying the potential innovators and compiling their inspiring stories in the form of this book "Stories of Innovations by IGNOU Students". It will be good, if the soft copy of this book is disseminated widely among IGNOU students and alumni.

(Dr. Srikant Mohapatra)
Pro-Vice Chancellor, IGNOU

PREFACE

Indira Gandhi National Open University (IGNOU) has been promoting creativity, innovation and entrepreneurship among its students. In view of the announcement of the Atmanirbhar Bharat mission by the Government of India, it becomes more important to identify, recognize and support such innovator and entrepreneur students. In this context, a scheme to identify Innovator Students was instituted in 2018. As an incentive, the best innovator students are given the Student Innovation Awards and other potential innovators are identified for further nurturing and guidance.

Every year, applications are invited from the bonafide and registered student of IGNOU. The students who have developed and implemented an innovative product, process or services as a solution to the problem/challenge being faced by individuals or society in any area, preferably from the given theme areas, can apply for the Student Innovation Awards. Theme Areas include Health Care and Biomedical Devices; Agriculture and Rural Development; Food Processing and Packaging; Smart Transport and Traffic Management; Renewable and Affordable Energy and Alternate Fuel; Clean and Potable Water and Water Management; Waste Management and Disposal; Technology Based Innovation; Robotics and Drones including AI and ML; Social and Environmental Issues; Smart City and Urban Development; Technology based Education System; and any other Emerging Areas of Innovation and Startup Opportunity. All the entries are evaluated by the experts in a series of physical and virtual meetings. The evaluation criteria is based on the six parameters including Innovation Readiness level, Novelty, Application of Innovation, Adaptability/ Practicability of Innovation, Cost Effectiveness, Market Acceptability/ Commercialization, and Social Impact. All the shortlisted students are invited to present and demonstrate their innovations before the committee members in virtual mode. After thorough discussion and evaluation, the committee recommends the best three entries for Student Innovation Awards and other few meritorious innovators for consolation awards. The innovator students not only get an opportunity to be recognized nationally for their innovation, but they get Best Innovation Awards, with some cash prizes, Certificates and Trophies. They also get opportunity to interact and network with other innovators and learn from their experiences.

During the last five years after starting of the scheme, 30 students have been awarded with the Best Innovation Awards and around several potential innovators have been identified. These identified innovators are being guided and mentored regularly to take their innovation to the next level. With the permission of the innovator students, a brief description of 30 innovations by IGNOU students has been compiled and documented in the form of this Book "Stories of Innovation by IGNOU Students". The content of each story is based on the information provided by the innovator concerned. Each story of innovation highlights the need of that innovation, innovative features, brief description of the innovation and its future scope. I am highly thankful to all the innovator students who have given content to publish their stories in the form of this Book. I am also thankful to our Vice Chancellor, Prof. Nageshwar Rao for giving his approval to bring out this document. I am thankful to Dr. Srikant Mohapatra, Pro-Vice Chancellor to provide his guidance and support in this regard. I am thankful to my colleague Dr. Jyotsna Dikshit, Dr. Moumita Das and Dr. Sujata Santosh for their support in identifying these innovators. I am also thankful to Mr. Praveen Chauhan and Mr. Pawan Kumar for continuous support.

It is hoped that this document will not only motivate the budding innovators, but it will be useful for those who intend to learn about innovations around us. I will be happy to get your feedback and comments on the stories of the innovations by IGNOU students for improvement.

(Dr. Oum Prakash Sharma)
Director, NCIDE

1

Low-Cost Livestock and Poultry Feed

An Innovative Composition and Method of Preparing Animal Feed

Need of the Innovation

Mr. Shiekh Fayaz Ahmad, a student of MA in Entrepreneurship at IGNOU observed that the Livestock and Poultry Feed is a major area of concern in the present world, particularly in the area of Jammu and Kashmir where he lives. He noticed that there is deficiency of 85% of concentrate feeds of livestock and poultry. He feels that the demand for livestock products increasing markedly due to population growth, particularly in the developing world. The considerable and increasing demand for animal protein is focusing attention on the sources of feed protein and their suitability, quality and safety for future supply. Considerable efforts are being made to utilize more diverse local sources of feed ingredients, in particular protein materials, in many developing countries such as India. Protein part of the livestock feed is the costliest part. There is a global deficit of plant protein sources, for feed production for livestock, which act as a major source of protein for human. For poultry enterprises, there is a heavy and increasing reliance on soybean -meal and fishmeal.

Mr. Shiekh Fayaz Ahamad feels that increasing concerns are being expressed in some developing countries about the costs of imported soybeans for animal feed formulation. Greater utilization of indigenous feed materials is being encouraged for resource-poor small farmers for increasing ruminant production. While growing up in a small village of Pulwama in Jammu and Kashmir, Mr. Shiekh Fayaz Ahamad was very well aware of problems faced by local farmers specially the poultry farm owners and dairy farmers. He noticed that they had to pay a large amount of their income in procuring the animal feed because 70 percent cost was on the feed, as there is no animal feed producer nearby and the animal feed which they were getting was very costly. On the other hand, he observed that there are some agri by productsthat cause pollution by dumping them openly into the environment and abundance of protein rich weeds in Kashmir.

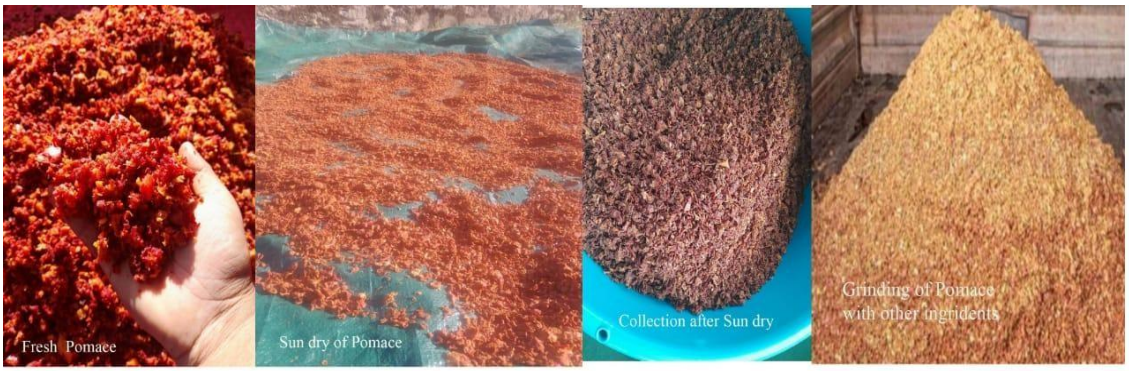
In view of the above problem, Mr. Shiekh Fayaz Ahamad felt the need to develop a low cost protein rich livestock and poultry feed by using these agriwaste material and weeds. Accordingly, he has developed an innovative composition to provide a low-cost protein-rich livestock and poultry feed comprising of different feed ingredients both conventional and non-conventional.

Brief Description of the Innovation

According to Mr. Shiekh Fayaz Ahamad, the present innovation relates to the field of animal husbandry. More particularly, this innovation relates to a low-cost livestock and poultry feed and method thereof. He tells that this unique feed formula provides efficient and sustainable nutrition solutions to maximize animal performance. In fact, for this purpose, he has selected some locally available unconventional feed

ingredients, formulate and develop a low-cost livestock and poultry feed with detailed research, analysis and farmers feedback.

In this context, he got DST-NIMAT Training Programme on "Establishment of Feed Mill for Production of Livestock, Poultry and Fish Feeds on Commercial Basis and Their Quality Control" that was Sponsored by National Science and Technology Entrepreneurship Development Board (NSTEDB), Department of Science and Technology, Government of India from SKUAST-Kashmir and two months Agripreneurship Orientation/Training and incubation from SKUAST-Jammu and a Fellowship for the same innovation from Somaiya Vidyavihar University Mumbai.



Mr. Shiekh Fayaz Ahamad highlights that in view of foregoing need as mentioned above, the present innovation caters to the low-cost protein rich livestock and poultry feed which has been prepared by reducing the grain (maize) and mustard oil cake quantity by some organic wastes, thereby making more grains available for human consumption. Therefore, the feed of present invention not only lowers the cost of feed and helps in saving environment from pollution but also provides a feed which is supplemented with additional nutrients from these organic wastes which the conventional ingredient of the feed cannot provide. The feed of present disclosure is economic/cheaper than the conventional feed as it has replaced major quantities of edible grains/grains meant for human consumption with these agri wastes Further, he says through this innovative composition, the protein content and other nutritional content of the present disclosure has been achieved very innovatively in such a manner that the quantity of nutritional content provided by the conventional feed remains unaltered.

Innovative Features

According to Mr. Shiekh Fayaz Ahamad, the Low-Cost Livestock and Poultry Feed itself is innovative in terms of unique composition and method of preparation thereof.

The patent for the same formulation has been published also. In addition to it, this innovative product has several innovative features as given below :

The present technology relates to a low cost livestock and poultry feed made from organic wastes Therefore, the feed of present innovation is cost effective and is supplemented with additional nutrients from some specific weeds and agri by products, that shows better performance than the conventional feed and also helps in saving environment from pollution.

- This animal feed is cost effective and has better performance than other feeds.
- This feed is more palatable in comparison to conventional feed.
- It contains more nutrients and antioxidants.
- It boosts productivity and profitability.

In view of the above, it is evident that the present invention provides a live stock and poultry feed which reduces the usage of edible food grain with the Agri by-products/waste products so that not only the food grains are available for ever increasing human population but also reduces the environmental pollution by converting this waste material into Value.

Future Scope of the Innovation

Mr. Shiekh Fayaz Ahamad finds that the feed price constitutes around 70% of the total production cost. Therefore, it is the major component in changing production and market scenario of poultry and dairy. He points out that at lesser feed prices more farmers are willing to enter into the business and most of them want to place more birds to rear. In future, he wants to increase the production of this innovative animal feed and for that Ministry of Agriculture and Farmers Affair (GOI) has sanctioned him a grant of 25 lac for the installation of his own production unit and can commercialize this feed under his registered Trademark of “Farooqii Feeds”. Also he plans to engage more number of small farmers in this endeavor as an alternative feed to double their income.

About the Innovator

Mr. Shiekh Shiekh Fayaz Ahmad is a student of Masters of Arts in Entrepreneurship (2106029061) at IGNOU Delhi and Founder of Farooqii Animal Feeds Private Limited a DPIIT registered Startup (DIPP873119). He has been awarded with the Best Innovation Award-2022 by the NCIDE, IGNOU. His innovative work has been granted by different incubation centers. He can be contacted at email shiekhfayaz4@gmail.com and Mobile 9906575105.

2

Krishakkart

An Online Platform to Provide Agriculture Tools and Services to Farmers

Need of the Innovation

Mr. Sanjay Kuamr Pandey, a MCA student of IGNOU noticed that there are large numbers of small medium farmers of the country who cannot purchase heavy machinery and took at their own. If they try to purchase at any rate, they get stuck in heavy loans. As a result, a bad situation occurs in the farmer's family. He thought of saving them from heavy lone. In this context, an idea come to the mind that if the farmers who have surplus machinery power, can become partner of an innovative scheme for sharing the tools and machinery with small farmers on rent basis and thus they can earn revenue also. For this purpose, he designed a model called Krishakkart which will work on Faas (Farming as a service) Model and also B2C Model for inputs.

Brief Description of the Innovation

While explaining his innovation, Mr. Sanjay Kumar Pandey informed that the **Krishakcart** has to provide agriculture tools to the farmers on rent online as we well as inputs related to agriculture such as High yielding seed and fertilizer/bio fertilizer also. Our main focus on Small marginal farmers who cannot purchase heavy machinery. He told that from Krishakkart we want to share machines of big farmers/SHG/Enterpreners, and also from **Maîtree** shop's of Krishakkart. He highlighted that the Krishakkart works on Faas Model (farming as a service) and to plans to give service on All India label through its **KSSC (Krishak Sewa Setu Centre)** and also have to establish **Maitri shop of Krishakkart** where one can find high yielding seeds and fertilizer, bio fertilizer and agriculture awareness also. He informed that Krishakkart is solving the pain farmers suicide, see hyperlink also https://drive.google.com/file/d/1FGoPv4qQHSDbedswNO5z5u0n0C9n_SxC/view.

Elaborating the concept of KSSC Mr. Sanjay Kumar Pandey told that it is a very innovative component of the Customer hiring centre of Krishakkart where various machines are kept ready for service. Any former can approach just through a Phone Call, Physically present on KSSC, by written order, by mail request on website, book on Website where krishakcartwordpress.com and Mumkin App, Krishakkart will provide desired machines and accessories set like Tractor+reaper, Tractor+Cultivvator, Harvestor+Tractor, Tractor+M. B. Plough, Tractor+Leaser land lavelor, spray tools for pesticide spary, etc.

Mr. Sanjay Kumar Pandey informed that on March 16, 2019 Idea of "Krishakkart" was Pitched in the TBI-KIET (Technology Business Incubator), KIET GROUP of Institutions, Muradnagar, Ghaziabad. As a result, **NIDHI-EIR fellowship was approved o**n 01 May, 2019. Thereafter, he joined NIDHI-EIR Incubation programme at TBI-KIET, Krishna Incubation Society, Ghaziabad, Uttar Pradesh.

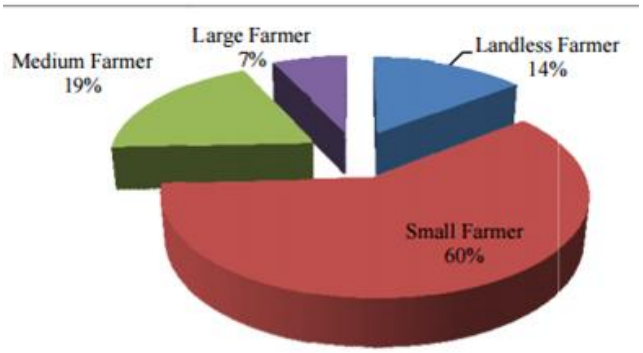
While discussing about the salient features, Mr. Sanjay Kumar Pandey, that the main aim of Krishakkart is use of new technology of farming to increase the production output of the farm through farm mechanization .In our country total farm available for cultivation is 394.6 million acre in which 585.6 millions hours are needed for cultivation at a time. At present only 0.7 million hours work done by other market players like Jfarm, Farmring, Trinngo, Em3agri services, Gold farm, Zamindra, etc. who is only 0.124 percent .rest are done by Indian farmers by use of traditional agricultural tools. Expert tells that it is 15,000 Crore Market.

Innovative Features

While talking about the innovative features of this innovation – Krishakkart, Mr. Sanjay Kumar Pandey tells that just like Uber and Ola he thought of sharing the farm machinery to produce maximum food produce instead of traditional desi hal, for cultivation, use of minimum manpower by replacement of farm machines all over India. Some of the innovative features of Krishakkart include the following :

- Providing very good quality services to small and medium farmers for increasing food production.
- Providing agriculture tools and farm machinery on rent to the needy farmers in cheaper prices.
- Solving problem of the small marginal farmers who can't heavy afford machines for their cultivation, showing, irrigation and harvesting and for post harvesting needs.

Further, he highlights that innovation is very easy to be used by the small and medium farmers. Big farmers can share their machines and can generate revenue. Sharing of machines is good utilization for small and medium farmers, big farmers and drivers also.



Future Scope of the Innovation

Mr. Sanjay Kumar Pandey tells that the prototype of the innovation is ready and he wants to use its prototype sale with the help of an App and Website. Any person can call on a toll free number and book the Agri-machinery rental services. After booking and payment confirmation, the KSSC Centre will provide machines/tractor. Further, he tells that their Maitri shops will operate soon.

He plans his Innovation to be commercialized under the roof of a private Limited Company. Till date Name approval has been submitted. Rest work is in process. In order to provide better services in Krishakkart, he will be taking feedback from the users and also planning to use **AI** technology such as Chatbots "Agri Bhabhi" for All Agriculture related question answer for agriculture planning. In future, the plans to provide technical

expertise to the farmers and sell their output at reasonable price and place and also use **IOT** technology Such as GPS to locate our rental machines exact positions of machines, YouTube channel to take maximum output to farm. He wants to develop a dedicated Website and Mobile App for the users.

About the Innovator

Mr. Sanjay Kumar Pandey is a MCA Programme (148067510) student of IGNOU at Regional Centre, Varanasi. He is using technology to find solutions to the various problems of Society. He can be contacted at email sanjay.sonebhadra@gmail.com and Mobile 7376024630, 8508937520.

3

MAGMEAL

An Alternative Animal Protein Source for Japanese Quails

Need of the Innovation

Protein sources are included in the diet of all organisms. Fish meal containing about 60 per cent protein is the good protein source in the Japanese quail diet. However, due to overexploitation of fishery resources by the burgeoning human population, fish availability is dwindling. There is a stiff competition for the same between man, animal and bird. This increase in demand has led to increased price of fish meal for poultry feed. In addition, the high feed costs can be attributed to scarcity and high cost of feed ingredients particularly animal protein supplements. The price of fish meal, the most guaranteed animal protein source has become prohibitive (Aneibo *et al*., 2008). Keeping it in view, Dr. Smruti Smita Mohapatra a PGCAP student of IGNOU thought of an innovative idea to replace fish meal with other animal protein supplements. For her use of maggot as a protein source is an attractive possibility and a valuable commercial alternative.

Accordingly, Dr. Smruti Smita Mohapatra used MAGMEAL as an alternative Animal Protein Source for Japanese Quails. Magmeal is a core product consisting of dried defatted larvae that is ground into a high protein larvae meal. Maggot meal, popularly magmeal is a potential alternative for fish replacement in the diet of quails. It has high protein content. The high crude lipid acts as protein sparer. It has a dark rich texture with a slightly nutty flavour. It is a rich source of animal protein and limiting essential amino acids – arginine and methionine that can be fed to poultry, pig and fish. Hence it is very crucial to incorporate magmeal as an alternative to reduce the feeding cost, and to make its culture a viable and attractive venture. The inclusion of magmeal can possibly lead to increase in poultry production and consequent economic affordability to the much needed animal protein. Thus, Dr. Smruti Smita Mohapatra finds that a commercial and sustainable magmeal production is a befitting solution to the existing protein meat need for the poultry. Magmeal not only helps in solid waste management strategy but also acts as another feed source for birds via conversion of abattoir and other plant wastes.

Brief Description of the Innovation

Dr. Smruti Smita Mohapatra informed that the maggots were cultured in the Department of Veterinary Parasitology, Madras Veterinary College, Vepery High Road, Chennai-600007. Magmeal was prepared by incubating (60°C for 24 hours in hot air oven) and powdering of the incubated maggots (Plate 1a and 1b).

She told that a study was conducted on 240 Japanese quail birds *(Coturnix coturnix japonica)* from day old to six week of age at Poultry Research Station, Madhavaram Milk Colony, Chennai-600051 to evaluate the effect of magmeal supplementation on intestinal physiology, morphological and hematobiochemical changes and growth indices. The birds were fed with quail brooder and finisher mash with varying proportion of fishmeal

and magmeal prepared at Central Feed Technology Unit, Kattupakkam-603203, Tamil Nadu. The birds were divided into four groups as follows :

Group 1 : (Control group) : Japanese quail basal diet (with 7% fish meal).

Group 2 : Japanese quail basal diet replacing 50% fish meal with magmeal.

Group 3 : Japanese quail basal diet replacing 75% fish meal with magmeal.

Group 4 : Japanese quail basal diet replacing 100% fish meal with magmeal were given to 60 birds (20 birds in 3 replicates) in each group and were fed up to 6 weeks.

A Handful of Maggots and Magmeal (Plate 1a and 1b)

2. Experimental set up and the brooding facility.

3. Body weight measurement of quails taken every week at Poultry Research Station, Madhavaram, Chennai.

Magmeal aptly evolved as an economic animal protein source for replacement of fish meal to quail ration. It emerged as a definite and great option when compared to the traditional meat meal which is fed to the Japanese quails and other poultry species. It is a

nutritive animal feed. Culture of abbatoir waste and fly larvae create sustainable animal feed in form of magmeal. It also combats the menace of high fly population which encourages a sustainable and cleaner environment. Fish meal, however, is a finite resource which cannot be produced in sufficient quantities, but its rising cost is another cause of concern for the farmers and breeders.

Dr. Smruti Smita Mohapatra tells that alternatives to fish meal are now an international research priority. It is the focus of current poultry nutrition research. This latest approach of the use of magmeal as an alternative source of animal protein in the diet of Japanese quails demonstrated that magmeal can establish itself to the physiological adaptability of quails. The innovation was submitted in the form of thesis entitled 'Influence of magmeal supplementation on intestinal physiology and growth performance of Japanese quails' for the partial fulfillment of Masters in Veterinary Science (M. V. Sc.) in the year 2016 in the Department of Veterinary Physiology of Madras Veterinary College, Tamil Nadu University of Veterinary and Animals Sciences (TANUVAS), Chennai.

Further, she highlights that the economic evaluation of magmeal in terms of feed cost was mainly influenced by the inclusion level of magmeal in the diet. By considering the current labour, time and operational expenses involved in the production of magmeal, the cost of magmeal incorporated in the experimental diet was approximately worked out as Rs. 10 per kilogram. The feed cost (Rs/kg) gradually reduced as the inclusion level of magmeal increased by replacing the fish meal. Accordingly the feed efficiency was improved (significant reduction in the value of feed conversion ratio) when higher level of magmeal was incorporated in groups G_2, G_3 and G_4. In Japanese quail production, feed cost and feed efficiency are the most contributing factors in the determination of production cost. This was visualized from the data worked out for production cost. The production cost was worked out as the cost to produce one kilogram of live Japanese quail at six weeks by incorporating various cost components such as the cost of day old Japanese quail chick (Rs. 6 per chick), cost of the feed and cost of medicine (Rs. 1 per kilogram live weight produced).

Innovative Features

Dr. Smruti Smita Mohapatra tells that this new and innovative product MAGMEAL is not only nutritive animal feed, but it has several other innovative features as given below :

- Magmeal was found to be a rich source for both essential and non essential amino acids. In Japanese quails, dietary inclusion of magmeal replacing fishmeal at 100 per cent at six weeks of age enhanced the tryptic and lipase activity. It improved the morphology of small intestine in Japanese quails thereby facilitating improved digestion due to high crude protein in the magmeal.
- It had a positive impact on hematological parameters by improving the hemoglobin concentration at three weeks and total erythrocyte count at both three weeks and six weeks.
- It improved the serum albumin and globulin in Japanese quails.
- It influenced the total cholesterol concentration in Japanese quails.
- The significantly high increase in two major thyroid hormones – Tri-iodo-thyronine (T_3) hormone at both three and six weeks and Thyroxine (T_4) at three weeks due to the inclusion of magmeal improved the growth indices and metabolism with age in the Japanese quails by improving the body weight

gain, muscle mass and feed consumption. This may be attributed to the fact that neutral odour and nutty flavour of magmeal contributed to the improving palatability thereby augmenting the nutritional impact for the quails.

- Magmeal did not negatively affect the feed efficiency and livability in Japanese quails and thus can be cost effective on large scale production.

Future Scope of the Innovation

As there was an improvement in the production performance parameters such as live body weight and feed efficiency, it brought down the cost and production from Rs. 118.23 in G_1 to Rs. 77.59 in G_4 (while replacing fish meal with magmeal from zero per cent to 100 per cent). There was a huge reduction in the cost of production in groups G_2, G_3 and G_4 when compared to control group G_1. Feed containing magmeal was found to be cheaper than the feed containing fishmeal for the Japanese quails. Thus, Dr. Smruti Smita Mohapatra believes that in future it can be adopted by the poultry farmers and breeders as it was found to be cost effective.

About the Innovator

Dr. Smruti Smita Mohapatra, is a PGCAP Programme (195733013) student of IGNOU registered through the Regional Centre, Bhubaneswar. She developed these innovative products as a part of her Masters in Veterinary Science Programme. She is a potential innovator. She can be contacted at email simplysmruti@gmail.com and Mobile 9040575534.

4

Solar Based Fencing

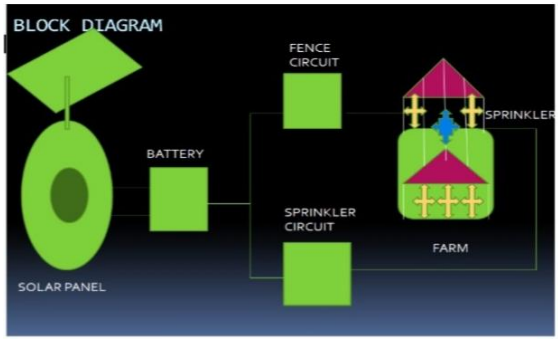
Farmer Friendly Electric Fence and Automatic Sprinkler System

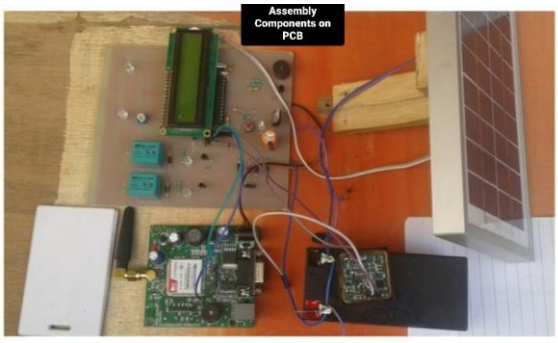
Need of the Innovation

Ms. Shrutee Bepari, MPS student of IGNOU noticed a problem of grazing of crops by stray animals in fields and farmhouses. Also she felt that there is an increased shortage of ground water for irrigation in several areas of the country. As an innovative solution to these problems, she thought of developing a prototype for using the available solar energy by storing in a battery and connecting it to the electric fence and water pump for automatically sprinkling the water in the fields. The electric fences can be used to protect farmhouse from animals by giving them a short sharp but safe shock that teaches them to stay away from the fence. In addition to this, she has designed a prototype of an automated sprinkler system which will automatically sprinkle the water required by the farm twice a day and thus reduces the manual work and providing sufficient amount of water requirement irrespective of season.

Brief Description of the Innovation

Keeping in view the above mentioned problem, Ms. Shrutee Bepari designed an innovative system to drive an electric fence along with an automated sprinkler system. For this purpose, first she made a solar tracking system which utilized the solar power collected by the solar panel to charge the battery. An electric fence is basically a barrier that uses electric shocks to deter animals or people from crossing a boundary.





However, she tells that the authorized persons having RFID card can enter the farm. Radio-frequency identification (RFID) is a technology to record the presence of an object using radio signals. It is used for inventory control or timing sporting events. RFID is not a replacement for the bar coding, but a complement for distant reading of codes. The technology is used for automatically identifying a person, a package or an item. To do this, it relies on RFID tags. These are small transponders (combined radio receiver and transmitter) that will transmit identity information over a short distance, when asked. The other piece to make use of RFID tags is an RFID tag reader. GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global Packet

Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc.) for computer. When a person tries to enter a farm, he has to show a valid RF ID card in the entrance. The RF card reader checks the authenticity of the person and denies entry to unauthorized person. The RF card reader is interfaced with a GSM module which automatically informs the owner about each entry via SMS.

Ms. Shrutee Bepari claims that this innovation is an efficient method to save a farmer's field from animals and at the same time it saves farmer's precious time by automatically sprinkling water in the field according to the moisture content of soil. Such electric fences can be used not only for agricultural fencing and other forms of animal control; they can also be used to enhance the security of sensitive areas, such as military installations, prisons, and other security sensitive places.

Innovative Features

Ms. Shrutee Bepari emphasizes that this innovation is highly useful for preventing animals from entering farms and thus saves the crops from grazing. The amount of shock is different for animals and humans and within tolerable limits. She highlights other innovative features of the innovation as given below :

- It ensures that only authorized persons can enter the farm and also alerts the owner about each and every entry in the farm.
- Interfacing of run time switches with microcontroller makes it flexible in respect of time settings for running a sprinkler water pipe line.
- A farmer using this system while doing irrigation work get protection against extreme odd weather conditions, tedious work of repeated assembly of sprinkler auxiliary water pipe line and risk of encounter with poisonous reptiles.
- Designed system enables a farmer to keep on irrigation work in the night hours. This system eliminates the requirements of physical presence of a farmer during irrigation in the fields, as the systems itself continuously monitors and control the sprinkler auxiliary water pipe line automatically.
- Very low cost and environment Friendly technology has been used in this system.

Future Scope of the Innovation

Ms. Shrutee Bepari says that for further improvement we can use a camera for proper identification of people trying to enter the farm. For protecting the farm from water logging we can add a motor driven shelter which will automatically close in case of excess rainfall. She says that it has lot of scope of further development and hence can be carried on by others for more added features.

About the Innovator

Ms. Shrutee Bepari is a student of MPS Programme (2000163716) of IGNOU studying through the Regional Centre Chhattisgarh. She has been awarded with the Student Innovation Award by the NCIDE, IGNOU in 2021. She can be contacted through email at shrutee786bepari@gmail.com and Mobile No. 8319545964.

5

Janu Avagaha Instrument

An Innovative Device for Treatment and Management of Osteoarthritis of Knee Joint

Need of the Innovation

Dr. Animesh Mohan, DNHE student of IGNOU and Medical Doctor in Ayurveda tells Osteoarthritis (OA) of knee joint is the most common type of arthritis with a prevalence of 22% to 39% in India. Symptoms may include joint pain, tenderness, stiffness, locking, and sometimes an effusion. He noticed that the presently used NSAIDs, alternative anti-inflammatory medications and Intra-articular Injections of Glucocorticoids and Hyaluronic acid are although effective in reducing pain, but for short duration with substantial and frequent side effects. Since OA is a mechanically driven disease, the mainstay of treatment involves altering loading across the painful joint and improving the function of joint protectors, so they can better distribute load across the joint by adjunctive role of pharmacotherapy along with mainstay non-pharmacological measures. In this context, he feels the need for improving the strength and conditioning of muscles that bridge the joint, to optimize their function. He thought that the Ayurvedic therapies or procedures performed locally on the joint can play an adjuvant role in strengthening the joint protectors and as a result in management of osteoarthritis.

He tells that Janu Basti, one of most common Ayurvedic treatment advocated in the management of this disease, is a procedure in which comfortably hot medicated oil is kept over the anterior area of knee joint for a certain period of time with the help of a cap like hollow structure constructed with dough prepared of wheat flour, covers only limited anterior surface of the effected knee joint, leaving behind the most important popliteal fossa, lateral and medial aspect of the joint. In view of this limitations of the existing device Janu Basti, he came up with an innovative idea to increase the efficacy of the procedure if the complete joint is dipped in the oil like in Ayurvedic procedure known as sthanik Avagaha (Complete dipping of the part of body in medicated oils/decoctions for a certain period of time so as to give fomentation to that body part). So, there was a need to modify the procedure or instruments to gain maximum benefits and develop an innovative device.

With the same intention and understanding his responsibilities, Dr. Animesh Mohan, who is pursuing his specialization {MD(Ay)} in the branch-Panchakarma from prestigious SDM College of Ayurveda and Hospital, Hassan, Karnataka started working in this area. Primarily, he listed out the areas where modification by up gradation could be carried out and then based upon the number of patients, need in today's world and available options, he prioritized them all. The first disease which was selected was OA of Knee, or Janu Sandhigata Vata in Ayurvedic terminology. As a solution for the same, he invented a therapy and a instrument to execute it, namely “Janu Avagaha Instrument”.

Brief Description of the Innovation

Dr. Animesh Mohan tells that according to Ayurvedic classical literatures, comprehensive management of Osteoarthritis of knee or Janu Sandhigata Vata in Ayurvedic terminology includes a judicious combination of the Abhyantara Chikitsa (treatment involving the internal addministration of drugs) and Bahya Chikitsa (treatment involving external application of drugs) like Janu Basti.

Janu Basti is the procedure that does both Snehana (Oleation therapy) and Svedana (therapeutically induced perspiration), treat the disease by braking the pathology chain as already proved effective by many clinical trials. But he noticed that it was focusing only on limited part of "Anterior extensor group" of Joint protection mechanism. Others muscle group need to be given more concern to enhance its activity for early recovery.

This all forced of Dr. Animesh Mohan to think of a new therapy “Janu Avagaha” and for its execution an instrument was required. Dr. Animesh Mohan tells that for this purpose, several models were made and changed around 12 times to meet the following practical challenges that were faced on performing it :

1. Large size of the instrument.
2. Huge amount of oil required to completely cover the knee.
3. Facility to maintain the temperature of oil or re-heat it.
4. Easy collection of oil preventing any wastage for reusing it.
5. Maintaining the comfort of the patient for whole course of treatment.
6. Continuous monitoring of temperature.

All these issues were solved by changing the design, material used and installing other accessory equipment many times. The final design was tested on the patients in the pilot study and after getting good results, a request was submitted for clinical trial to the research committee of the institution. Clinical trial was performed in a comparative study with classically used procedure after clearance from Institutional Ethics Committee (IEC) and registration in Clinical Trials Registry – India (CTRI).

Dr. Animesh Mohan proudly shows that, now this new and innovative instrument and treatment procedure is very commonly used for the management of patient suffering with OA of Knee and approaching SDM Ayurveda Hospital, Hassan, Karnataka and giving significant and sustained results.

According to Dr. Animesh Mohan, this invention provides an instrument for performing an Ayurvedic Panchakarma procedure "Janu Avagaha" which is a therapeutic sudation technique by dipping the complete knee joint in comfortably hot medicated oils for certain period of time in the patients with pain or inflammation in Knee joint.

While describing details about the complete process of Janu Avagaha using the instrument, Dr. Animesh Mohan tells that the Flow Diagram shown in Figure 1 describes the complete process.

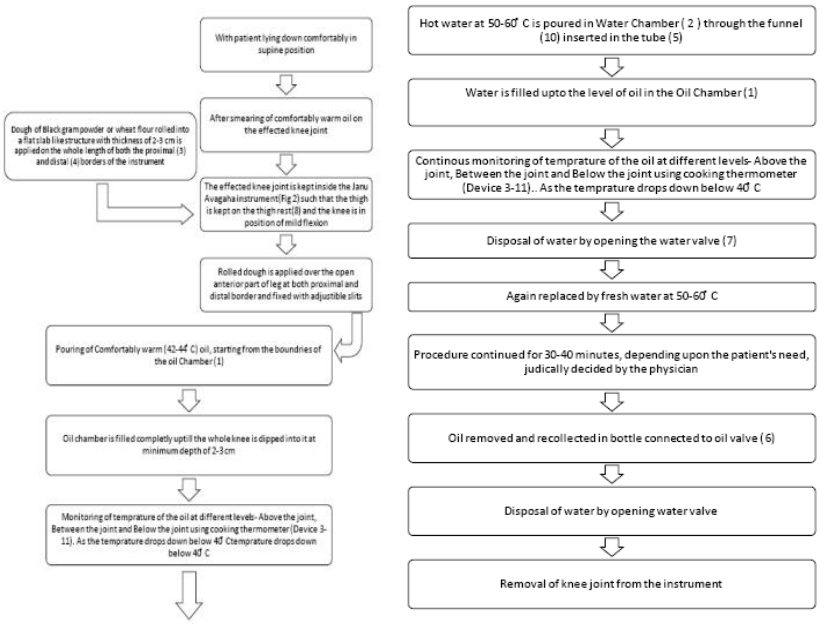


Figure 1

In the block diagram shown in Figure 2, different parts of the instrument includes Oil Chamber (1) where the medicated oil is filled after putting the patient's effected knee joint inside it. It is a U shaped chamber open from top and closed from 5 sides. The outer boundary of this chamber is formed by a thin steel sheet, separating it from concentric outer Water chamber (2) and inner boundary is formed by the surface of patient's knee joint. It is connected to oil outlet (6) guarded by a valve with inlet at the bottom of the chamber. On the inner border both proximally and distally, a rubber edging (9) will prevent the direct contact of the metal with the body surface, preventing any chances of burns due to high temperature of metal instrument. The proximal adjustable slit (3) and distal adjustable slit (4) will be fitted to both the borders of the instrument after putting the patients effected knee inside it. The water chamber (2) has a fixed Tube (5) for insertion of funnel (10) while pouring the hot water in it. Water outlet (7) guarded by a valve is present along with the oil outlet (6) on bottom of the outer surface of the instrument. It is connected to the inlet at the bottom of water chamber. The thigh rest (8)

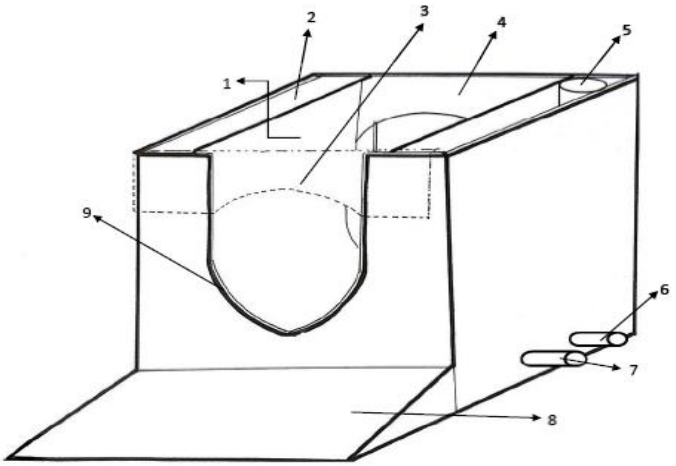


Figure 2

Device 2 (10)

Device 3 (11)

FIGURE 2

is helpful in providing comfort to the patient during the procedure and also in maintaining required flexion of knee joint.

In block diagram shown in Figure 3, three different concentric chambers of the instrument are shown. The inner most chamber: The Oil Chamber is for allowing the comfortably hot medicated oil to stay for certain period of time in contact with the surface of knee joint kept in it. The outer one: The Water chamber, separated by a thin sheet of steel with inner oil chamber is for pouring hot water at 50-60^{o}C. It will act as a constant heater and helps in maintaining the temperature of oil inside the oil chamber to required range. The water inside the chamber can also be replaced by hot water, once the temperature of oil goes down the required range by discharging from bottom valve and again inserting from funnel. The outermost chamber: The Air Chamber work as insulator to prevent quick heat loss.

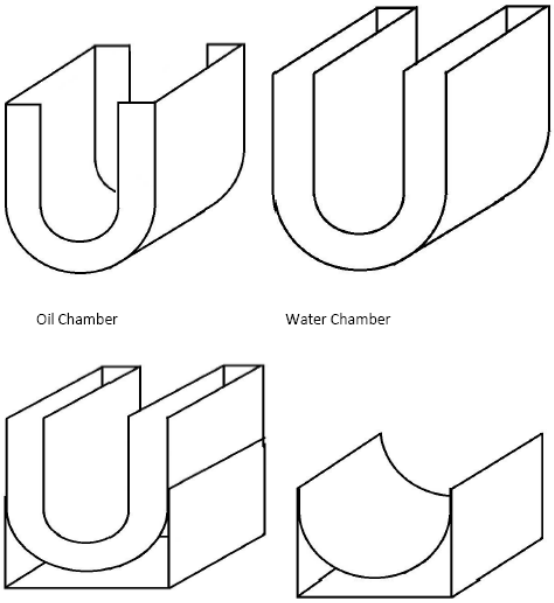


FIGURE 3

Innovative Features

According to Dr. Animesh Mohan, this modified innovative device Janu Avagaha has certain innovative features as given below :

- Designing an instrument to perform this new treatment procedure – Janu Avagaha (Therapeutic fomentation of full Knee joint and associated musculature using medicated oils).
- Through this treatment, increasing the surface area of contact of oil used for janu basti. (Fomentation of knee by oil pooling technique) to gain maximum therapeutic benefits in the patients of OA of Knee.
- Making the procedure easy and convenient for administration so that it can be performed even by non-skilled masseurs or for self-use by the patient.
- Facility within the instrument for continuous monitoring and maintaining the temperature within standard limit (41 ± 2°C) that too with avoiding repeated changing of oil.
- It minimizes the quantity of medicated oil required as much as possible.
- Cushioned thigh rest inclined at an angle such that when patient keeps the knee joint on it for the treatment, the knee joint will automatically come into "Position of Ease" or optimal position for whole duration of the therapy to further enhance the benefits.
- Adjustable upper slits for fitting easily on every patient with different size of thigh and leg comfortably.
- Performing the procedure without harming the comfort of the patient during the procedure.

- Material used for making the instrument is handy, not easily breakable i.e. stainless steel.
- This instrument and the procedure don't require use of electricity or any power source to operate, so that it can be performed even to the patients of remote or inaccessible areas.

Future Scope of the Innovation

According to Dr. Animesh Mohan, presently this innovation is highly useful in treatment of patients of Osteoarthritis of Knee, particularly Grade-I to Grade-III. Especially in the large percentage of sub threshold population that is Grade-I or borderline OA it can not only give symptomatic relief but can also check the further progression of disease. He tells that in future, it can be very easily used at Ayurveda treatment or Panchakarma centers all over India or any foreign country without any difficulty on regular basis. As it don't require any skills or training, it can also be used by the patients for self-use. As the instrument is very cost effective, it can be used for years together by putting different medicated oils, decoctions or even plain hot water as per the availability or requirement of the disease.

Dr. Animesh Mohan tells that the market size for this instrument is already very big with 28.7% prevalence rate of OA Knee in India. With increasing awareness towards avoiding excessive use of pain-killers and use of Ayurveda treatment for non-communicable diseases, demand is continuously going to increase in coming years.

Further, he says that this therapy is easy to use, scientifically proven effective by clinical trial and can be practiced on daily basis, it will be widely accepted by about 8 lakhs of Ayurveda doctors in India and abroad at their centers. Because it don't require any training or skill for practice, patients can also purchase it for self-use. Moreover, the light weight and hard stainless steel body make it convenient for transportation at low cost. Being the first and the only one supplying this product.

About the Innovator

Dr. Animesh Mohan, a student of DNHE Programme (195338755) of IGNOU is basically a practicing Ayurvedic Doctor. He has been finding innovative solutions to the various problems of his patients. For his innovation, he was awarded with the Best Student Innovation Award-2019 by the NCIDE, IGNOU. He can be contacted at email saxena.animeshmohan@gmail.com and Mobile 9457438200.

6

Eye Rotation Pendulum

An Innovative Device for Visual Improvement Exercises

Need of the Innovation

Mr. Kailash Kumar, a student of IGNOU is a Yoga Expert. He has been providing services to the people for eye vision improvement. For this, he was using the normal eye exercise techniques. But, he realized that if we do general eye movement, we can't move our eyes after a particular direction. So, he thought of an idea how to move our eves at 360^{o} to develop our peripheral vision and improve the eyesight.

He discussed this idea with one of his optometrist friends and then an innovative solution came up in the form of a dial chart on which he could fix the degrees. After that, he designed an innovative device by using a bearing wheel and two rods to move our eyes in a particular direction.

Brief Description of the Innovation

Mr. Kailash Kumar tells that the Eye Rotation Pendulum is a non-surgical and customized innovative device used for visual exercises and activities. According to Mr. Kailash Kumar it is a scientifically designed device to correct refractive errors like Myopia, Astigmatism, Cylindrical number etc. This equipment helps in reducing the refractive power of the prescribed glasses or contact lenses. The solution has been tested on around 150 people and shown substantial improvement, in the refractive errors these people had. He claims that the optometrist checked the refractive error and power before and after the program. A significant improvement was found in all the persons who attended the program.

This tool is to help the eye exercise at the scale of 360^{o}. He has to rotate eyes into a certain direction. It depends on the prescription.

Mr. Kailash Kumar highlights that it's a natural vision improvement program to help people to prevent and reduce eyesight problems at an early stage, without any surgery, Lasik or Laser. The solution involves physical exercise, eye movement. Because it's a natural program, so it doesn't have any side effect.

Mr. Kailash Kumar claims that people who are suffering from any eyesight problems are generally treated by opticians and ophthalmologists by prescribing spectacles, contact lenses, laser surgery, and other eye-related medications which are expensive for a country

like India where a large volume of the population is still living below the poverty line. The spectacles or contact lenses are not a permanent solution as there is no guarantee of the vision not worsening further. Usually, the corrective power keeps on increasing and the vision further deteriorated in spite of wearing spectacles and lenses. The contact lenses have their share of side effects like redness, allergies, infection, etc. Expensive surgeries like Lasik are also an extremely expensive solution that is also 200% higher than the living index and is not permanent.

Innovative Features

While telling about the innovative features of this device, Mr. Kailash Kumar tells that it is a manual equipment for exercise, which could be moved it in various directions. We use two stainless steel rods with a wheal which is attached with bearing and fixed into the wall. Further, he highlighted the innovative features as follows :

- It has two different colors of ball to trace the eye movement, so we can prescribe the movement according to problem statement.
- The Red ball movement is used for Minus and cylindrical number and yellow ball for plus number.

Highlighting the Applications of Eye Rotation Pendulum, Mr. Kailash Kumar tells that if we want to improve our minus or plus number then we have to trace our eyes in a particular direction that depends on the problem statement. Similarly, to improve cylindrical number, we have to trace our eyes from a particular degree. Suppose if someone is wearing two CYL number at 150^{o}. So, we have to trace our eves from 150^{o} to 0^{o}.

He informed that presently this equipment is being used at Preksha Eye Yoga centre at Adhyatm Sadhana kendra Chhatarpur. The solution is cheap and restores vision at an affordable cost on a permanent basis. It will be a boon to people from low socio-economic status and help people with a better personal, social and financial life.

Future Scope of the Innovation

In future, Mr. Kailash Kumar wants to use this equipment at various vision centers as a startup. The next steps to be taken to convert the idea into commercially deliverable solution are the complete digitization of the exercise process. He plans to go for the documentation of the Pre and Post Program vision status and Eye glass power/prescription Development of screening and a few exercises equipment. In future, he also want to digitize all the equipment so that it can be scaled and reach masses.

About the Innovator

Mr. Kailash Kumar is a PGCIATIVI Programme (198046399) student of IGNOU under the Regional Centre, Varanasi. He has set up his startup Preksha Eye Yoga Centre and he has been awarded with the Student Innovation Award-2019 by the NCIDE, IGNOU. He may be contacted at email kkailash4@gmail.com and Mobile 9717680775.

7

Repositioning the Facial Deformities

An Innovative Surgical Method to Operate Post-Traumatic Residual Deformities of a Zygomatico-maxillary-orbital Complex

Need of the Innovation

We know that the face is an identity of a person. Dr. Prem Kumar Rathod a student of IGNOU in PGDHHM Programme finds that facial bones fractures involving cheekbones (zygoma), upper jaw (maxilla), in and around the eyes (orbit) constitute the most common and most destructive form of facial injury. This area is called the zygomaticomaxillary-orbital complex (ZMC). Dr. Prem Kumar Rathod notices that such residual deformity patients may have downward and backward placed eyeballs, double vision, shrunken eyes, difficulty in mouth opening and chewing, depressed and deformed face, or even an eye injury. Living with these problems is nothing but a physical, psychological, and social handicap. ZMC is irregular and has thin fracture edges. Delay or improper surgical treatment causes changes in its fracture edges by bone formation or reabsorption. These bones can rotate and displace in infinite ways, and it is challenging to reposition and fix them in their pre-injury state.

Dr. Prem Kumar Rathod, observed that operating such facial fractures is complex and requires special machines like Computed intraoperative tomography or intraoperative navigation. The cost of such machinery is in crores of rupees. Even the best hospital in the country like CDER - AIIMS, New Delhi does not have this machinery.

Brief Description of the Innovation

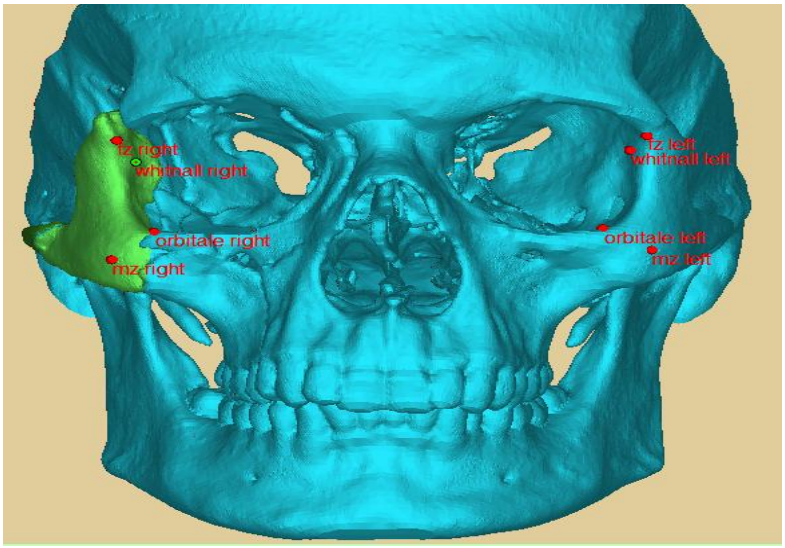
Considering the above problems, a novel zygoma analysis to quantify the deformity was developed by Dr. Prem Kumar Rathod and his colleagues at AIIMS, New Delhi and also a novel surgical method was used to reposition the zygomaticomaxillary-orbital complex. The effectiveness of the analysis and the surgical technique was studied at AIIMS. The study was started only after obtaining ethical clearance institutional ethical committee (IEC No. IECPG-540/20.12.2017, RT – 2/31.01.2018). According to Dr. Prem Kumar Rathod, for solving this problem, an Innovative Surgical Method to Operate Post-Traumatic Residual Deformities of a zygomatico- maxillary-orbital Complex in the Absence of Intraoperative Computer Tomography or Intraoperative Navigation was designed and developed by the innovators using Novel Zygoma Analysis and Virtual Surgical Planning.

Dr. Prem Kumar Rathod shared that the study was conducted on the patients with residual deformity of ZMC after their informed and written consent. The primary outcome variable was to evaluate the symmetry and stability of ZMC using our zygoma analysis on MIMICS software after zygomatic osteotomy and miniplate fixation by comparing the data obtained preoperatively, immediate postoperatively, and 6 months postoperatively. The secondary outcome variables were orbital volume changes (in cm^3, using MIMICS

software), correction of diplopia (number of gazes), increase in mouth opening (whether >/< 35 mm : yes/no), ocular motility (number of gazes), infraorbital paresthesia (using cotton wisp) preoperatively, immediate postoperatively and 6months postoperatively. Patient satisfaction was evaluated 6months postoperatively.

The measurements of landmarks were also performed for contralateral (uninjured side) preoperatively, immediate postoperatively, and 6months postoperatively for the baseline data.

Describing his innovative method further, Dr. Prem Kumar Rathod tells that the landmark measurement was done by using the measure and analyze tool in the MIMICS software. Measurements from reliable points to specific planes were done enhancing the reproducibility of data and thus reducing bias from a random measurement. Measurements were computer-generated after the selection of reliable landmarks. After digital presurgical planning, the standard zygomatic osteotomy procedure was performed. Further, he tells that surgical approaches used were coronal, periorbital, intraoral vestibular or preexisting scar if any. Fracture lines are usually apparent at the infraorbital to zygomaticomaxillary buttress region and it is opened up using a piezotome. If this is not the case, then the sequence of osteotomy is the frontozygomatic region, zygomatic arch, and infraorbital rim.



Innovative Features of the Innovation

According to Dr. Prem Kumar Rathod this new surgical method to reposition the facial deformities has several innovative features as given below :

- The lowest intra-operative CT costs range around 45-65 crores of rupees. This method is an alternative and can be performed without intra-operative CT scans. Thus, making this procedure cost-effective, radiation-free, universal and simple.
- The study results showed that the results are comparable to the uninjured side. Thus, demonstrating the effectiveness of the innovation.
- There was an improvement in mouth opening and orbital volume, thus improving functions of the mouth and eyes.
- The bony skeleton was symmetric to the uninjured side, and significant change was seen after surgery.
- There was no previous method to measure the three-dimensional position of deformed bones. Nor was there a method to accurately reposition the facial bones without computed tomography or intra-operative navigation.

- Previous studies using intra-operative CT have shown successful results in smaller deformity corrections. But the new method showed excellent results in patients, even those with larger deformities without intra-operative CT.
- Orthognathic analyses were marketed extensively for jaw corrections, but there is no similar analysis for ZMC correction.

Future Scope of the Innovation

While talking about the future scope of the innovation, Dr. Prem Kumar Rathod tells that in future, this innovative method can be used to plan and operate patients with injured face, depressed cheekbones, prominent cheekbones, patients with orbital dystopia, patients with a congenital deformity of cheek and eye bones, for knowing average facial values of a population, to operate bilateral residual deformity cases using average values, etc. He also thinks that in future, the users may include the Maxillofacial Surgeons, Plastic Surgeons, ENT Surgeons, Radiologists, Virtual Surgical Planning Software Developers.

About the Innovator

Dr. Prem Kumar Rathod is a Medical Doctor by profession working in AIIMS, Delhi. He is continuing his studies at IGNOU as a student of PGDHHM Programme (2102158570), registered through Regional Centre Hyderabad. For his innovation, he has been awarded with the Student Innovation Award by NCIDE, IGNOU in 2021. He can be contacted through email doctor.prem@yahoo.com and Mobile No. 8790796922/8555953234.

Multidirectional Rotatory Disinfector

An Innovative Device to Disinfect the Daily Use Items

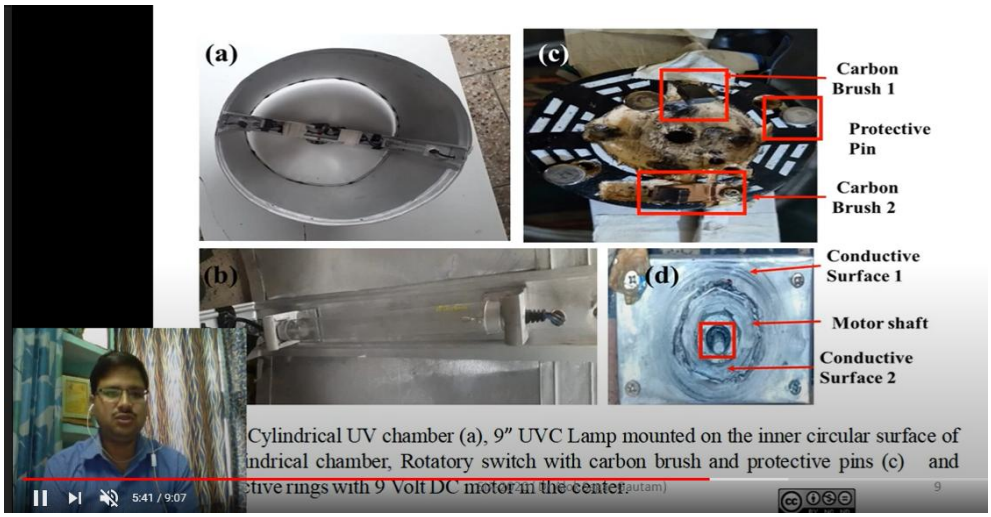
Need of the Innovation

We all know that the COVID-19 was the biggest problem in the 21th Century which crashed the economy and health around the world. According to Mr. Alok Sagar Gautam, a PGDSS student of IGNOU, the main reason to become COVID-19 as a global pandemic was because of multiple mode of transition of users and use of insanitized products specially food items, mobile phones, home delivery packets as well use of public transportation. During Covid-19 Pandemic, it was a great challenge to get sensitize without coming in contact.

He observed that a lot of chemical sanitizers were available in the market, but they may have serious health issues in the near future. Keeping this in view, Mr. Alog Sagar Gautam realized to develop an innovative solution which is not only chemical free, but disinfects the daily used products like vegetable, home delivered food, mobile phones, key, letters, etc. more effectively and safely. Thus, he developed an innovative device called as Multidirectional Rotatory Disinfector.

Brief Description of the Innovation

Mr. Alok Sagar Gautam says that the Multidirectional Rotator Disinfector is an innovative device used to disinfect the daily sue items including the food items without using chemicals sanitizes. The device is safe and essay for operation. Safety switch protects humans from harmful UVC radiation. It can be used in the two different modes for sanitizing the food and daily use goods. It is chemical free and no need to be refilled as in case of the usual chemical sanitizers.



Cylindrical UV chamber (a), 9″ UVC Lamp mounted on the inner circular surface of ndrical chamber, Rotatory switch with carbon brush and protective pins (c) and ctive rings with 9 Volt DC motor in the center.

While explaining the working of his device, Mr. Alog Sagar Gautam tells that initially, the target objects can be loaded in the sanitization trolley. Then push switch and trigger are activated by the closing of the door. This triggering helps to generate a pulse by IC55,

whose width depends upon the value of R&C. The both timer circuits for rotation of cylindrical chamber and operation of UVC lamps get on for a fixed time period. In this manner, the dose is controlled by controlling the period of the exposure of UV radiation by the timer circuit. The DC motors and UV Lamp are synchronized for simultaneous operation. After complete one cycle, the power in the lamp is driven to off, i.e. lamp and motor get turned off. Now, the object can be removed from the sanitization trolley, and now the device is ready for next use and triggers again.

Innovative Features

Highlighting the innovative features of his device, Mr. Alok Sagar Gautam explains that his device uses less number of UVC lamps and less power to disinfect all side/dimensions of any object with complex geometry.

Other innovative features of the multidirectional rotatroy disinfector are as follows :

- It is cost effective, easy to be controlled and simple for manufacturing. Users can control the device by using mobile phones and foot operations.
- Minimum 3 minutes are required to disinfect any object. It is quite useful for the medical professionals, homes, shops, malls and offices for sanitization.
- It is much safer than other available products in terms of safety and accuracy. The device can be customized as per users' requirements and size.

Future Scope of the Innovation

According to Mr. Alok Sagar Gauatm, this innovation has definitely proved helpful during COVID-19 pandemic as well post COVID-19 pandemic for improving air Quality of the room and heater in the winter (In the updated version). This innovation will also reduce the number of COVID-19 infections in the society. He says that it is easy for manufacturing and less resources were required for its production. Therefore, it can be used for mass scale manufacturing. Mr. Alok Sagar Gautam believes that if it is manufactured on mass scale, it will not only be cost-effective and easy to afford by all, but it will create job opportunities for the migrant workers. All economic groups can be covered by different variants so any person can afford it and safeguard their lives.

About the Innovator

Mr. Alok Sagar Gautam, a student of PGDSS Programme (202020395268S) of IGNOU at the Regional Centre Delhi, is a Researcher and Assistant Professor at University. For his innovation, he has been awarded with the Student Innovation Award-2021 by IGNOU. He can be contacted through email phyalok@gmail.com and Mobile 9997138763.

9

ORO-COV 19 : The Mysterious Cavity

An Innovative Process of Early Detection of Covid-19

Need of the Innovation

With the rising number of Covid 19 cases, Dr. Humeera Mulla, a Dentist by profession and IGNOU student of PGDHHM Programme thought of an early detection of Covid-19 symptoms which could help in early diagnosis and thus early treatment leading to control in the spread of the infection and a healthy nation. Based on some research findings, she found that the main path of COVID-19 transmission is through droplets (The Chinese Preventive Medicine Association, 2020) from the oral cavity. This is why dental professionals are widely exposed to be infected, but they could also be the first ones to identify SARS-CoV-2-positive patients. Dr. Humeera Mulla feels that since oral mucosa could be the first area infected with SARSCoV-2, it could be hypothesized that oral mucosa lesions could be the first COVID-19 signs to arise, if they were to be considered COVID-19 signs. Therefore, an early detection and prompt treatment leading to limiting of the disease by thoroughly examining for any oral mucosal lesions could be the important in this context. If studies confirm, this innovative process of identification of suspect SARS-CoV-2-positive patients could get tested and treated appropriately at the earliest.

Brief Description of the Innovation

"Oral health is the mirror to general health". Believing in this, Dr. Humeera Mulla found that few diseases show oral symptoms before systemic symptoms.

In a study, Peng et al. stated that Oral mucosa has been implicated as a potential route of entry for SARS-CoV-2. The SARS-CoV-2 cellular entry receptor ACE2 was found in various oral mucosal tissues, especially in the tongue and floor of the mouth (Xu, Zhong, et al. 2020). ACE2-positive cells were also detected in buccal and gingival epithelial cells. The presence of ACE2 receptors in oral tissues suggests that it is biologically plausible for the oral cavity to be the initial site of entry for SARS-CoV-2.

With this theory, Dr. Humeera Mulla began the social service for door to door examination of patients and found few to many oral inaugural symptoms. After she found these symptoms, she asked the patients to test them self for Covid Test RT PCR. She maintained a record of patients with these lesions and tested positive patients.

Further, she has examined the patients visually and with velscope which enhanced her error abilities, thus quick examination with faultless result could be given. A follow up of patients was taken so that the lesion could be monitored. With her urge to do social service, she has completed 952 patient's examination, maintained a record, done psychological counselling for disturbed patients thus, paving a path for healthy nation. This innovative method of early diagnosis of Covid-19 could help in early treatment and this helped to control in the spread of the injection.

Innovative Features

Talking about the innovative features of her new method of early diagnosis of Covid-19. Dr. Humeera Mulla highlights several salient features as given below :

1. As this process has a provision of door to door service, she could identify the lesions in asymptomatic patients, thus their early diagnosis.
2. In this technique, Dr. Humeera Mulla has done manual visual examination and also used velscope device. This device produces abnormal fluorescence patterns that aid the clinician in seeing unhealthy mucosal tissue that sometimes cannot be visualized with the naked eye.
3. Visual examination of the lesion created by Covid-19 virus in the early stages of the disease will benefit in early diagnosis, prompt action on boosting the immunity, limiting the damage created and early treatment, thus preventing the further spread of the disease.
4. This innovation in early stage, being flawless method of detection with use of velscope and manual method to rule out any abnormality along with a large sample size, makes it unique and different from others.

Future Scope of the Innovation

Covid-19 case detection and disease containment is the need of the hour. In that context, Dr. Humeera Mulla tells that this innovative approach may be used for an early diagnosis of Covid-19 and treatment for screened patients. In future this process may be extended for early diagnosis of other such diseases also.

About the Innovator

Dr. Humeera Mulla, is a student of PGDHMM Programme of IGNOU (183530853) registered through Regional Centre Nagpur. She is basically practicing Dentist and she has been finding new and innovative ways of diagnosis and treatment the present innovation is one of them. She has been awarded with the Student Innovation Award-2021 by the NCIDE, IGNOU for her innovation. She may be contacted at humeeramulla@gmail.com and Mobile 8080244895.

10

Pharmacy Assistant Robot

Technology Assisted AI Based Pharmacy Assistant

Need of the Innovation

Mr. Tarun Raj Kumar, a BCA student of IGNOU is basically a pharmacist. While working in pharmacy industry, he noticed that the Pharmacist (Hospital or Retail) face different types of problems while searching and delivering the medicines to the customers. These problems include large number of Patients and Prescriptions at a time to dispense, Fluctuating Inventory and New Brands and Locating Medicines in Racks, Cold Storage and Boxes, etc.

He observed that many a times, the workers in the pharmacy are not able to identify the correct boxes of medicines and focus in counting and handling of large inventory, Pharmacists have to do all work themselves including pulling of medicine (labour work), packing, Dispensing. Job Switch, Location and Pharmacy Adjusting is also challenging. Besides, most of the Pharmacies in India are running on outdated technology or no technology at all.

He feels that most of the pharmacies in India are not digitally upgraded over time and old racking system is being used which increases chances of dispensing errors. In view of the above mentioned problems, Mr. Tarun Raj Kumar thought of developing a technology assisted AI based system to assist the pharmacists. Accordingly, he developed a prototype, of Pharmacy Robot which can detect find open boxes and locate medicines. It works on voice commands and uses Machine Learning Algorithm based prediction of Medicines, inventory optimization, fast moving, forecasting dashboard and graphs making.

Brief Description of the Innovation

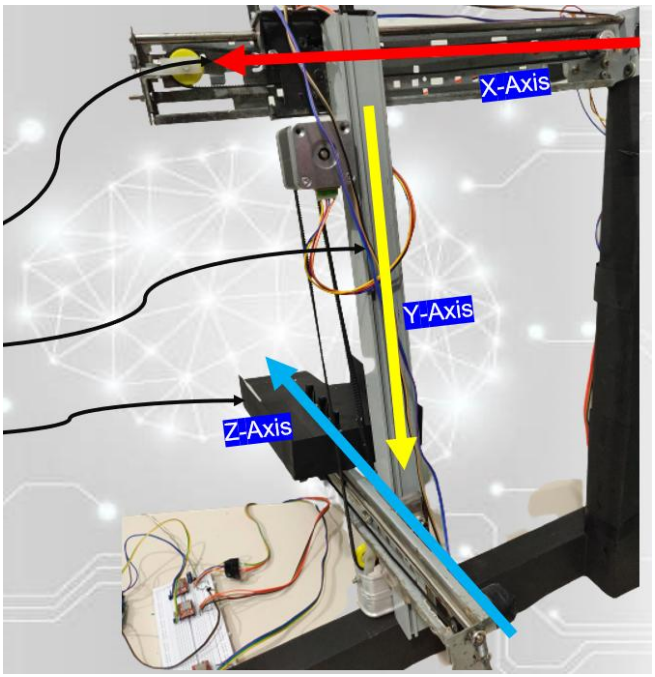
Keeping in view of the above-mentioned problems, Mr. Tarun Raj Kumar developed an automated robotic solution to assist the pharmacists. Pharmacy Rack Robot is basically a CNC and Stepper motor-based robot which works on 3-Axis and which can find, locate any medicine box as per requirements.

According to Mr. Tarun Raj Kumar, this innovation is supported by a Pharmacy Assistant Web App. This particular web app can be integrated to the billing system and make forecasting, data prediction use ML and Data Science. It proposes a 3D Layout of the pharmacy store where all racks and pharmacy design can be seen in 3d on system. It can find medicine location along with billing it shows in 3d virtual rack location of the medicine example :

RACK 3 -→ ROW -→2 -→ 5th Box

Mr. Tarun Raj Kumar claims that the pharmacy assistant robot can automatically, arrange medicine inventory in all the racks and provide label as per the data Sci and ML algorithms. It can also, connect to the Pharmacy Rack Robot and works live with pharmacists as they enter in system for medicines, robot locate and open boxes in which

those medicines are kept. This device connects to Mobile App for summarization, inventory control options. It has a dashboard for getting Fast Moving items and other details along with predictions of upcoming medical patients or medicines inventory optimum level using ML Algorithms.



Innovative Features

Mr. Tarun Ral Kumar tells that for the purpose of scalability, the system has a very innovative feature of Voice Assistant and Commands provision. Other innovative features of the pharmacy assistant robot include the following :

- The voice assistant is built to make the process more-handy so, it can just go to rack and command, “locate me Amlopress 5 mg” then the robot will move and open the box.
- It can automatically locate and open the medicine boxes.
- It works on 3-Axis CNC type Arduino Based System.
- Uses Stepper Motor and Driver are used to move the robot across the rack.
- It connects to Pharmacy Assistant App for full functionality.

Future Scope of the Innovation

According to Mr. Tarun Raj Kumar, the Global Pharmacy Automation is currently 6 billion USD 2022 and it is predicted to be 10 Billion USD by 2025. He believes that in view of the increasing demand, the pharmaceutical products, their dispensing, maintaining and inventory management requires new age tech for strengthening the healthcare system. Therefore, in future this innovative robotic system can be scaled up and installed in large pharmacy and hospitals.

About the Innovator

Mr. Tarun Raj Kumar is a BCA Programme (198749719) student of IGNOU. He is an accomplished Software Engineer in leading MNC. He has been awarded with the Best Innovation Award-2022 by the NCIDE, IGNOU. Presently, he is working Pharmacist in AMR Research Project at Government Hospital. He can be contacted at email tarunrajkumar7@gmail.com.

11

Asthma Alert

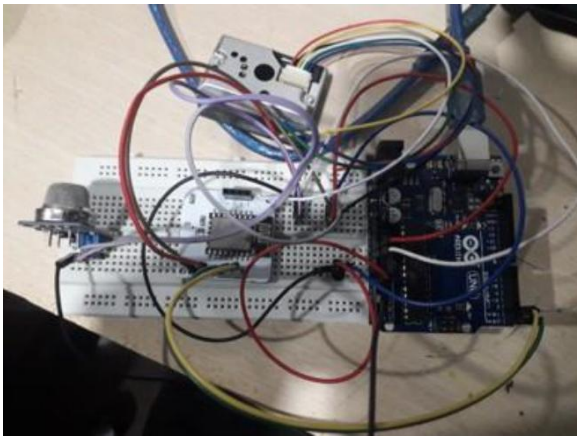
An IoT based Smart Asthma Alert System

Need of the Innovation

We know that asthma is a common long-term inflammatory disease of the airways of the lungs. Effects include episodes of wheezing, coughing, chest tightness, and shortness of breath. These episodes may occur a few times a day or a few times per week. Asthma can be classified as mild, moderate, and severe asthma. Mild asthma patients have symptoms more than twice a week but not daily. Daily activities slightly get affected. Moderate asthma patients have symptoms daily. The daily activities get 50% affected. The use of medications becomes regular use for the patient once to twice daily. Severe asthma patients have an occurrence many times a day. The daily activities are 80% affected. The controller's usages become more than twice daily. Generally, asthma becomes un-controlled if proper quick-relief medications are not taken when the environment triggers the patient. It is advised to visit Doctor immediately. It is a chronic disease of the airways that transport air to and from the lungs

Mr. Anoop Kumar Prasad a PDIPR student of IGNOU and an engineer by background noticed that there is no full cure available for asthma, but management methods can help a person with asthma lead a full and active life. Management of asthma before triggering of asthma can help in better treatment and long-term relief of this chronic disease. In order to address this problem, Mr. Anoop Kumar Prasad came up with an idea to design an IoT based Smart Asthma Alert System. Initially, the device is set up in a way that it can alert the patient to take quick-relief medication by sensing the configured trigger detectors and systemized in a prescribed way to alert about taking controllers. The critical threshold for environmental triggers asks the user to take medications before long exposure to that harmful environment which can result in Asthma episodes. These way-controlled measures can be taken for Asthma.

Brief Description of the Innovation



While describing the design and working of the innovative system, Mr. Anoop Kumar Prasad informed that the device uses the concept of the Internet of Things (IoT) for collecting the data. However, a mobile application is set up for the alert of taking quick-relief medications and notification alert for the reminder of controllers as prescribed. The other part uses the internet for communication of machine to machine i.e. the Module's model with any smart phone and configured mobile application to receive the push notification or email. This model has a

low-cost Wi-Fi microchip with full TCP/IP (Transmission Control Protocol/Internet Protocol) stack and microcontroller capability. Using, ESP2866 model or NodeMCU (A Lua-based firmware) or Raspberry Pi, we can connect GP2Y1010AU0F Optical Dust Sensor, 'NO' Gas Sensor and LM35 sensor. We interface Bolt IoT and Arduino. Using 'Bolt IoT module Arduino helper' library, analog signals are sent from Arduino to Bolt. Using cloud computing the data is processed online. The system uses ubuntu server and set the criteria.

Further, he elaborates that the Data Mining concept of Decision tree classifier helps in understanding the nature of the triggers and thus helps in setting up the threshold for the patient. Decision trees are important tools for developing classification or predictive analytics models related to analyzing big data or data science.

Innovative Features

Mr. Anoop Kumar Prasad highlights that most importantly, this innovative device signifies the alert to use quick-relief medications by sensing the environmental triggers for which it is configured to sense using sensors. Further, he enumerates the innovative features as given below :

- The device has the capability to alert the reminder of taking controllers as prescribed to treatment patterns and quality of life (QOL) by using questionnaires designed for patients and physicians.
- The word 'SMART' here denotes 'Single Maintenance and Reliever Therapy'. Controllers are long-term medications to prevent episodes of asthma, while quick-relief medications rapidly open the airways so you can breathe more comfortably once an episode has begun.
- The device also sends an email alert and pushes a notification to the user's account or device.
- Thus, the device is helpful to the asthma patients in managing their disease and performing their daily activities in time.

Future Scope of the Innovation

Talking about the future scope of his innovation, Mr. Anoop Kumar Prasad tells that using Nanotechnology, we can create specific designs for the product which will be tiny to get fit with wearable devices. He also visualizes a research work for supplying the energy to the device using solar panels or harvest power from the human body which relies on heat and motion, i.e. conversion of potential energy to electrical energy.

About the Innovator

Mr. Anoop Kumar Prasad is studying in the PGDIPR Programme of IGNOU (2102093587), registered through the Regional Centre Guwahati. By profession, he is an Engineer and a keen researcher to find innovative solutions to the problems of the individual, society and the country. For his innovation, he has been awarded with the Student Innovation Award by the NCIDE, IGNOU. He can contacted through email anoopkumar12816@gmail.com.

12

Contactless Disinfector

A Multi-Utility Contactless UV-Disinfecting System for Covid-19

Need of the Innovation

During Covid-19 period, Mr. Yugal Kishor, an IGNOU student of PGDRD Programme observed that the Corona virus can easily travel and transmitted through different surfaces. The virus and germs get easily stick on the surface of these belonging which could be a big cause of infections. He noticed that when personal gadgets like mobile phones, laptops, goggles, pen, wristwatches, wallets, wireless mouse, bag pack, power adapter, etc. get exposed to the such viruses. In fact, the virus can be easily spread through the official or personal belongings, tools, and gadgets, as they are more exposed to the external environment. Further, he observed that to prevent us from the infection of the viruses, normally a chemical spray free, dry, quick and easy way of disinfection is required to disinfect that medium. But it increases the chances of spreading the virus.

Brief Description of the Innovation

In view of the above, Mr. Yugal Kishor thought of a quick and easy way of disinfection which should be chemical free and dry. In this context, he found that the contactless Ultraviolet (UV) disinfecting system could be a novel automated solution for rapid and chemical-free disinfection for personal and office utility. Then he decided to develop an innovative disinfection process which should be completely contactless to ensure personal hygiene and thus reduces the chances of community spread of the virus. This Multi-Utility Contactless UV-Disinfecting System for Covid-19 is not only very cost effective, but it is quick as compared to the manual UV-disinfecting system. The total cost of one prototype is around Rs. 8000 only.

Stage of Product : Working Prototype

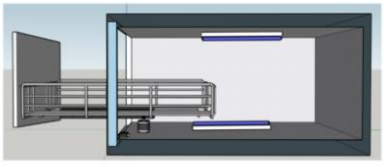


Fig.1 Proposed CAD Design

Fig.2 Proof of Concept (PoC)

Fig.3 First Prototype

The USP of proposed design is contactless mechanism, more effective area and cost effective with similar range of product. The simple control algorithm and overall control make it more suitable for real time application

Innovative Features of the Innovation

According to Mr. Yugal Kishor, in the present pandemic situation this contactless Ultraviolet (UV) disinfecting system is very innovative and useful. He says that it has several unique features, as given below :

- It is fully automated and contactless UV-disinfecting System, which enables uniform 360° spread of UV rays inside the chamber.
- It is a multi-utility and portable product which can be used anywhere like School, Colleges, Offices and Hospital, etc.
- It has a robust design and works on two mode of operation including sensor based operation (Developed) and IoT based control (Under development stage).
- It has Auto-Resume function which allows to resume the process in case of power failure, and also it has a safety switch which shut off power in case of accidental opening of door.
- It is very cost-effective and quick as compared to the manual UV-disinfecting system and can also be run through solar PV and battery in remote areas.
- In addition to above, the commercially available UV-disinfecting chambers and boxes are non-contactless and mostly are manual operated, which is not suitable for current scenario of COVID-19.

Future Scope of the Innovation

The prototype built is in desperate need of a technical solution for fast disinfection. Nonetheless, many improvements and enhancements are still conceivable in this prototype's future scope. Because the disinfection duration varies by article, UV-sensing-based disinfection can be incorporated to this system. Furthermore, if we wish to use this in distant regions where electricity access is problematic, the prototype may be powered by solar PV panels.

About the Innovator

Mr. Yugal Kishor is a student of IGNOU's PGDRD Programme (181350139) registered through Regional Centre Raipur. He has been awarded with the Student Innovation Award by NCIDE, IGNOU. He can be contacted through email yugalsahu87@gmail.com and Mobile No. 8103095114.

13

Manually Operated Briquetting Machine

An Innovative Mechanism to Convert Waste into Worth

Need of the Innovation

Mr. Ajay Kumar Choubey, a student of ACPSD (Appreciation Course on Population and Sustainable Development) at IGNOU and an engineer by profession observed that parali or stubble burning in agriculture field is one of the biggest problems. Besides, the disposal and management of the household waste and bio-waste is also a great challenge for the society. Further, he tells that according to reports, every day 650 tonnes of waste (solid waste/papers/biomass/medical waste, etc.) is collected from Bhopal (Madhya Pradesh), and this will be dangerous for health and environment if burned in the field. And lastly, we know that Parali or stubble burning in agricultural field is the biggest problem, because burning of stubble (or biomass/waste) produces smoke, which is dangerous for human life. Therefore, an innovation is needed which could overcome these problems. He thinks that this waste needs proper management and hence some new techniques are required for conversion (or disposal) of the waste into worth.

Also, he finds that various power plants and industries depend upon fossil fuels such as coal and natural gases. But, the amount of fossil fuel is continuously decreasing. In this context, Mr. Ajay Kumar Choubey thought of an idea that if such type of waste is converted into coal (or fuel) by new techniques than it would not only be useful for power plants, but it will solve a great problem of waste management in our society. For this purpose, he thought of developing a manually operated briquetting machine. By this machine waste like stubble, sawdust, paper, biomass, can be converted into briquettes which can be used as fuel. The machine is low cost, manually operated, and easy to assemble. Briquettes which produced can be used in restaurant, boiler-based industries, or various commercial purposes.

Brief Description of the Innovation

Mr. Ajay Kumar Choubey believes that the biomass is basically an organic matter which can be used as an energy source. The term “biomass” encompasses a large variety of materials, including wood from various sources, agricultural residues, and animal and human waste. Biomass is biological material derived from living, or recently living organisms, such as wood, waste, hydrogen gas, and alcohol fuels. Biomass gets its energy through photosynthesis. With sunlight, water and oxygen plants make carbohydrates, which is good source of energy. Biomass is renewable source of energy because we can grow more plants in a short time. It is used for facility heating, electric power generation, and combined heat and power.

Keeping in view of the above mentioned facts, Mr. Ajay Kumar Choubey designed and developed a manually operated briquetting machine. By this innovative machine, waste like stubble, sawdust, paper, biomass, can be converted into briquettes (fuel). He highlights that in the process, first 70% biomass and 30% paper with some amount of water is mixed properly. After mixing and converting aggregate material into small pieces, these pieces are pressed via hydraulic jack and thus densified the material, produce briquettes (coal) are produced.

Innovative Features

Highlighting the innovative features of his innovative product, Mr. Ajay Kumar Choubey says that this is an original idea to produce briquettes from the waste by using manual pressure. Further, he highlights its innovative features as given below :

- There is no need of springs, screws and pulley, etc. for operating the machine.
- Four cylinders and plunger arrangement are introduced for making 1 kg of briquettes at one press.
- This machine has a low cost and is an easy to assemble machine.
- It can be used anywhere, as there is no need electricity for operating the machine.
- This innovation is not only profitable, but it can be developed at domestic as well as institutional level.
- This innovation solves a problem related to environment and also this innovation helps in improving people's lives. This uniqueness helps the farmers and unemployed/common people to earn money.
- This is a sustaining innovation, and it is a manually operated biomass-based briquetting machine, which involves design thinking and proper roadmap.

Future Scope of the Innovation

According to MR. Ajay Kumar Choubey, presently the briquettes produced from present machine (innovation) can be used in restaurant, boiler based industries, or various commercial purposes. In future it can be converted into automatic system by belt and pulley attachments. Also, the same machine can be made movable via wheel arrangement. He believes that in future this innovation will create new jobs in market, if it is converted into a startup business. Accordingly, it may contribute in economic growth of country also. Also, it may be useful for academic sessions, and training for students, entrepreneurs, farmers. In future, if its production is commercialized, it can help the people to make briquettes from the waste at their workplaces, in societies, factories, and fields, etc. which can be profitable venture for all.

About the Innovator

Mr. Ajay Kumar Choubey is ACPSD Programme (2252492020) student of IGNOU. He has been awarded with the Best Innovation Award-2022 by the NCIDE, IGNOU. He can be contacted at email a1ja1y@yahoo.co.in.

14

Portable Biogas Bottling System

An Innovative System for Storage of the Surplus Biogas

Need of the Innovation

Mr. Ajay Kumar Sharma, a BSc. student of IGNOU belongs to a village in Varanasi area. He observed that with the help of Government, many people have set up biogas plants and the biogas is having produced continuously. But the whole amount of the biogas is not being consumed. In that case, as there is no provision for storage of the surplus gas, it was going waste. In view of this problem, he felt store the excess biogas in some way and use it to later at any other place. Thus, an idea came to the mind of Mr. Ajay Kumar Sharma to store the biogas in cylinder. But the main problem was how to fill the gas in the cylinders. Thus, the idea of Portable Biogas Bottling System fame to his mind.

Brief Description of the Innovation

According to Mr. Ajay Kumar Sharma, this innovative bottling machine is a portable, energy efficient and cost effective biogas bottling compressor. It compresses the biogas in a biogas tank from 0 to 200 psi. It can operate on electricity, solar energy and can also work with manual effort. Further, he tells that with this compressor, the bottling of the biogas can be done directly from the biogas plant/digester (after purification) and hence preventing the need to store large volume of biogas for creating high pressure for bottling biogas from a large tank.

Mr. Ajay Kumar Sharma feels that the use of biogas is limited to domestic cooking in the kitchens near the plant. Due to lacs of adequate affordable technologies for bottling, the gas is not finding the scope in using locations, far away the biogas plant. Mr. Ajay Kumar Sharma highlights that the product is portable compressor machine, which compresses the biogas up to 200 psi and enable to store in a conventional gas cylinder. Prior to compression, the biogas is fitted and scrubbed through water and lime. It removes impurities and CO_2 from the gas.

Mr. Ajay Kumar Sharma claims that this product is very cost effective for users. This is very cost effective for formers. Comparatively than large plants, manufacturing costing is approx Rs. 35,000 to Rs. 45,000. And market value is approx Rs. 1,50,000.00 to Rs. 200000.00 and at present other company market price is above 8 lacs rupees. So this product is very cost effective in terms of money as well as energy.

Innovative Features

Talking about the innovative features of the machine, Mr. Ajay Kumar Sharma tells that the product is innovative, portable and cost effective biogas compressor machine used for storing the biogas in the cylinders. The other innovative features include the following :

- The unit consists of motor (1.5 HP, 1400 rpm) which runs a 3 hp compressor. As an option to operate the unit by solar energy, product has DC motor (12-24 V, 1000 w, 3000 rpm). The motor gives drive to compressor through two gears and pulley belt system.

- It has fly wheel which makes the operation so easy that can easily be operated by manually.

Future Scope of the Innovation

Mr. Ajay Kumar Sharma feels that in view of the ever increasing demand of energy, it is necessary to go to the non-conventional sources of energy like biogas. For that purpose more and more biogas plans should be encouraged and the excess amount of biogas should be stored and transported to other areas. In that case, more number of low cost portable bottling machines need to be produced. In future, it can easily lead towards a startup producing, maintaining and servicing the biogas bottling machines.

About the Innovator

Mr. Ajay Kumar Sharma, is a BSc. student of IGNOU (159852512) registered through Regional Centre, Varanasi. He is a grassroots entrepreneur student. He has designed and developed several innovations useful for the Society. For his innovations, he has been recognized by the President of India and he has been awarded with the Student Innovation Award-2018 by NCIDE, IGNOU. He can be contacted through email me_sharmaajay@rediffmail.com and Mobile 7084553937.

15

Drive Alert

An Innovative Device for Sleep Detection while Driving

Need of the Innovation

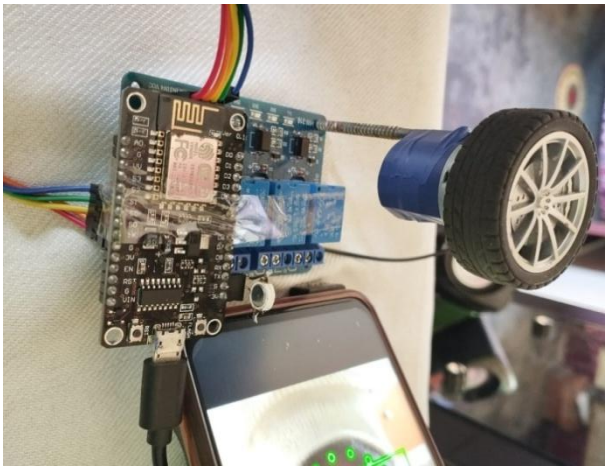
Mr. Abhijeet Kumar, a BCA student of IGNOU observed that many a times due to continuous driving for long drivers get fatigue and get asleep while driving. He finds that this has been considered as one of the most common issues for a huge number of accidents basically due to tiredness, stress and unfavorable climate and road situations. Drowsiness related accidents have all the consequences of being more serious accidents, because of the higher speed involved distraction and the driver being not able to do anything in order to avoid this activity, or even try brakes before the accident takes place. When drivers fall asleep then the driver basically loses his control over the vehicle.

In view of the above-mentioned problem, Mr. Abhijeet thought of developing a sleep detection device for car and other vehicle drivers with an innovative system to alert the driver on the condition of drowsiness while driving.

Accordingly, Mr. Abhijeet Kumar developed a prototype of an innovative Sleep Detection while driving system which can be installed in vehicles, and will continuously monitor the yawning and eye movement of the drivers. As soon as the system detects yawn or sleepy eyes/eye movement then an alarm starts ringing, the system can also control what action is to be taken to slow down or stop the vehicle.

Brief Description of the Innovation

While describing the design and working of the innovative system developed by him, Mr. Abhijeet Kumar tells that in this innovation a USB or Phone Camera monitors the driver's eye blinking, eye closure, and sync signal to NodeMCU. These monitored characteristics helps to measure driver's fatigue and instantly alert the driver via buzzer and sends a notification to the owner of vehicle who can contact him and make him conscious to avoid accident. An implementation of Sleeping detection Device in a vehicle which is the primary objective of this project which can prevent road accidents from happening.



Innovative Features

According to Mr. Abhijeet Kumar, the Sleep Detection while driving system has several innovative features as given below :

- This innovative device is very cheap and easy to install at any vehicle.
- It immediately detects if the driver is sleeping or yawning while driving. Thereafter, it sends signal through relay module to stop or slow down vehicle engine.
- At the same time, it sends a notification to the owner of vehicle and other authorized persons.
- An audio or Visual LED Alarm can also be configured for Alert immediately after finding the driver sleeping or yawning while driving.
- In addition to it, the device can be installed in Hospitals also to monitor facial moment of a 'coma patient'.
- The data can be stored in Excel or CSV format with Timestamp which can be analyzed later.
- It also has a provision wirelessly managing all settings, report and signals, etc.

The device can be commuted with the Smart Watch also which allows for more convenient and seamless monitoring of a devices sleep pattern while driving.

Future Scope of the Innovation

Mr. Abhijeet believes that if this device is installed in all vehicles, we can prevent road accidents up to great extent, which occurs due to drowsiness of drivers. Also, he thinks that the innovation can be used as 'Health Care and Biomedical Device' in hospitals. As this device can detect even a small movement of eyes, so Mr. Abhijeet visualizes its immense use for the comma's patients for detecting and recording their movements which can be recorded in database with time stamp and analyzed later.

With these benefits, he thinks that there will be a huge demand in future. Accordingly, many things can be updated in future like Integration of this device with inbuilt Android system of car, or Audio warning Alarm through music system of car, etc.

About the Innovator

Mr. Abhijeet Kumar is a BCA Programme (2003004600) student of IGNOU. He has been awarded with the Best Innovation Award-2022 by NCIDE, IGNOU for his innovation. Presently working as a Programmer Analyst at 366 Pi. He enjoys using his technical skills to detect and solve real world problems. He can be contacted at email aryan.abhijeet21@gmail.com.

16

Smart Traffic Management System

Density Based Automatic Traffic Management and Monitoring System

Need of the Innovation

Dr. Navneet Kumar Agrawal, an IGNOU student of MP Programme thinks that the traffic congestion is a severe problem in many modern cities around the world. Congestion has been causing many critical and challenging problems and challenges in most of the populated cities including Udaipur in Rajasthan. To travel to different places within the city has become very difficult for the travelers and tourists coming from all over the world in this city of lakes. Due to these congestion problems, people waste time, miss opportunities and get frustrated. It directly affects their performances too thus falling company productivity, delayed goods delivery and hence increasing the transportation cost. In order to solve this problem, Dr. Navneet Kumar Agrawal thought of a Smart Traffic Management System which will prove boon for the smart city like Udaipur without changing the existing road network and associated infrastructure. He thinks that this innovation will give direction to those cities and countries also who are willing to get rid of traffic congestion problem and working to manage their existing transportation systems to improve mobility, safety and traffic flows in order to reduce the demands of vehicle use. The system tries to reduce possibilities of traffic jams, caused by traffic lights, to an extent.

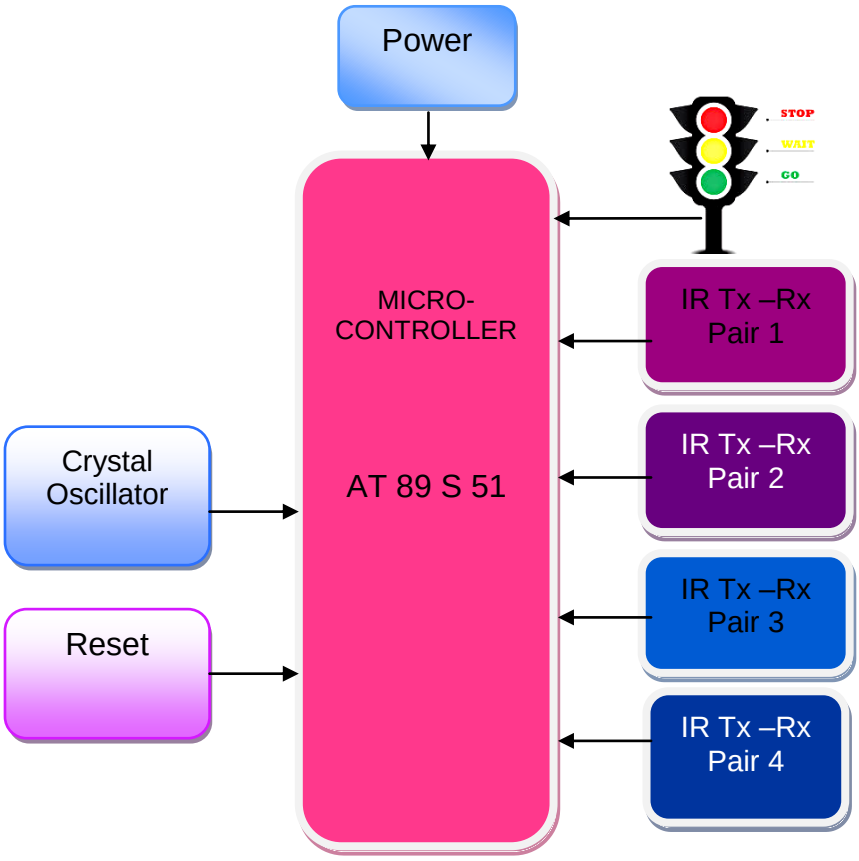
Brief Description of the Innovation

Dr. Navneet Kumar Agrawal tells that the system developed is based on microcontroller AT 89C51 which is MCS-51 family based. The system contains IR (Infra-Red) transmitter and IR receiver which are mounted on either side of roads respectively. The IR system gets activated whenever any vehicle passes on road between IR transmitter and IR receiver. IR light is invisible to human being and has wave length of 950 nm which is below the visible spectrum. Microcontroller controls the IR system and monitors the number of vehicles passing on road. He highlights that based on different vehicles count, the microcontroller takes decision and updates the traffic light delays as a result. The traffic lights are situated at a certain distance from the IR system.

Thus, he tells that based on vehicle count, microcontroller defines different ranges for traffic light delays and updates them accordingly. The innovation is developed to meet the requirements of solid state traffic light by controller as the main controlling element and adopting.

Explaining further, Dr. Navneet Kumar Agrawal tells that LEDs (Light Emitting Diodes) are used as indicators. The microcontroller is interfaced to LEDs and provides the centralized control of the traffic signals. The microcontroller is controlled in such a way as to adjust the timing and phasing of the traffic conditions. The circuit besides reliable and compact is also cost effective.

While talking about working of the innovative product, he tells that for prototype testing of the system model, the distance between the transmitter and receiver is kept equivalent to the road width. The system is placed near road as a standalone device. Whenever any obstacle like vehicle passes between IR transmitter and IR receiver (sensor), microcontroller detects and increases the number of vehicle count in a recording interval for particular traffic light. Traffic light is placed ahead of IR sensor at a distance so that decision taken by the microcontroller to control light can help in reducing the congestion at traffic light. The vehicle count microcontroller decides the traffic light delays for next recording interval. Traffic light delays are predefined by varying the vehicle count. This mode depends on the previous vehicle count calculated in predefined recording interval. On the basis of traffic data load, the timings are updated by microcontroller command. Administrator can also send command microcontroller to erase the previously recorded data after analysis.



Talking about the main applications of innovation, Dr. Navneet Kumar Agrawal tells that this Smart Traffic Management System will not only relieve common mass from traffic congestion, but the decisions based on the system developed will save money, energy and control road accidents. He tells that the model can be implemented on any existing traffic management system. Also, the model is neither space consuming nor environment polluting, hence eco and nature friendly.

Dr. Navneet Kumar Agrawal informed that the proto type model of the innovation has been implemented in research lab conditions. The traffic was artificially created by forced movement of human being and the observation was made for validating the results.

He says that the project is very cost effective and economic in the sense that it does not involve costly equipments. The electronic components chosen are very cheap and easily

available with long life. The developed system can get interface with the existing road traffic network system.

Innovative Features

According to Dr. Navneet Kumar Agrawal, this Smart Traffic Management System has certain innovative features as given below :

- The idea is unique in the sense that it is based on microcontroller and embedded system, which is completely automatic and more precise in practice.
- It supports the existing infrastructure without calling for development of new road network thus saving huge revenue of the government.
- The automatic traffic density control system gives respite to common mass and the business community as well, thus enhancing their comfort in life.
- The administrator sitting at central place on computer can command system to download the recorded data, update the light delays, erase the memory, etc. Thus controlling and accessing the traffic conditions in the nearby roads, thereby reducing the traffic congestion to an extent.
- The system has features of displaying the traffic position on different roads and suggesting the most optimum route available with minimum traffic, to be available on users mobile phone through GPS or cloud.

Future Scope of the Innovation

Dr. Navneet Kumar Agrawal thinks that his innovation can be scaled up in future and can be implemented very easily. In order to commercialize the system, he plans to first bring the project out of the research lab. It is to be tested on practical grounds in the site where real time traffic is confronted. The system model is to be tested under different traffic conditions. If the results are reproducible, then only, the product can be recommended for commercialization. As Udaipur has been declared as one of the smart city of India, UIT and other agencies will contribute in making our project more users friendly and implement on road side. As the innovation is novel and indispensible, affecting everybody's life, it has got very good scope of commercialization.

About the Innovators

Dr. Navneet Kumar Agrawal, is an Alumni of IGNOU studied MP Programme (970459628) through the Regional Centre, Jaipur. He is very keen observer of the societal problems and tries to find innovative solutions. Presently, he is working as Associate Professor and Head Department of Electronics and Communication Engineering College of Technology and Engineering, MPUAT, Udaipur. He can be contacted at email navneetctae@gmail.com and Mobile 9828276279.

17

Innovative Fuel Tank

Especially Designed Fuel Tank with Mileage Calculator for Two Wheeler

Need of the Innovation

Mr. Ajay Raman Walekar, BSc. Student of IGNOU finds India has a huge market for automobiles and it has the largest number of two wheelers in the world. An average two wheeler has a fuel tank of 9-12 liters and has a reserve tank of 1-1.5 liters which varies on make and models of different bikes available in the market. He observed that if a two wheeler switches to reserve fuel supply due to low fuel in the fuel tank, it can run for about 50-70 kilometers before the two wheeler gets completely dried. There is no indicator for urgent or minimum fuel indication in the fuel tank, hence, Mr. Ajay Raman Walekar felt that there is a necessity to have a emergency storage tank with indicator of fuel in the two wheelers after the main tank completely dried and also for emergency source of fuel.

According to Mr. Ajay Raman Walekar, it is very difficult to trace the exact amount of fuel in the normal reserve tank; moreover it is also difficult to check the exact mileage of the two wheelers with the help of current reserve fuel tank. In such a situation a normal two wheeler may undergo the problem of drying completely due to this inaccuracy to trace the exact amount of fuel in this reserve tank; especially in remote areas where there are no fuel stations nearby, and if the two wheeler dries completely, two wheeler drivers have to tow the two wheeler manually for a long distance before reaching the nearby fuel pump, leading to a huge loss of time as well as leads to physical stress; this is major head-ache for a normal middle class person in India who owns a two wheeler. In view of this problem, Mr. Ajay Raman Walekar to invent new fuel reserve supply technique.

Considering the potential to develop an alternate system, Mr. Ajay Raman Walekar came with an innovative idea for a modification in the existing fuel reserve tank. Accordingly, an entirely new emergency reserve tank system of 100-200 ml was tried out by him which can be also used as an effective system to calculate the exact mileage of two wheeler and may also provide an indication for the driver to fill fuel in his two wheeler at the nearest fuel station within a range of approximately 5 kilometers of running.

Brief Description of the Innovation

Describing the design and working of the innovation, Mr. Ajay Raman Walekar tells that in this design there is provision for a small fuel reserve tank with the normal fuel tank for storing the fuel.

As per the new design the fuel is supplied from the main fuel supply tank to the emergency fuel reserve tank through a Y Connector which results in filling of the emergency fuel reserve tank; a secondary knob is used to control the fuel supply from the emergency reserve fuel tank to carburetor which helps to measure the mileage of the two wheeler; an emergency supply line or emergency fuel tank supply line consisting of

tubing and this tubing connects the emergency fuel reserve tank with the main knob region under normal conditions, fuel will be supplied trough the main fuel supply line and normal fuel reserve line; however in case the reserve tank of the two wheeler also dries completely, the operation of emergency fuel tank will come into operation with the help of the secondary knob by adjusting the position of the secondary knob, and the fuel will be supplied from this emergency fuel reserve tank for next 5 kilometers until the two wheeler gets completely dried.

In accordance with another embodiment of this innovation, Mr. Ajay Raman Walekar tells that the working of the system is based on the principle of flow of fuel from the main fuel tank to the emergency reserve tank through the secondary knob due to the action of gravity and the once the emergency fuel reserve tank gets filled up completely by adjusting this secondary knob, the fuel supply to the engine is through the normal fuel tank and the operation of the emergency fuel tank comes into picture only when there is no fuel in the normal reserve tank and hence this helps the two wheeler to run for next 5 kilometers before it dries up completely.

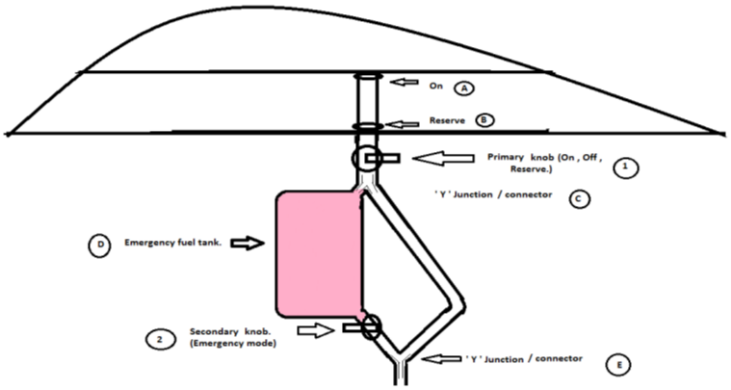


Figure 1 : Emergency Fuel Reserve for Two-wheelers

As shown in the Figure 1, the main components of the proposed system are emergency fuel reserve tank, normal reserve tank, supply from normal reserve tank, main fuel tank of two wheeler, a primary knob which regulates the type of fuel supply, i.e. direct fuel supply, reserve fuel supply; a Y connector connecting Primary Knob, emergency fuel tank and direct tubing line to carburetor, a secondary knob which regulates the supply from the emergency reserve fuel tank to carburetor; a direct supply line which connects the main fuel tank with the primary knob region; an emergency supply line or emergency fuel tank supply line consisting of tubing and this tubing connects the emergency fuel reserve tank from secondary knob region to carburetor.

Figure 2 shows the design of the Emergency Fuel Tank with In and Out System of Fuel.

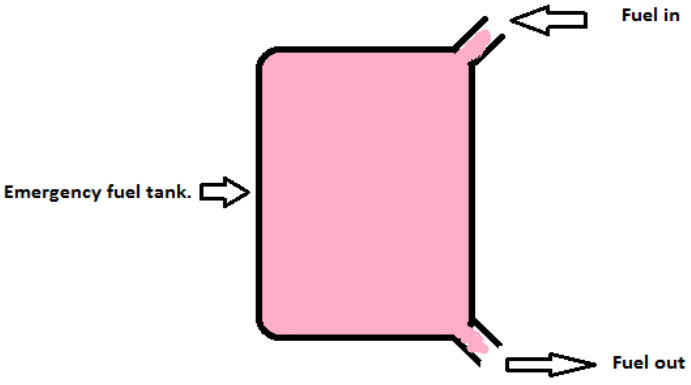


Figure 2 : Emergency Fuel Tank In and Out of Fuel

Innovative Features

While talking about the features of his innovation, Mr. Ajay Raman Walekar highlights the need of an emergency fuel reserve supply system in the two wheelers. Further, he informed certain innovative features, as given below :

- It can trace the exact amount of fuel remaining in the two wheelers.
- No complicated moving parts required in the system. The system requires very less space.
- Yet another innovative feature is to indicate the driver to fill fuel in the two wheeler at the nearest fuel station which lies within a range of approximately 5 kilometers of running.
- It can calculate the exact mileage of two wheeler by providing a Primary knob and secondary knob to regulate the exact amount (i.e. 100-200 ml) of fuel to the emergency fuel reserve supply.
- The main knob may be adjusted according to the type of fuel supply i.e. direct fuel supply from the main fuel tank, reserve fuel supply from the main fuel tank.
- Suitable diameter piping are used which serve the purpose of connecting lines between the various fuel tanks as well the knob.
- The emergency fuel reserve tank occupies very less space in the fuel supply system and can mounted anywhere below the main fuel tank system, so that the fuel from the main fuel tank flows to the emergency reserve fuel tank
- Highlight the advantage of this innovation, Mr. Ajay Raman Walekar tells that it can prevent the two wheeler drivers to tow the two wheeler manually for a long distance before reaching the nearby fuel pump, especially in remote areas where there are no fuel stations nearby, and hence preventing loss of time as well as prevent the physical stress.

Future Scope of the Innovation

According to Mr. Ajay Raman Walekar this innovative emergency reserve fuel tanks helps to calculate mileage. If the mileage goes down from the regular mileage then it means there is something wrong in the system. The fault can be rectified immediately preventing loss of mileage, economical loss and reduction in pollution since mileage goes down because of increase in combustion. However, in future there is scope for automation in the process of connection of emergency fuel tank. In future, it can be designed at the time of manufacturing of the main fuel tank.

About the Innovator

Mr. Ajay Raman Walekar is a BSc Programme (165669639) student of IGNOU registered through Regional Centre, Pune. He is a creative and innovative thinker. He can be contacted at email ajayrw6765@gmail.com and Mobile 9545516765.

18

New Bulletproof Material

An Innovative Bulletproof Material of High Efficiency

Need of the Innovation

Mr. Milindshekhar Chandrashekhar Gupta, IGNOU student of MAPCD Programme observed that presently the most popular bulletproof material used for different purposes is 'Kevlar'. He found that this material does not stop the impact forcefully. Moreover, it has got expiry date too, therefore, it cannot be used after a specific time duration. He feels that protecting the human life particularly our armed forces is always a challenge and therefore there is a need for developing a more effective bulletproof material of high efficiency and low cost.

Brief Description of the Innovation

Keeping the above mentioned problem in mind, Mr. Milindshekhar Chandrashekhar Gupta has invented a new bulletproof material which not only absorbs the impact, but it is also durable and long lasting (with no expiry date). He has used Impact Distribution System to counter the velocity, momentum and penetration aspect of the bullet. This new bulletproof material is designed to stop the 'Steel Core Bullets' which can penetrate the conventional bulletproof Jackets which is made up of Kevlar or Boron Carbide. Importantly, this new Bulletproof Material has passed all the Non Prohibited bullet tests. According to Mr. Milindshekhar Chandrashekhar Gupta the DRDO (Defense Research and Development Organization) has agreed to test it with Non Prohibited bullets (used by armed forces). He says that this Bulletproof Material is designed with the standards at par with NIJ Level IV (international grade accepted for Bulletproof Jackets used for Military Services).

Innovative Features of the Innovation

While highlighting the innovative features of this new bulletproof material, he says that it not only absorbs the impact, but it is also durable and long lasting with no expiry date. Further, he highlights its innovative features as given below :

- 'Kevlar and Boron Carbide' are two popular materials used for making bulletproof material. But the new bulletproof material does not use either of

these two materials. It is a unique new composite material used for the first time for making bulletproof material.

- The shock absorption and impact distribution technique used in my invention absorbs all the impact of the bullet thereby causing minimum damage to the person using it. It stops the Steel Core Bullet which even Modern Bulletproof Jackets do not stop.
- The process of manufacturing for this Bulletproof Material is simple and does not involve very high investment. The manufacturing cost of this material is 1/10 compared to conventional Bulletproof Jackets procured by armed forces.
- The overall weight of the conventional Bulletproof Jacket is 18 kg, whereas the Jacked made with this Bulletproof Material weighs 3.5 kg only.
- Conventional Bulletproof Materials like Kevlar have expiry date, whereas innovative material has no expiry date, it is for lifetime.

Future Scope of the Innovation

According to Mr. Milindshekhar Chandrashekhar Gupta, this is untapped market of low cost Bulletproof Jackets with the limited supplier in the defense sector. He says that as the prototype has already passed the testing for non prohibited Bore and also DRDO has approved to test the prototype for testing the bulletproof material for the NIJ Level 4 standards (International standard for Military grade bulletproof material), it has immense potential to be used in the defense system. As the utilization of bulletproof material is not common amongst general public, this innovative material will be exclusively used for the armed forces and security personnel.

About the Innovator

Mr. Milindshekhar Chandrashekhar Gupta, a student of MAPCD Programme, Enrolment Number 186786833, at the Regional Centre Nagpur is basically a Mechanical Engineer. He has been doing innovations right from his school days. For his innovation he has been selected for Student Innovation Award-2021 by the NCIDE, IGNOU. He can be contacted through email at milind.nagpur@gmail.com and Mobile 9372032644.

19

KEYA-AI

An AI Powered Offline Home Automation System

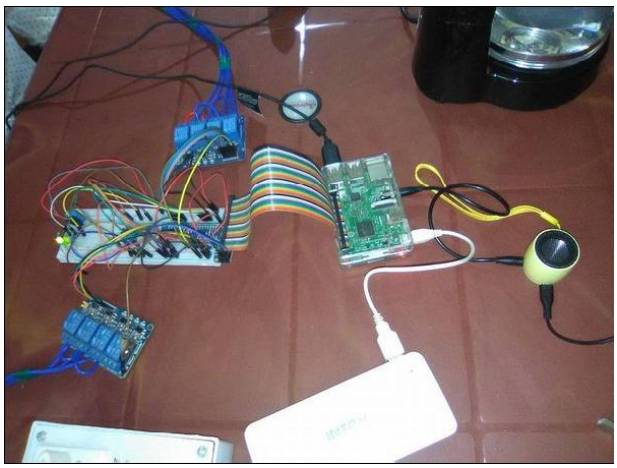
Need of the Innovation

We know that with the increasing use of technology, there are many internet based home automation systems available in the market. For their working internet, WiFi or Bluetooth connectivity is required. Mr. Kunal Ambasta, MCA student of IGNOU noticed that this kind of internet or Bluetooth connectivity based home automation system can easily be compromised and can put users data and privacy in great danger.

Keeping in view of the above mentioned problem, Mr. Kunal Ambasta thought of an innovative AI based have automation solution which works totally offline and hence respects and protects user privacy and secrecy. Thus, he designed and developed KEYA-AI an AI Powered Totally OFFLINE Complete Home Automation System which has entirely different goal in mind. It has been designed to be simple and easy to use anywhere without requiring internet. To protect privacy of the user and to safeguard your data, it performs all the processing onboard and does not even store your data or history unless it is instructed to do so. KEYA-AI has also been developed in order to get easily integrated into any house hold circuit and to be able to get connected to all available electric and electronic devices though general hardware interface. It has also been designed to provide hands free easy access using speech recognition system and for better security and advance features, Facial Recognition has been added. It does not require any WiFi or Bluetooth connectivity to work as such connections can easily be compromised and can put users data and privacy in danger.

Brief Description of the Innovation

While describing the design and working of his innovation, Mr. Kunal Ambasta tells that KEYA-AI works on the top of Raspberry Pi 3 Model B and Raspbian OS (A LINUX DEBIAN derivative). It has been designed on the top of open source hardware platforms including open source sensors, open source hardware interfaces and open source software components. Its entire program is written in PYTHON3 and it uses open source python libraries. Further, he highlights that it can easily be integrated into any household circuit and can be installed anywhere in the world to get started with it. Using a digital webcam attached in KEYA-AI, it receives speech commands and can recognize faces. It has not been paired up with any app because for that it has to be open for Bluetooth and WiFi connection, which will make it



vulnerable to attacks. In fact, the attackers may find faults in app or using WiFi connectivity, invaders can attack the system even from the distance.

Innovative Features of the Innovation

According to Mr. Kunal Ambasta the unique features of the KEYA-AI innovation include the following :

- It works totally offline and hence respects and protects user privacy and secrecy.
- It works on the top of open source hardware and software platform.
- It performs all the computing operations locally on board.
- It can work easily with all the electrical and electronic devices at home to control their basic functions.
- It is really very cost effective and affordable.
- It can perform speech recognition and face recognition totally offline locally on board.

Future Scope of the Innovation

Mr. Kunal Ambasta says that now, newer high end open source Raspberry Pi 4 platform is available and it will offer more hardware resources. Therefore, in future with the help of the advance open-source headless RASPBIAN OS, more advance tasks can be performed with better efficiency. Computing will be done in lesser amount of time and further, he tells that KEYA-AI is also getting ready in other local languages in order to make it more accessible by the users from different geographical locations. KEYA-AI may change the way we are looking at AI based home automation systems.

About the Innovator

Mr. Kunal Ambasta was a MCA student of IGNOU (2100837165). Before that he completed the BTECH in Mechanical Engineering and designed several technology based innovative solution. He is registered at the Regional Centre Ranchi. For his innovation, he has been awarded with the Student Innovation Award by the NCIDE, IGNOU in 2021. He has also participated and won the Smart India Hachathon-2022 at Ranchi Nodal Centre, organized by the Ministry of Education. He is a passionate innovator to find solution to the various problems of the society. He can be contacted at email kunal.mech21@gmail.com and Mobile No. 9199905177.

20

Miniature Drone Communication System

An Inexpensive Agile Communication Method during Emergency and Disaster

Need of the Innovation

Mr. Vipin Kumar Pandey, PGDDM student of IGNOU noticed that during disaster, the traditional communication medium such as cellular network often goes down. This communication blackout results into the situation, where the stranded victims of the disaster are not able to call or raise an alert of their current status, resulting into huge human and material losses. For example, he share that in Bihar and Chennai flood, huge number of victims got stranded and were hungry for almost 3-4 days before they were rescued. He says that the reason of such atrocity is no communication network availability in the affected area.

In view of such problems, Mr. Vipin Kumar Pandey thought of developing an innovative inexpensive agile communication system. He thought that this robust and easily deployable method should act as a viable alternative, which gives the stranded victims an alternative method to raise the alert, so that rescue party can attend them at the earliest.

Brief Description of the Innovation

Describing about how the idea originated, Mr. Vipin Kumar Pandey told that on seeing and reading the plights of stranded victims of the flood affected area of Chennai and Patna, it strikes that if such kind of solution was available then the victims wouldn't have faced such hard time. He thought that the technology can be surely used for better scheduling of rescue party resulting in improved rescue rate of the victims. The basic idea which makes this solution differs from any other available solution is its device-centric nature. The solution proposes to utilize the mobiles of the stranded victims for establishing connection which makes it possible to reach each and every victim. Figure 1 gives a pictorial representation of how rescue parties can be deployed in the affected region based on the collected information for faster rescue operation.

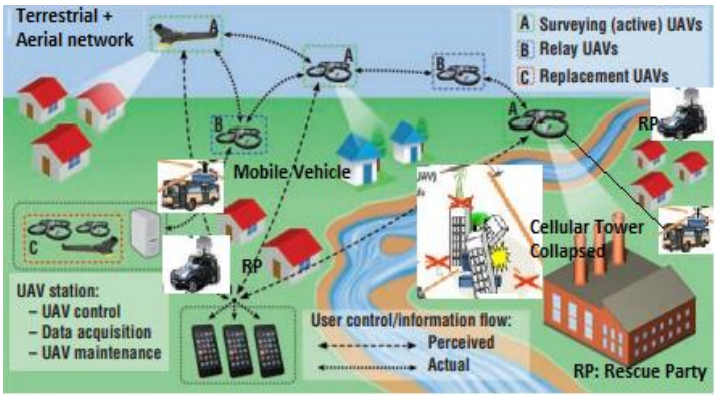


Figure 1 : Rescue Party (RP) Coordinating about Information received from Victims when Cellular Network is Collapsed

Explaining the development details, Mr. Vipin Kumar Pandey shows that in development phase, the foremost thing was that the solution should be inexpensive, rapidly deployable and user-friendly. Therefore, to give coverage in difficult terrain miniature UAV is chosen. At the same time, it is rapidly deployable in any affected area. He felt that the UAV with built in Operating System (OS) could be expensive, so, Single Board Computer like Raspberry Pi based on Linux architecture was mounted with small power-bank for providing the Wi-Fi/Bluetooth connectivity. Also, as the Raspbian OS is open-source, it can be easily configured to make the communication process light-weight. Figure 2 shows one such R-Pi mounted on miniature-UAV that act as a unit of the proposed solution. Mr. Vipin Kumar Pandey highlights that the R-Pi mounted with power-bank weights around 125g-150g for giving coverage of around 15 minutes. This miniature-UAV can be controlled by a RF signal based remote control which have a remote coverage range of up-to 750 m.

Figure 2 : R-Pi Mounted on Miniature-UAV

Mr. Vipin Kumar Pandey tells that in this innovative solution of the above mentioned problem, there are three important entities i.e. Base station, miniature-UAV and Mobile phone of the victims stranded in the affected region. Figure 3 depicts the architecture of the proposed solution where the UAV is in the affected region for collecting information from the stranded victims. Then this information is transferred to the Base station for taking decision for the scheduling of the rescue parties in the region.

Highlighting the software component of the innovation, Mr. Vipin Kumar Pandey tells that the work is coded in Java and Python language and the program is installed in Raspberry-Pi. The program running in the R-Pi is based on UDP connection to provide the best-effort delivery of message from the client. The mobile nature of the devices also makes the UDP a better choice over TCP; however, an acknowledgment service is interfaced with UDP to make it reliable in nature. A background service was developed for running on Android phones for getting a push notification and collecting the information from the stranded victim. He informed that the solution was tested in a 500m*500m playground where some user with mobile phones are rapidly deployed acting as the stranded victims. Then a message which originates from miniature-UAV is delivered to victims, i.e. user with mobile phones and their responses is recorded at UAV. Testing for making the method applicable for feature phones is still going on to make the method a universal solution.

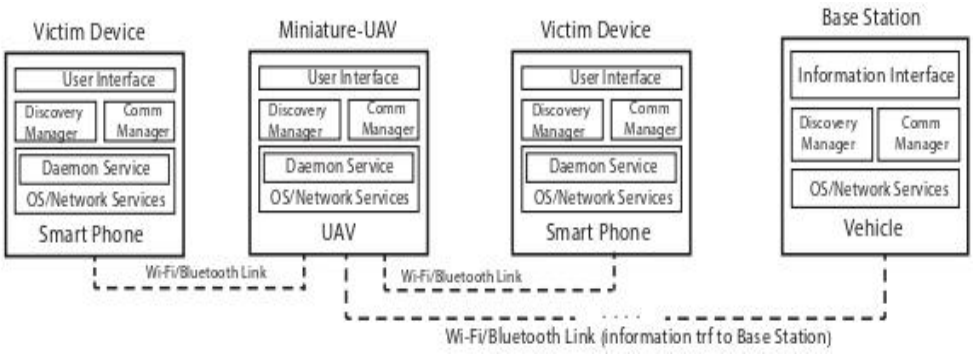


Figure 3 : Architecture for Proposed Solution

As far as the Application and /Utility of the Innovation is concerned, Mr. Vipin Kumar Pandey shares that this innovation can be very handy in recently seen urban flood situations of Patna and Chennai. This provides an easy and inexpensive alternative to get the location and status of the stranded victims and scheduling them as per their criticality to get them rescued using the NDRF/SDRF rescue teams. Another important application area of the work is to give the coverage in no network area for e.g. in a battle field this communication method can be useful in better strategizing the war.

He claims that it's an inexpensive solution which every smart-city should have to fight such kind of emergency situations. However, he clarified that the innovation is currently applicable for smart-phones. Efforts are being put to make it applicable for feature phones to increase the coverage.

Innovation Features

According to Mr. Vipin Kumar Pandey some of the innovative features which make it the best alternative for such kind of emergency situations include the following :

- It is rapidly deployable in any affected area using inexpensive miniature-drone. For example, in severely flood affected area where the water logging has gone up to 12-15 feet can easily be covered.
- It can be Mounted Raspberry-pi (Single Board Computer) on miniature drone can provide efficient Wi-Fi/Bluetooth connectivity to the stranded victims for collecting their information.
- It has a provision of Push notification to the victims on availability of such network with Beep alert.
- Easy steps to be comprehended by victim to get the smart-phone configured to communicate their status via newly deployed network using miniature-UAV.
- Makes possible to give coverage in the difficult to reach region/topology.
- Connecting with deployed NDRF/SDRF/Army unit to get the location of the critical stranded victims for faster rescue operation.
- It has inexpensive set-up using toy grade miniature drone.
- Possible to upgrade the method to work for feature-phone to increase the coverage base.

- Different topology of drones can be tested for faster information collection.
- Additional battery can be added to increase the network up-time.
- Video surveillance can be carried out by mounting cameras over UAVs or using video option available in Raspberry-Pi.

Future Scope of the Innovation

At the present work is quite basic in nature, Mr. Vipin Kumar Pandey thinks that there are lot of additional features which could be added to it to make a full-fledged commercial solution. In future, he plan to make it work for any smart phones as well as feature phones and also wants to use it for collecting the details from the victims who are unable to move/injured. He wants to see the system acting as a Multi-hop communication device to connect to infrastructural network will make it a fully commercialized unit in future.

About the Innovator

Mr. Vipin Kumar Pandey is a PGDDM Programme (173683401) student registered through Regional Centre, Patna. He can be contacted at email vipinpandey.mnnit@gmail.com and Mobile 8707340564.

21

New Fixture

Innovative System for Temperature Stub Fit-up in Pipes

Need of the Innovation

Mr. Puran Mal Bankoliya, a student of IGNOU works in a power plant. He noticed that temperature stub fit-up is one of the most important processes in any Power Plant Piping Unit. It's providing a place for the temperature measurement equipment at the power plant site location. He says that temperature measurement is one the most important work at site to maintain the proper temperature of used medium in pipe line and it should be clearly visible to the operator. It underlines the importance of the temperature stub and its location. It must be fit-up as per design, otherwise any deviation in the location or orientation or in concentricity may invite a big problem at the power plant site.

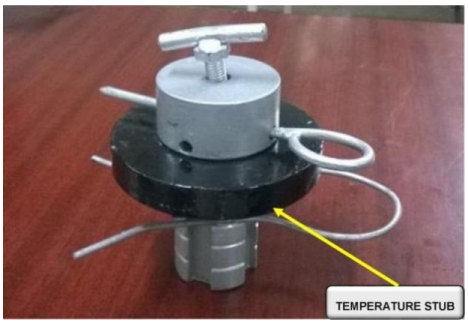
He noticed certain shortcomings of the existing fit-up process such as long cycle time, extra manpower requirement, inefficient process leading to reworks, etc. According to Mr. Puran Mal Bankoliya, the existing system is comparatively unsafe (involves handling of hot work piece with hands, etc. In existing process, as per the temperature stub fit-up location, proper pipe positioning is needed. In case of Bend pipes, if stub fit-up location is offset from the bend axis, then pipe bend has to be hold with a crane, so as to maintain a feasible fit-up position. In such a case, the crane is held up for the entire duration of fit-up. Root gap and orientation maintaining is also difficult in hot condition due to non--availability of proper clamping arrangements to clamp the temperature stub. Only a stand for up-down movement of the stub is available, other adjusting movements and positioning are to be managed by hand only.

In the existing method stiffeners are used for weld tacking so as to keep the temperature stub in position. Use of stiffeners is not advisable as per the standards for P91 grade material. Mr. Puran Mal Bankoliya identified such limitations and challenges in the existing method.

Brief Description of the Innovation

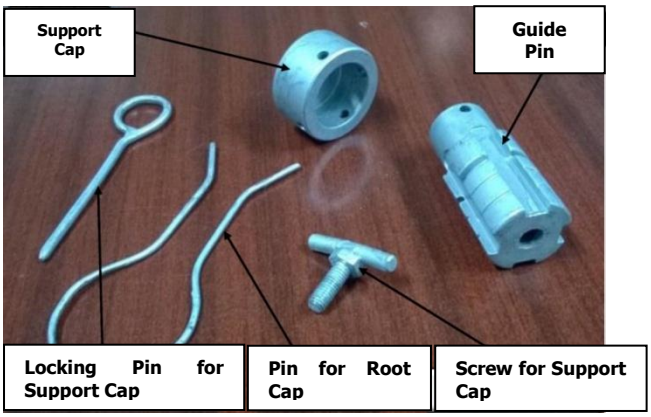
In view of the above mentioned difficulties and challenges, need was felt to develop an innovative solution to improve the existing temperature stub fit-up process. Accordingly, he thought of developing an innovative fixture for temperature style fit-up in pipes and thus designed and developed a new and innovative fixture. Here, fit-up process is divided in various stages aimed at finding out the various possible improvement stages. In the new method, a fixture has been made, which can reduce the cycle time, manpower, rework possibility and unsafe conditions during the fit-up process as well as providing the auto control on concentricity, even root gap and self-orientation of stub with main pipe. It is the special fixture for temperature stub fit-up with pipe. Mr. Puran Mal Bankoliya informs that the fit-up can be done at any given angle as per the drawing. Pipe positioning and movement of crane is eliminated. With the help of this fixture fit-up time is reduced and process is easy.

Its main parts include Guide pin, Support cap, Locking pin for support cap, Pin for root gap and Screw for support cap. The **Guide Pin** gives concentricity and auto orientation to temperature stub with pipe hole. During angular fit-up **Support Cap** supports the guide pin to rest in proper position. **Locking Pin for Support Cap is** used to lock the support cap to avoid rotation of guide pin during unlocking. **Pin for Root Gap** used for maintain even root gap during fit-up. **Screws are used for support and** Lock **the cap** with guide pin.



Innovative Features

Besides the unique design of the new fixture, the main innovation lies in its parts and accessories. According to Mr. Puran Mal Bankoliya, the new fixture has certain innovative feature as given below :



- Self-concentricity, auto orientation and even root gap maintaining is possible with new innovated fixture,
- It can help to avoid direct contact of fitter with hot condition pipe thus same is reduces the unsafe conditions.
- New method is easy to handle and numbers of stages are reduced, hence cycle time has reduced.
- It is gives few auto control stages, hence, manpower and crane uses also reduces.

Future Scope of the Innovation

Innovated project is related to power plant piping sector. Mr. Puran Mal Bankoliya says that in future, this new fixture can be used in any pipe manufacturing company for the temperature stub fit-up.

About the Innovator

Mr. Puran Mal Bankoliya is a student of IGNOU studying in the MP (2006858412) Programme registered at the Regional Center Mumbai. He works at Bharat Heavy Electricals Limited (BHEL). For this innovation, Mr. Puran Mal Bankoliya has been awarded with the Student Innovation Award-2021, by IGNOU. He can be contacted through email pmbadal.bankoliya000@gmail.com and Mobile 9042137664/8667553292.

22

Web Over Radio

An Innovative System of Hosting a Website Over Radio

Need of the Innovation

Mr. Vishal V. Vastava**,** *a BCA student of IGNOU noticed that e*ven today, internet is not so prevalent in the villages and the biggest reason for this is that there is a lot of problem of mobile network there. In that situation, it is difficult for many of the rural students to get facilitated by proper information and education available online or in any other digital format due to connectivity issues. Moreover, there are rural areas which do not have 24 x 7 electricity. On the other hand, radio has reached the villages long back.

In order to overcome these barriers and realizing the strength of the radio, Mr. Vishal V. Vastava has developed an innovative prototype of hosting a website over radio. Through his innovation, the web-based content can be transmitted through radio waves even in the remote areas without internet.

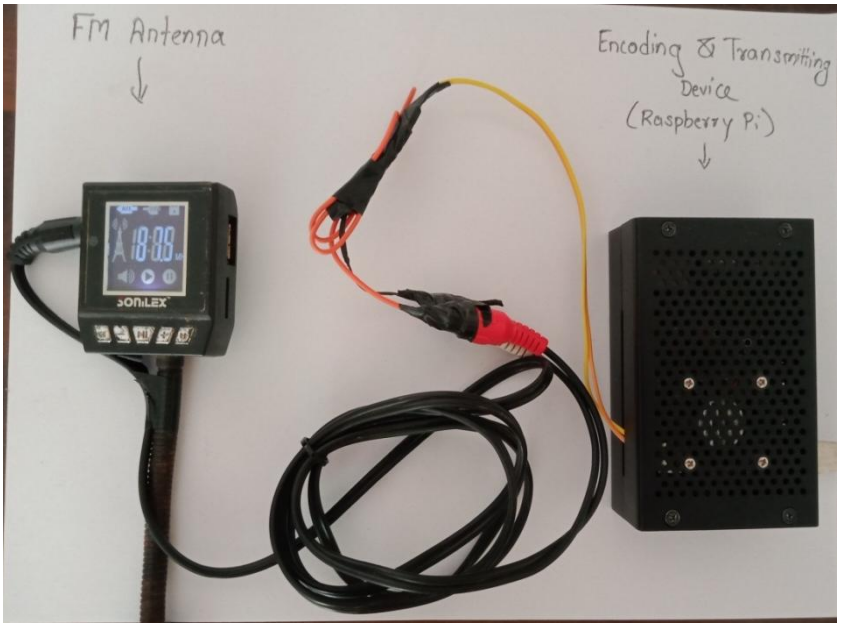
According to Mr. Vishal V. Vastava, the biggest objective of developing this innovation is that we can give good education and digital experience to the children who live in remote areas by transmitting web content through radio waves.

Brief Description of the Innovation

While describing the design of the innovative project, Mr. Vishal V. Vastava tells that it has two parts, one is transmitter and the other is receiver. If we talk about the transmitter side, we see that a Raspberry Pi has been used. But first we need a website that we want to transmit through radio. He claims that the websites in Html, CSS and Java Script can be transmitted through this innovative system. Talking about the working of his innovation, Mr. Vishal V. Vastava explains that first we will feed all the files of the concerned website in the Raspberry Pi. Here, the Raspberry Pi will compress these raw files and create a hex dump file and then this hex dump file will be converted into binary. Thereafter, this binary file will be transmitted through electric pulses with a pre-set time over radio as a beat, thereafter these beats can be heard on normal radio receiver.

On the other hand, he explains that the receiver will detect these beats and store them in a file after which a binary file will be created. Now, this binary file will be decoded in hex dump and then it will become a compressed file back from hex dump. There will also be a Raspberry Pi in the receiver which will do all these things. Now, it will decompress this compressed file on Raspberry and host it locally. Mr. Vishal V. Vastava highlights that the advantage of hosting it on a local network is that whoever connects to it does not need internet connection and can view this website as long as they are connected to the same network.

In present scenario Digital Radio Mondiale (DRM) is the latest one of interests which transmits data over Radio, like Text, Images and Videos. These transmissions are done over AM and Digital Frequencies. But if seen, the range of AM frequencies is less and the range of FM frequencies is more due to which the FM can reach far and wide



Innovative Features

According to Mr. Vishal V. Vastava, this innovation Web Over Radio is has several innovative features as given below:

- It can be used in those places where mobile network is weak or unavailable, and most of these places are mountain areas and extremes where education can be difficult.
- It can be used in the situation of war or natural disaster when the internet is shut down and other means of communication are not working.
- Also, the costing for establishing the Web Over Radio setup is very less.
- Moreover, it can be used through the existing radio transmission system.

Future Scope of the Innovation

Talking about the future scope of the innovation, Mr. Vishal thinks that the usability of this innovation can be increased by hosting the latest websites, hosting different websites on different channels. In future, it can be used continuing the studies of children in remote areas. Also, it can be used to release public notice in any kind of situation without internet. It can be used even in a situation when internet is working might be hacked to track data In future, it can be used as the safest mean of public note and information including the defense sector.

About the Innovator

Mr. Vishal V. Vastava is a BCA Programme (198057829) student of IGNOU registered through the Regional Centre, Mumbai. For his innovation, he has been awarded with the Best Innovation Award-2022 by NCIDE, IGNOU. He can be contacted at email vvvastava@gmail.com.

23

Innovatively Customized Two Wheeler

A Two-Wheeler for People with Disability Who Don't Have Both Hands

Need of the Innovation

It is said that the necessity is the mother of invention. Mr. Shubhajit Bhattacharya a person with disability realized it. He had lost both of his arms in a childhood accident. On the right he had lost his arm from his elbow onwards and on the left from his shoulder onwards. He works as a graphic designer using a prosthetic arm. He wanted a safe and quick way of commuting to work since buses were crowded and unsafe, especially while getting on and off in crowded buses. With no arms, it was very stressful and unsafe for Mr. Shubhajit Bhattacharya to travel in the public transport. As he had to change two buses each way while commuting daily, it was not only more time consuming, but it was costlier also. , Thereforeas an innovative solution, he thought for modifying his two-wheeler which could help him commuting safely and efficiently in Bangalore without depending on the public transport.

Brief Description of the Innovation

In view of the above mentioned problem, Mr. Shubhajit Bhattacharya thought of modifying a Suzuki Swish scooter using his own design to make it possible for him to drive safely and comfortably despite his disability. In this regard, he consulted several mechanics, watched a number of online videos and read articles before devising these modifications.

In fact, he already had some experience of this kind since in 2013, as he had modified a bicycle to go around in his immediate neighbourhood. First he thought to consult a willing mechanical workshop in his city to design and modify his scooter as per his requirement. But this was very discouraging. Many workshops did not believe that it was possible for a person without arms to ride a scooter at all. Most of the workshops either quoted a very hefty amount that he could not afford or wanted a very long time to do the needful. He felt that these mechanics could not really understand the challenges posed by his disability. This all made him sceptical of their ability to deliver a vehicle which would be safe and easy for him to drive.

Thereafter, he himself designed modifications a Suzuki Swish automatic scooter which could help him to commute safely within Bangalore. The modifications are unique to his disability. This could be possible, because it was he only who could best understand his specific needs. He modified the handle on the right as spiral shaped to enable tight grip by his elbow. This was very important, as he is driving with one hand only. Also he did cushioning of the spiral shaped handle to protect his elbow in case of bad roads or sudden brakes. Mr. Shubhajit Bhattacharya says a that the most important part of his innovation is shifting all components like brake, accelerator, lights, horn to the foot area, so that he could operate them easily.

Innovative Features of the Innovation

Describing the unique features of his innovation, Mr. Shubhajit Bhattacharya highlights the innovative features as given below :

- A modified spiral shaped handle on the right with cushioning to enable a tight grip, to provide comfort and to protect the arm from getting hurt especially during sudden brakes and bad roads.
- All components like brake, accelerator, lights, horn are fixed in the foot area, so that the better space availability could allow him to operate them easily.
- Accelerator connected using a specially welded iron rod and pipe to prevent the wire from being cut off when brake was pressed with force. This prevented the scooter from abruptly coming to a stop amidst traffic and potentially leading to an accident.
- Components attached in a screw on fashion to enable him to move easily and cost efficiently to a different scooter should the need arise. The present scooter can be sold as a regular one enabling him to recover some of its cost.

Future Scope of the Innovation

According to Mr. Shubhajit Bhattacharya his innovation essentially involves adapting a scooter to operate without handles. It will be beneficial to anybody with any disability in one or both of their hands or arms. With these modifications people with arm/hand disabilities will be able to ride their own mode of transport and enjoy an independent life.

Mr. Shubhajit Bhattacharya believes that major retailers of scooters can be briefed and educated about the need that disabled people have for scooters. They can be informed about the innovation – how it has improved his life and also do not involve spending large amounts of money. On understanding their requirement of individual, Mr. Subhajit Bhattacharya is ready to suggest the specific design and modifications needed suitable to that person with disability. Thereafter, the actual modification could be made by a local mechanic in that specific city.

About the Innovator

Mr. Shubhajit Bhattacharya is pursuing his MSW (2106147296) from IGNOU through the Regional Centre Bangalore. Being a person with disability and expert in graphic designing understands the problems differently. Accordingly, he tries to find their innovative solutions. He has been awarded with the Student Innovation Award by the NCIDE, IGNOU for the Customized Two Wheeler as per his special needs. Presently, he is working as a Counsellor for Autism Children (Banjara Academic Bangalore). He can be contacted at email bhattacharyasubhajit4@gmail.com and Mobile No. 8310976860/9738550195.

24

Chantons en français

An Innovative Way of Learning French Through Songs

Need of the Innovation

Based on his personal experience, Mr. Jaivardhan Singh Rathore find songs perfect for playful and implicit teaching/learning of French. He tells that it was one of the motivating factors for creating something related to French songs as a pedagogical tool. At the same time being a research scholar at School of Foreign Languages, IGNOU, was also a great source of inspiration for developing such an innovative learning solution.

Further he told that the idea of creating a song book "**Chantons en français**" to learn French, triggered from the time of formulation of the research title at School of Foreign Languages, IGNOU. The period of research for the thesis helped him to understand the cognitive, cultural and linguistic needs of the French learners in India and elsewhere. At the same time he could understand the challenges faced by the learners and the teachers in terms of using songs in learning and teaching environment of French. In this regard, he acknowledge that the support of the faculty members at SOFL specially has research guide Dr. Deepanwita Srivastava along with the members of the doctoral committee who guided him to understand the techniques of teaching through songs efficiently.

While talking about the challenges that were faced by him during the creation of the book, Mr. Jaivardhan Singh Rathore tells that these were related to the time constraint, proper arrangement of musicians and the recording studio for assembling all the things together. The coordination with the Illustration artist in Delhi on phone to create certain images was also difficult to explain and thus had to be redone.

Brief Description of the Innovation

Mr. Jaivardhan Singh Rathore believed that from a long time, music has entered into the field of didactics, but has not been actively used in terms of French as a foreign language teaching-learning. He tells that the musical intelligence propounded by Howard Gardner to exhibit the inclination of each individual towards music and thereby captivating that competence in teaching has been the innovative idea behind this innovative way of learning French. This musically designed innovative book aims to teach French in a melodious way. He felt that at times students find French cumbersome due to grammar and pronunciation, they could utilize this book not only at distance mode with the help of CD but regular class teachers could also use specific songs according to learners' needs. Through songs, the language is retained in the mind and songs help in memorizing and pronouncing French in a better way. This innovative book provides every learner a fun filled experience of learning French. The book contains 21 French songs specially designed for beginners to master their all language competencies.

While asking about his experience of getting nominated for the second prize for Students' Innovation Award 2018, Mr. Jaivardhan Singh Rathore tells that it was a wonderful one. He told that the mail for the award came as a surprise to him and then the whole process till the award ceremony was a fruitful one. The complete support and informative

exchange with NCIDE was beneficial for understanding the unfolding of the ceremony. He felt glad to have known that there is such a department entirely dedicated to the cause of Innovation.

An Interaction with other Faculty Members and a Session for the Students with the Book "Chantons en français"

Innovative Features

According to Mr. Jaivardhan Singh Rathore, his new method of teaching-learning French through songs a very innovative and creative way which introduce the learners in the process. Further, he highlights the main features of his innovation as follows :

- *Rote learning is avoided.* Students find it innovative and unique to learn through a fulfilled manner thereby removing the monotonous pattern of language learning.
- *It provides an Alternative Learning Path.* There are certain students who would want to learn things differently as they couldn't follow the ordinary/normal approach of teaching, hence this musical approach comes a creative way for them to explore their potential of learning.
- *Autonomy of the learners is greatly enhanced due to audio.* At times students are all alone and thus want to reinforce their language learning in such cases this learning kit comes to a great help. Students can put the CD and could learn and repeat sentences and words all by themselves thereby enhancing their autonomy as learners.
- *Method is applicable in both face-to-face and distance mode*. The students living in the far corners of the globe without any access to the direct face to face teaching with the teacher could make the most of this book as they would find a huge support of the book and CD to take them along on the learning path profoundly.
- It is based on a scientific framework under the theories of musical intelligence, earworm phenomenon, song stuck in my mind, differential pedagogy, and autonomy of the learners.

Future Scope of the Innovation

As far as the future prospects are concerned, Mr. Jaivardhan Singh Rathore tells that he would like to add that later on in the series a teacher's guide, a workbook and a video CD could be incorporated along with the learning package. The expansion of the innovation would be based with the massive dissemination of the methodology in cities across India

and overseas. For this purpose, workshops and trainings on the use of songs in teaching/learning of French would be conducted for making the innovation reach to other French teachers and learners. Also, he wants if IGNOU could take up his project as a start-up and then helping him to enhance it at higher levels.

At the end, Mr. Jaivardhan Singh Rathore wanted to say a few words for others who are interested to do some kind of innovation in their life. While inspiring and motivating others towards innovation, he advises them to work on simple things which they are concerned to the larger public. He suggested to create an innovation which could be affordable for the public. He feels that the innovative could also be to improve and update one's innovation with the passage of time.

About the Innovator

Mr. Jaivardhan Singh Rathore, is a PhD Student (138001209) in French Language at School of Foreign Languages, IGNOUI. For his innovative method of teaching-learning French, he has been awarded with the Student Innovation Award-2018 by NCIDE, IGNOU. He can be contacted at email jaivardhan134@gmail.com and Mobile 09828706386.

25

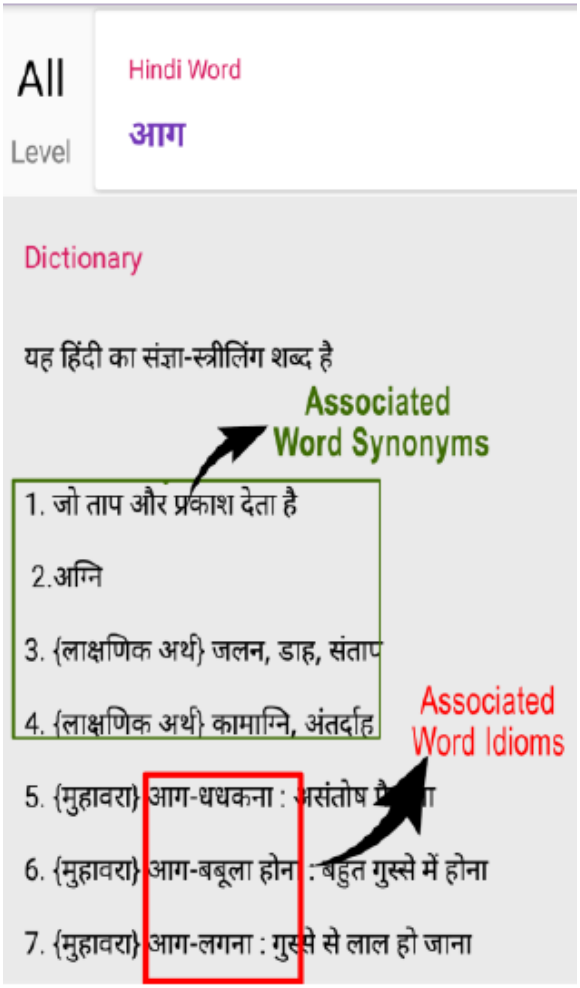
Hindi-TED

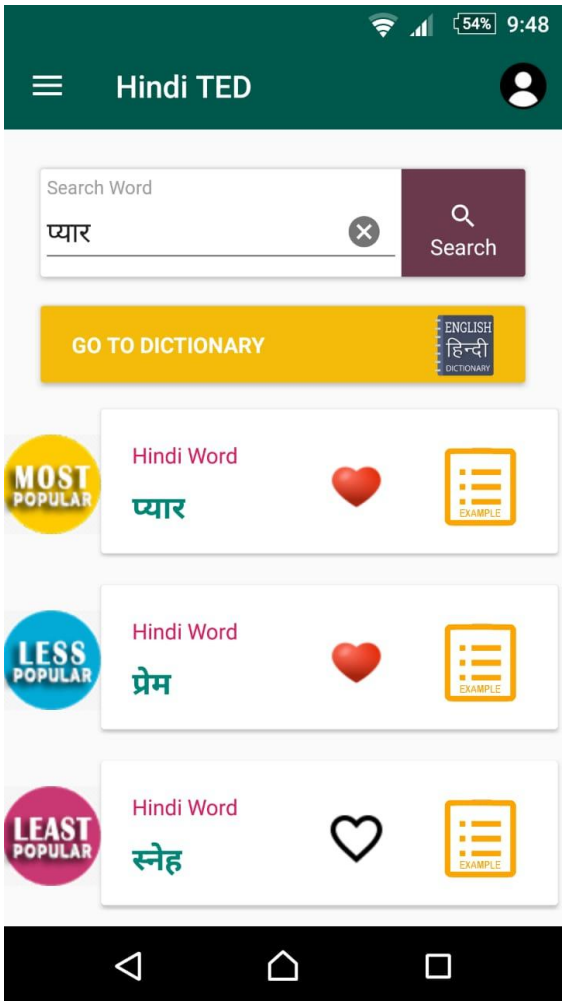
Android Application to Teach Hindi Through Translation, Example and Dictionary

Need of the Innovation

Mr. Vivek Tripathi, a student of Diploma Course in Translation, while studying the PGDT-1 course book (Page No. 43), noticed a statement that "each word has different cultural background and hence it's important to choose right-kind of word in different translations". Keeping it in view, Mr. Vivek Tripathi thought of developing an innovate app named as Hindi-TED as a practical-result of this principle.

Further, Mr. Vivek Tripathi tells that this motivation for developing Hindi-TED grew higher when he was doing his PGDT-5 assignment and there were chapters on literature, science, agriculture, sports, etc. and he noticed that the same words were changing their behavior on the basis of cultural context, for example the multiple use of the word 'Fire' get changed on the basis of the cultural context as given below :





Context	Example of Multiple Use of Word – Fire	
Literature	Poetry glow with the **fire** of words.	कविता शब्दों की **उर्जा** से प्रकाशित होती है
Science	Heat the tube with low temperature **fire**.	ट्यूब को कम **आँच** में गरम करें
Agriculture	Lands are burnt with **fire.**	**आग** से भूमि जल गयी है
Sports	There should be **fire** on body.	देह में उत्साह की **ज्वाला** होनी चाहिए

You can see here, word "Fire" has different Hindi words (उर्जा, आँच, आग, ज्वाला) for different cultural context.

In view of the above, Mr. Vivek Tripathi collaborated with many govt. translators to create popularity scale of words, based on CEF (Central European Framework) language-scales, as :

- **Level 1 –** the most spoken word (basic level)
- **Level 2 –** the literature word (mid- advance level)
- **Level 3 –** the literature word (advance level)

This innovative app gives sentence-examples and all possible word meanings to bridge the gap of word and cultural context. This Application provides Hindi learners (non-native), Hindi Translators and Hindi Students – a common app to solve their language query.

Hindi TED refers to "learning Hindi through Translation, Example and Dictionary". Hindi TED specifically disrupts the way we use our dictionary. It solves 3 kinds of problems for respective 3 users :

Hindi Non-native speakers	How to find most spoken Hindi words?
Hindi Translators	How to understand/visualize contextual-meaning of Hindi words?
Hindi Students	How to increase Hindi vocabulary?

Brief Description of the Innovation

Mr. Vivek Tripathi tells that the ideation of the app mainly came from his PGDT assignment. When he was doing the assignment, he realized that there are lots of the words which change their contextual meaning according to the context. For example, he cites sample from his assignment only :

He explains that the term distribution means **वितरण**, but in the context of rainfall, it becomes **विभाजन**.

Also, a second case that being a Hindi language enthusiast, he dedicated lot of time doing activities related to the Hindi language. In his teaching, one of the aspects is spoken Hindi

language training. While doing the same, a most common problem which arises from all of his students has that they were keen towards learning the language, but not the technical-words of Hindi but the most common/most popular Hindi words. Keeping it in view, he thought of an innovative solution which would be to take a dictionary and underline each and every popular word, which is totally unrealistic and cumbersome.

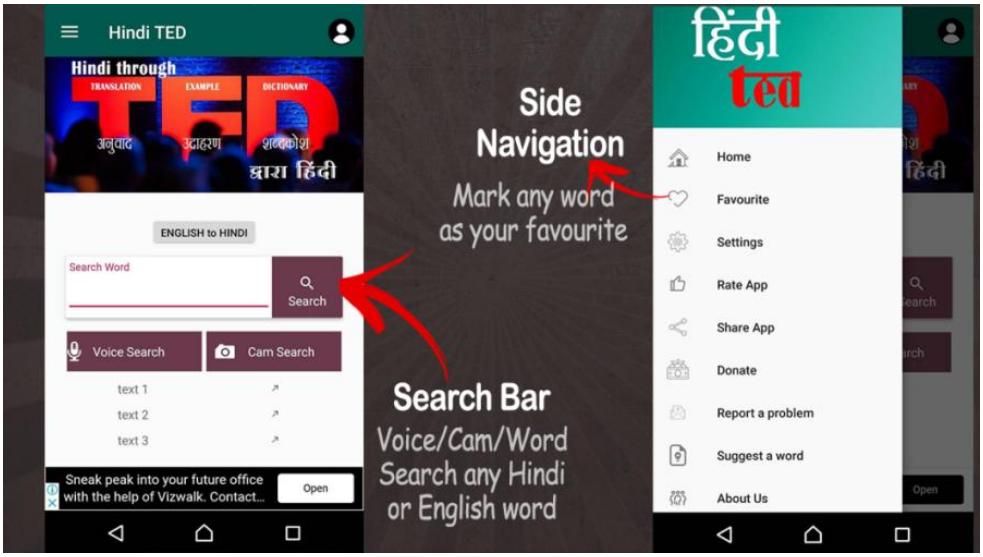
Mr. Vivek Tripathi believes that every word has its contextual meaning. So, the challenge was to think on how to pre-understand the context (background) of words before using it, and how to know the most spoken words of the Hindi or any other language?

In view of the above mentioned problem, he designed the app and did the development (coding) for minimal possible design.

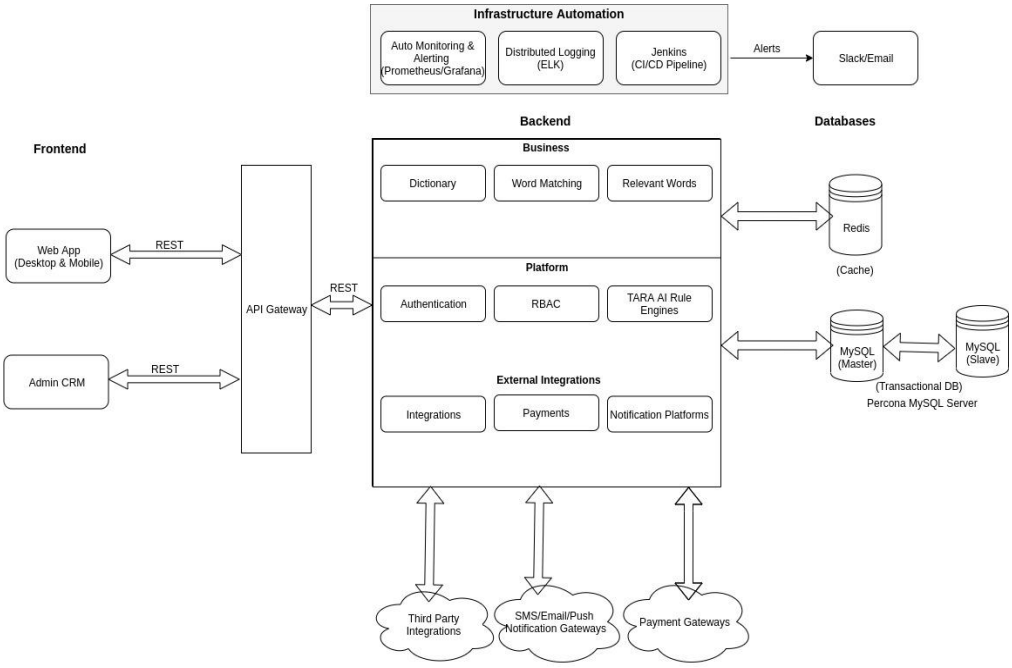
His goal was not to just create dictionary app by compiling all words into the app, as this has been done by Oxford and many such reputed organization. He was thinking one step ahead of it. He was looking for an app which could serve any Hindi – user segment to solve all query they might have with the language viz. lexical content, non-lexical content, fugative/denotative meanings and contextual examples. Hence, the roadmap was created and it served as blue-print of his idea which looks like this, in brief-way :

This app has primary goal of creating an "Algorithm which decides the popularity level of Hindi words", which today works for Hindi language but once it get stable architecture, it should be able to extend to other languages like Tamil, Telugu, Bengali, etc. as well, i.e. finding most popular, day to day spoken word of any language. Hence, he never focused on database development and or on design of the app but focused on algorithm of app alot.

Mr. Vivek Tripathi highlight that this android app has just 1 search bar where you can voice-search, text search or search through camera- any English or Hindi Words, as shown in figure below :



Mr. Vivek Tripithi created the UI design which **should be very easy to operate, for any non-technical user** and hence the android app (Hindi- TED) came into the picture.



The architecture of the app contains front end, back end and database interaction. The frontend consists of web-app which manages the data-addition to our server and Admin CRM (Customer Relationship Management) for content-management. The data goes through API (application program interface) following REST protocol. The backend have business segment and third party integration where stays our popularity-matching algorithm to decide which word is popular and which is less popular. The popularity value stays in our MySQL database. Further infrastructure automation is also planned for user's smooth experience in the app.

Among the 3rd party integration, he has added the Ads to keep app sustainable and functioning each day and keeping the cost of our server.

This innovation will help three kinds of potential users (or application) including the Hindi Learners (Non-native), Hindi Translators and Hindi Students.

Innovative Features

According to the Mr. Vivek Tripathi this app named as **Hindi-TED** refers to "**Hindi** *through* **Translation, Example** and **Dictionary**". He says that the innovation is more about disrupting the way we use our Dictionary. The innovative features of the Hindi-TED are as given below :

- It shows **Hierarchy** of each and every word (A1-A2; B1-B2; C1-C2).
- It enables **Hindi/English Language Learning** based on international CEF (Common European Framework for Languages) Levels.
- It helps in **Dictionary** Usage by creating Word Family (consist of meaning, idioms, proverb and contextual-meaning).
- It also provides **Translation Support** through Sentence-examples. Hindi and English Word Search Functionality.

Besides Dictionary Functionality, it has Idioms and Proverb Functionality, Hindi and English Voice Search Functionality and Transliteration **(लिप्यंतरण)** Functionality using Google Voice-to-Text API.

Future Scope of the Innovation

Mr. Vivek Tripathi is looking to have a business deal in future, with private vendors of dictionaries. For Example, Shabdkosh (Hindi) or Oxford dictionaries (English and Hindi both) are some examples, who have their online-sites. As Mr. Vivek Tripathi is working on functionality to provide their dictionary-content in his app, it may help in generating paid-leads to their website**.** Besides it, he is working on increasing word levels by creating a database of 10,000 words and near 1000 word-family (minimum) using major dictionaries.

He expects that this B-model will help him to keep the app into survival and if it will not work, he may go for **Ad based B-model**. He believes that both model can work together to develop more functionality into the app and also be commercial for me to keep app working for long-time.

About the Innovator

Mr. Vivek Tripathi, is a PGDT Programme (188439066) student of IGNOU registered through Regional Centre, Mumbai. He is a very creative and innovative person. He was awarded with the Student Innovation Award-2019 by NCIDE, IGNOU for his innovation. He can be contacted at email sopan.tripathi@gmail.com and Mobile 7987876701.

26

UPSC RADIO

An Innovative Way of Podcast in Education

Need of the Innovation

Mr. Dinesh Dintakurthi, an innovator student of IGNOU says that education is non profitable in India and free education to all below 14 years is a fundamental right. This is what he studied in the Indian constitution, in the decade of his preparation for the Civil Services Exam. After attempting the Civil Services Exam of UPSC multiple times, Mr. Dinesh Dintakurthi decided to teach how not to fail along with subject knowledge, rational thinking, current affairs, depth and diversity in the topic. Moreover, the rapid global spread of Covid-19, and the enforced country-wide lockdowns, with likely severe harsh consequences on all sectors particularly on education, inspired Mr. Dinesh Dintakurthi to think of an innovative way of imparting free and quality support to the UPSC aspirants.

Keeping it in mind, podcast brothers Mr. Dinesh Dintakurthi as host along with Mr. Nikhil Dintakurthi as Producer started a new format of radio podcast called UPSC RADIO PODCAST to help aspirants preparing for UPSC and Telugu PSC (APPSC and TSPSC) and SSC to clear various government exams in a simple lucid way without spending single penny by listeners. Initially, he started podcasting in 2019 for visually challenged students who wanted to prepare for UPSC, but later he noticed that it could be viable for every student, particularly in a rural area and particularly for the financially weak students.

Brief Description of the Innovation

In the UPSC RADIO podcast, he speaks about the constitutional perspective of things and his unique model of belief with social problems, geography, economics and many more, which are mainly useful for aspirants who couldn't afford much time in their busy job schedules, busy in academics, part time works, college and school students.

This podcast is helping them to prepare and work simultaneously. This Radio podcast can be part of life and can be listened while working, cooking, walking, gaming, etc. which will neither hamper either work or preparation. This is the main advantage with this podcast or with any other podcast.

According to Mr. Dinesh Dintakurthi this innovative experiment was started in October 2019 and got very good responses in during the lockdown period, where institutions were closed. Further, he explains that this podcast has mainly 5 Seasons : the **season 1 covers** Current Affairs, **season 2 focuses on** Policy Analysis of Governments, Geography, Government Schemes, Current Affairs, etc., the **season 3 includes** India Year Book and explain every Aspect and Sectors of India, **season 4 covers** Indian Constitution, and the **season 5 covers** Conversation around Economics, Ethics and other Theoretical Concepts.

Innovative Features

While talking about the unique features of this innovation- UPSC RADIO, Mr. Dinesh Dintakurthi tells that providing education through podcast is itself a very new to India. As the UPSC RADIO is a free platform, so anyone can get quality education through it. Further, highlights the following main features :

- With a simple command like **ok Google, hey Alexa,** or **hey Siri** we can play podcast by saying play UPSC radio.
- One can work and prepare simultaneously for the competitive exams with UPSC radio podcast.
- **Visually challenged aspirants** can listen to the podcast and clear various competitive exams and also can learn knowledge in the Academics.
- Not just about one way communication, it can be used to conduct debates, discussions and analysis in the podcasting with online or offline mode which can be broadcasted in the podcasting.
- Till now there were podcasting for storytelling and news, but this podcast is delivering subject knowledge and information about competitive exams to the aspirants.

Future Scope of the Innovation

According to Mr. Dinesh Dintakurthi the future goal of this innovation is reach out to all those students who are left behind institutional coaching and couldn't afford or who want to brush up concepts, by providing them insights about how to prepare, what books to read, what not to read in this journey, explanation of current affairs, all static subjects and demand based on listeners request. Further, he thinks that open schooling and Universities can utilize this opportunity to deliver knowledge to the students even in the remote areas.

About the Innovator

Mr. Venkata Dinesh Dintakurthi is a student of IGNOU in the CRD Programme (2001254261). He is now a very seasoned and experienced teachers imparting education in the UPSC and PSC assignments through the new and innovative podcast method. He has been awarded with the Student Innovation Award by the NCIDE, IGNOU in 2021. He is registered at the Regional Centre Hyderabad. He can be contacted at email upscradio@gmail.com and Mobile No. 8519914611.

27

IGNOU Space App

An Automated Android App for IGNOUI Students

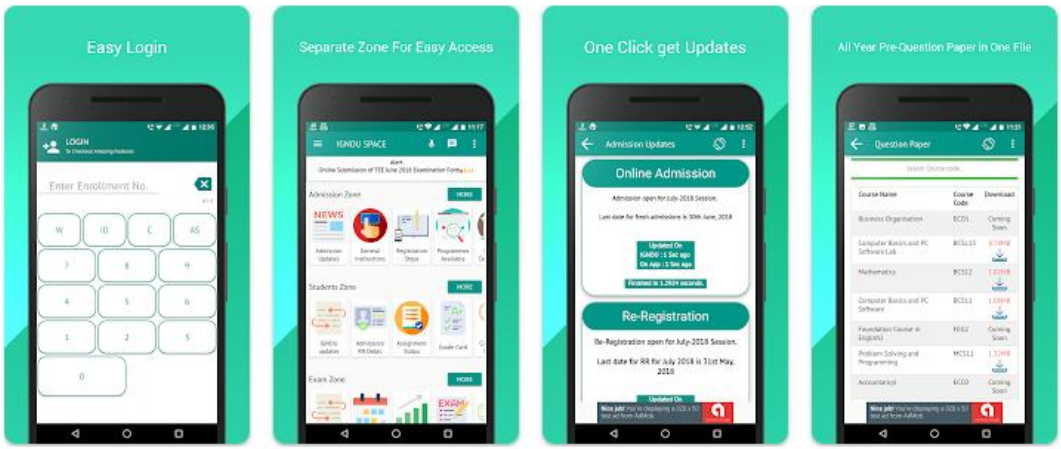
Need of the Innovation

Mr. Deepak Sharma is a MCA student of IGNOU. While searching for some information pertaining to IGNOU or downloading the study material or assignments from IGNOU Website, he faced several problems and felt that there should be a single point access for different supports to the students. He thought if all these requirements are made available through Mobile App, then it would be highly useful and learner centric. Keeping this in mind, Mr. Deepak Sharma thought of developing an innovative Mobile App as a single point support to IGNOU's students.

Brief Description of the Innovation

According to Mr. Deepak Sharma, it is basically an Android app developed for the IGNOU students, it gives the information about the students for example student detail, course detail, exam detail and more. There is no need of any PDF reader for downloading and viewing study material or previous year question papers. With the help of this app student can also solve the query about their study through IGRAM or Email.

IGNOU Space App is ready to give all information about academics for IGNOU students at one platform. Mr. Deepak Sharma tells that at present, innovation is in use by approx. 33 thousand students on Google Play Store by app title IGNOU Space.



Innovative Features

According to Mr. Deepak Sharma, the IGNOU Space App is very easy to use and leaner friendly. It has the following innovative features :

- In order to make it user friendly app, all modules are separated in the different zone like Admission Zone, Student Zone, Exam Zone, Download Zone, Friend Zone and Help Zone. All the zones are having all related information useful to IGNOU students.

- With these modules students get all useful updates like Admission Updates, IGNOU Updates, Exam Updates, etc.
- It also has a **Voice Assistant** that provides the facility to get any detail of modules with the help of voice message **Voice Command.**
- It has an automatic filter to access the Date Sheet, Study Material, Previous Year Question Paper by enrolled courses.
- IGNOU Space App is easy to access and navigate as per need.

Besides the above mentioned, features the App saves students time and also administrator of the institution to notify students. There is no extra cost to be paid by any students for accessing the information, only internet connection is needed either in mobile or in computer system.

Future Scope of the Innovation

In future the App can be expanded further and commercialized. For that purpose, Mr. Deepak Sharma expects official support to manage App Modulus/Contents, and some database records to verify the enrolled students, program details and marks of students. Further, he wants to develop some other modulus of IGNOU official database.

Also he needs a PHP Server to deploy Application and Store Documents on the Cloud, Developer Console to Publish Application on the Google Play Store (Android), App Store (ios). This innovation has immense scope to facilitate IGNOU students in variety of ways.

About the Innovator

Mr. Deepak Sharma, a BCA-MCA student of IGNOIU (146644297) is registered through the Regional Centre Lucknow. He is very keen observer of the problem of IGNOU students and accordingly, he tries to find technology based solutions to those of such initiatives by Mr. Deepak Sharma, for which he was awarded with the Student Innovation Award-2020 by NCIDE, IGNOU. He can be contacted at email dsharma413@gmai.com, okignou@gmail.com and Mobile 7518181920/8707351658.

28

Learn on the Go

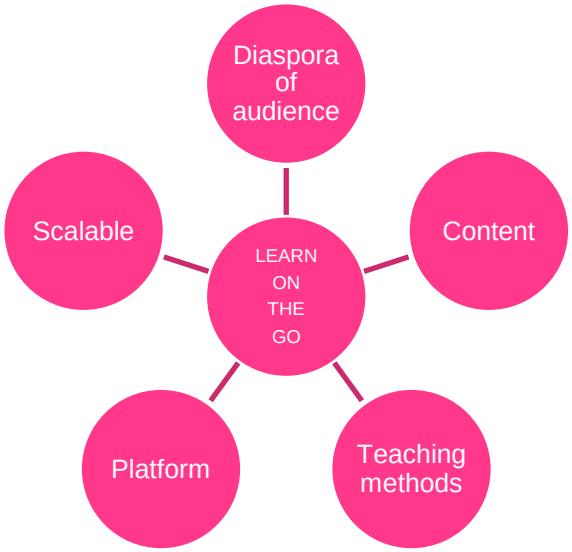
An Innovative Method of Learning

Need of the Innovation

Mr. Viswanadham Swarrupraj, MEG student of IGNOU experienced that there is huge gap between the intellectuals and the youth in terms of knowledge experience. Having done his B. Tech. in Electronics and Communication Engineering and having worked in the Banking Sector for a short period of time, Mr. Viswanadham Swarrupraj felt that this was not his chosen field. Working as a facilitator for Communicative Skills Classes in the Ramakrishna Mission Rajamahendravaram, he realized that this was a field that could enable him to find joy in the process of teaching and mentoring. Accordingly, he thought of developing an innovation to build a bridge between highly experienced faculty/intellectuals and the modern youth to inspire the latter to capitalize on knowledge, experience and advice of the elders and move towards greater heights of personal and professional evolution.

Brief Description of Innovation

According to Mr. Viswanadham Swarrupraj **LEARN ON THE GO** is an innovative methodology that translates education into real life through practice and service. The idea is to combine peer-to-peer teaching along with online teaching. The primary purpose is to heighten productivity, generate social capital and empowerment, through personality development along with English language skills and communication. He felt that a holistic personality development is the need of the hour. His team consists of himself, two Retired lecturers and three guest faculty who are all tech savvy.



TEACHING WITH TECHNOLOGY - ONLINE TEACHING

"Education is for Life, not for a Living"

Mr. Viswanadham Swarrupraj tells that leveraging technology and infrastructure with lean and agile approach, the combination of real and virtual classrooms is intended to reach out to a wide audience. Further, he highlights that this endeavour is to open young minds to the vast potential within themselves that will support them across the vicissitudes of life.

The concept of Online Teaching which is gaining greater prominence comes with its own set of challenges. One of the predominant factors related to online teaching is the connectivity between the teacher and the taught. It also comes in as a handy tool for enhancing the learners' capability. However, it is to be noted that there are a number of factors that have to be taken into consideration.

As a teacher of English Language, the first problem that we encountered was to create an ambience where interactivity could be ensured. The second problem relates to content material and the right use of audio-visual methods with proper feedback, sustained interest and progression in levels of efficiency. While it is true that the learner's interest can be captured through audio-visual methods, there is always a danger that some of the learners can tend to become passive recipients rather than active respondents. Moreover, the different levels of understanding of students can result in an imbalance of interactive sessions. This often results in a kind of one-way communication.

Thus the content material has been designed in such a manner that it is not too cumbersome both for the teacher and the taught. The use of Power Point Presentations and Audio Clippings has been tailored to meet the needs of the learner. It is therefore essential that the assignments should be such that they are easily done and do not go over the head of the students.

Creativity and ease of application to complete the assignments are crucial factors. The learner is given easy access to resource material through the printed books and also through assignments and activities like PowerPoint and Poster presentations that have been made by the students of previous batches. Role-plays, Quiz competitions, JAM sessions, Group Discussions and presentation of skits are some of the activities that the learners take up. There is continuous monitoring of the various programs throughout the course.

Technological problems in the classroom resulting in gaps and silences which can be a hurdle at both ends are overcome through the presence of the facilitator and the teacher being observant and enabling a smooth flow of the class. Financial constraints have not hindered the progress of teaching since adequate care has been taken to ensure a balanced and affordable infrastructure.

Since a decade, we have been experimenting a great deal to be able to reach out to the learners at different places. Our experience has shown that the learner has been provided with an opportunity to experience the importance of expressing himself or herself with greater confidence.

Recorded classes are made available to the learners who are unable to attend a particular session. It also provides a window to the institution to rope in experienced/retired faculty to share their knowledge/expertise with the learners. It can also help in cutting down the budget. It is thus a win-win situation where the senior faculty takes it up as a kind of service which is not really very strenuous. This provides an opportunity for the teaching faculty to have some breathing space that enables them to supplement their own resources. The teacher in the classroom will thus be in a position to correlate diverse views and amalgamate the content to suit the needs of the students.

All said and done, online teaching can be both frustrating and challenging in the initial stages but satisfying and rewarding in the long run.

While talking about the diaspora of audience, Mr. Viswanadham Swarrupraj tells that they are catering to Under-graduates, graduates, post-graduates, professionals and home-makers. Since they are strengthening the foundation, they are providing services on a non-commercial basis which can definitely be expanded to reach out to a wider section of society as they have all the required material and infrastructure.

Holistic content including language and communication, soft skills, managerial skills leading to personal and professional development at various levels. Books have been printed and published to suit the needs of the various categories of students.

Mr. Viswanadham Swarrupraj claims that in his innovation, the method of teaching is very interactive, learning oriented, pragmatic and contemporary. A balanced combination of online and offline tutoring on a wide range of topic is followed. Summer camps and workshops are held to enhance intrinsic skills of the learners and to instil in them a respect for culture and philosophy are organized. They are exposed to art, craft, communication and entrepreneurial skills.

While there are a number of platforms that can be used, he has chosen Wiziq. Further, he tells that WIZIQ is an interactive, comfortable online platform. Real time and recorded classes are available which registered students can access and download. PDF notes, Global connectivity between students and faculty, and being OS independent, provides an impetus to learners to use the inputs from "EXPRESS YOURSELF" and reflect upon various avenues of opportunities and professional progress.

Innovative Features

According to Mr. Viswanadham Swarrupraj, this innovative method of teaching-learning has several features, as given below :

- It has **Global Reach** as a web based platform is used.
- **Audience Relevant Appropriate Content** is provided and it is customized to need and degree of evolution.
- **Regular Monitoring and Evaluation (M&E) of Students** is done through attendance, assessment and progress reviewed, etc.
- There is connectivity among the students through Student Forums where students can also help each other. In turn, they can become facilitators for their peers and also for any one they choose.
- It has a provision of **Peer to Peer** intervention as an extension of the idea **Each One, Teach One**. It is applicable to different spheres of life skills and also acts as an eye opener to the members of the family as they learn to communicate in a free manner on different topics.
- This **Flagship Program** has a provision of **EXPRESS YOURSELF** in English Language and Communication has benefitted over 2000 students in the last seven years.

The innovation is low cost and highly effective due to the reasons including small, socially conscious, adaptive, innovative, tech savvy and experienced manpower; Minimum infrastructure and consumables; Lean methodology having minimum physical

resources and maximum digital resources; Appripriate IT infrastructure and Low CAPEX and OPEX.

LEARN ON THE GO is in use at two locations in Rajamahendravaram, East Godavari District, Andhra Pradesh. EXPRESS YOURSELF is the primary course being followed. This course is learner centric, primarily designed to build a sense of confidence and enable the individual to speak in English fluently. Mr. Viswanadham Swarrupraj was associated with this course in 2011 and later he become a tutor for the same, in real and virtual classrooms. After experimenting with technology he and his team moved to WizIQ platform. The scope of topics ranges from basic Soft Skills training to complete Event Management. A number of students have been trained for examinations like IELTS, BEC, Distance Education Support, Competitive Examinations and for general life-skills especially home-makers.

Future Scope of the Innovation

According to Mr. Viswanadham Swarrupraj at the present moment all the features of Wiziq are not being used, they are as yet to think of extending the services both locally and globally. It is possible to operate even with minimum infrastructure – a laptop and a headphone and then adapt and evolve with technology and scale up to suit any number of audience with appropriate IT support.

Further, Mr. Viswanadham Swarrupraj claims that in future, **Learn on the go** can be commercialized using the following models to suit the individual's/institution's need and resources.

(i) **Package/Pay per View – for Online Sessions :** This is if the program is being run by a small core team and is focussed only on leveraging technology akin to MOOCs. This can be extended through the use of websites and blogs which can be used for greater interaction and accessibility. The Process of Building Blogs and Websites have been started tkracademy.in and gateguru.org/learning.

(ii) **Revenue Sharing Model :** A partnership model where content can be provided by the core academic team while the infrastructure : Civil and IT is brought in by the partner. The fee paid by the participants goes to sustain the program.

(iii) **Entrepreneurial Model :** The entire IPR is bought/licensed out to an entrepreneur who can replicate the model according to his/her budget or scale.

(iv) **Knowledge Partner Model :** Established institutions can hire the services of **LEARN ON THE GO**, as part of their internal L & D programs. At present online classes are being held for the students of Ramakrishna Mission High School – Vijayawada as a measure of building up competency in Language Skills. This is a voluntary project.

About the Innovator

Mr. Viswanadham Swarupraj is a MEG Programme (177289132) student of IGNOU studying through Regional Centre, Vishakhapatnam. He is very much keen to experiment new and innovative methods of teaching-learning. He can be contacted at email swarup492@gmail.com and Mobile 8106345129.

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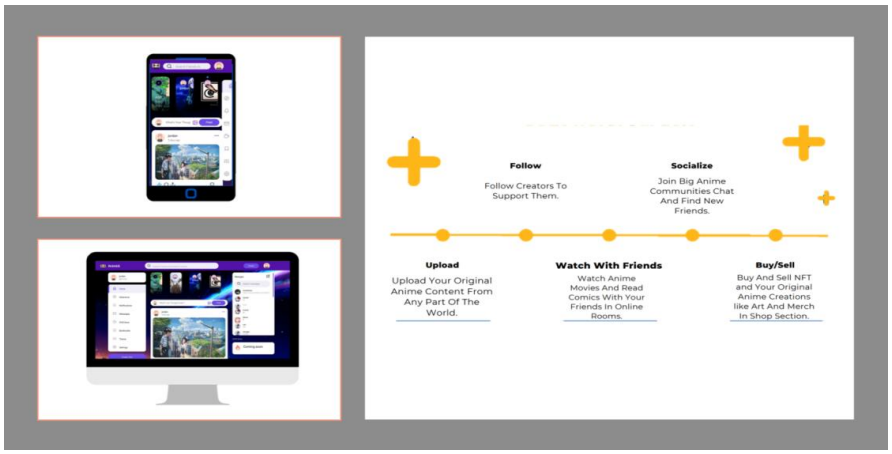
Animick

An Anime Social and Streaming Platform

Need of the Innovation

Mr. Sahil Kushwah, a BCA student of IGNOU observed that with the advancement of technology and increased use of social media, people particularly the young generation is more interested in creating and joining the focused groups of their interest. They want to create public as well as private discussions in the form of short animated video with end-to-end encryption. Keeping it in view, he felt to developing an innovative, interesting app to make the like minded communities to connect with each other.



Brief Description of Innovation

According to Mr. Sahil Kushwah Animick is the world's first web3 anime social and streaming platform where millions of anime fans can watch and enjoy anime with their friends. They can make communities connect with people around the world and make friends. It's a place where viewers can easily be creators, they can create public and private discussion and chill rooms where they can watch and play games with their friends, discuss different topics, watch short animated videos on the WeebPlay section, and chat and video call their friends with end-to-end encryption. In the shop section, anyone can sell and buy their creative NFT and other digital assets. They can also place bids on Animick's original NFT, which will be released every month from our side. It will be a hub for every anime viewer and creator. The prototype of the innovation can be seen at : https://www.animick.com.

Innovative Features

While talking about the innovative features of his innovation, Mr. Sahil Kushwah highlights the main features as given below :

- It will solve the problem that viewers currently face, which is basically about the lack of variety in anime on other platforms. As in Animick, anyone can be a creator, so there will be a lot of variety.

- Users can watch Anime Premiere with other users and watch it with their friends in voice chat or video call, which will give them a more social feel.
- Anyone can mint NFT and trade with each other.
- It will give more opportunities to small creators from all over the world.

Future Scope of the Innovation

Mr. Sahil Kushwah tells that right now, the target audience of this innovation is teenagers from all over the world. It is found that normally 3 out of 10 teenagers watch anime. It mainly focuses on the entertainment industry. Further, he says that presently, everyone wants to learn new skills such as animation. So, for them, this platform can be the best place to earn and showcase their skills to the world. Animick has a potential to connect people with similar interests. In future, it can also unlock many markets for people that were never discovered till now.

About the Innovator

Mr. Sahil Kushwah is a BCA Programme (2200054707) student of IGNOU studying through Regional Centre, Delhi-2. He can be contacted at email sahilsinghkushwah@gmail.com and Mobile 9718047774.

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Interkith

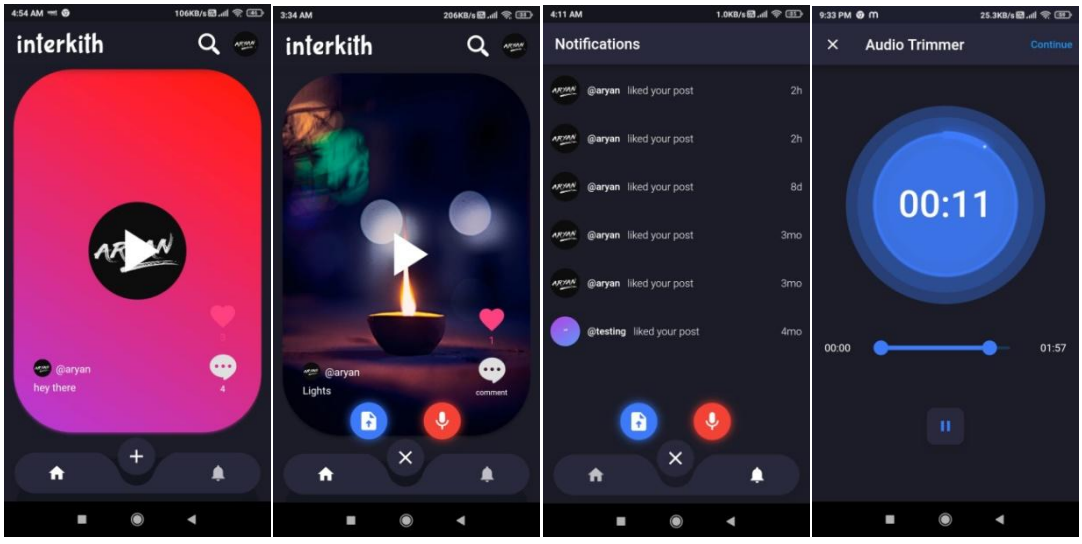
An Online Platform to Create and Share Short Audio Content on the Go

Need of the Innovation

By doing some market research, Mr. Aryan Kumar, a BCA student of IGNOU found that amateur audio content creators who do not have access to the appropriate equipment and software to create good quality content like the idea, they normally create audio content using their smart phones. Further, he tells that even platforms like Instagram suggest users to record audio on one device and edit it on some PC software, but for that purpose, the software with more features are generally paid. Keeping this need of people in mind he thought student of IGNOU of designing and developing a platform that allows users to create and share short audio content on the go using only their smart phones.

Brief Description of Innovation

While describing the details of his innovation, Mr. Aryan Kumar tells that currently he is working on a social media platform called Interkith. The goal is to create a platform where people can find others who share interests with them. The idea to incorporate the feature to display their interests was also added. And since interests have no limit, the idea is to use the same principle as the search engines allow users to enter their interests in the list and then use algorithms to find out other people who have similar interests. Also, the platform would allow users to create and share short audio content.



Presently, when a user signs up on the platform they get to pick their interests from a list provided. These interests then show up on the user's profile and also, in the explore section of the application. The user could then upload a pre-existing audio or record something in the app itself. The audio can also be edited (right now only cropping of the audio can be done). Also, since creators wish to share their content on multiple platforms,

the audio is converted to a video with a 'cover image'. This cover image can be edited in many ways, like changing the background image, adding a single color background, a gradient background, or even adding text or just some drawing on the screen. This allows the users to share their content on as many platforms as they like. Since the application was made using Flutter, it is ready to work on both Android and iOS devices. The motivation to use Flutter was that I needed to maintain only one codebase for the application. The application uses FFmpeg for all the editing processes. The UI was designed with the intention to make it as intuitive as possible and keep things simple yet elegant to allow users the ability to easily edit the content they create. So the milestones achieved are validation of the idea, the creation of the platform using Flutter, and adding the features like selecting interests from a list, creating\uploading existing audio content editing them a bit, and designing the cover image to share the content.

Innovative Features

Highlighting the innovative features of his innovation Mr. Aryan Kumar tells that his product Interkith has following innovative features :

- Presently, users have to use different applications to create, edit and share audio content, with our application, you would only need one application. (Amateur singers do not have access to many equipments to create good quality audio content.)
- This application allows user to select their interests and thus, allows them to find people with the same interests.
- This application also has a very easy-to-use UI, that anyone could quickly learn how to use.
- Presently, there are very few applications that allow people to create and share audio content, so our product is one of the few applications with this feature.
- People can show what their interests are, which allows everyone to connect themselves with like-minded people.
- This application converts the user-created audio content to a video clip that can then be shared on multiple platforms and not just Interkith, thus allowing users to get their content to reach more people.

Future Scope of the Innovation

Mr. Aryan Kuamr tells that the Interkith has the first mover's advantage in the category of applications that would allow user to create, edit and share short audio content using only their smart phones, thus, it has the potential to attract all initial users. Further, he informed that as Interkith is being made by analyzing shortcomings of existing social media applications, therefore, people who wish to use something new and improved would love to use Interkith. He also in future plans to use advertisements as a means for revenue generation. In addition to it, users could also promote their content for reasonable charges for more engagement.

About the Innovator

Mr. Aryan Kumar is a BAC Programme (2107513996) student of IGNOU studying through Regional Centre, Ranchi. He can be contacted at email aryan.shandilya14@gmail.com and Mobile 9472709222.

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ABOUT THE BOOK

Innovation is considered to be a key driver in the socio-economic growth and development of a Country. Recognizing the importance and potential of innovation in making *Atmanirbhar Bharat*, NCIDE, IGNOU has been identifying, supporting and mentoring the Innovator Students and Alumni of IGNOU. During the last five years, IGNOU has identified a number of Innovator students and best few of them have been awarded with the Best Innovation Awards.

In order to recognize their innovative work and also to motivate other budding innovator, NCIDE has compiled and documented their innovations in the form of this Book "Stories of Innovations by IGNOU Students". Each story of innovation highlights the Need of that Innovations, Innovative Features, Brief Description of the Innovation and its Future Scope. It is hoped that this book will not only boost the morale of the innovators whose innovations are included in it, but it will encourage and inspire other students also towards innovation.

ABOUT NCIDE

The National Centre for Innovation in Distance Education (NCIDE) established in 2005, at the Indira Gandhi National Open University (IGNOU). It is mandated to promote, support, re-engineer, document and disseminate innovations in the Open and Distance Learning (ODL) System. It is a ground for nurturing bright minds whose ideas would to lead to innovations the ODL System. The mission of the Centre is to create and nurture a culture of continued search for innovative solutions aligned to the University's mission to offer cost-effective, seamless and quality education to its learners. The main objectives of NCIDE include : Providing intellectual, financial and technological support to innovators. Encouraging innovations in ODL through collaborations and networking in India and abroad. Working as resource centre for prototype development of innovative learning and support solutions. Conducting research studies in the areas of innovation in the ODL system, enabling research based framework and guidelines for standardization and total quality management of all facets of the ODL system. Documentation and dissemination of the innovations in the ODL system. Capacity building of the functionaries for innovations in ODL. Development of innovative programmes, guidelines, mechanism for creating culture of innovation in the University.

NCIDE is very actively creating and nurturing an Innovation Ecosystem in the University. For the purpose, a variety of activities are being organized. Recognizing its performance and contribution, NCIDE has been conferred with the Best Centre Award.

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