

Cluster
Innovation
Centre



संकुल
नवप्रवर्तन
केंद्र

*...Evolving Senses
Dissolving Boundaries...*

Musé

Projects at a glance

Volume II (2015 - 2018)



Cluster Innovation Center
University of Delhi

“Learning gives creativity, Creativity leads to thinking, Thinking provides knowledge, Knowledge makes you great.”

APJ Abdul Kalam

At Cluster Innovation Centre, we endeavor to harness the passion and dedication of bright young minds with some of the major challenges of societies and industries especially relevant to India. We strive to stream relevant ideas and projects into our learning and research programmes thus enabling students to acquaint themselves of the real world program. The projects undertaken by the students come from a plethora of diverse streams ranging from innovation in education to information technology to social sciences. The collation of multifarious projects like Semester-long projects, Summer internship, Innovation projects, Internship in education setting, Industrial mini projects not only encourage students to participate enthusiastically in the welfare of society or enable them to be future entrepreneurs but also assist them in learning team spirit, working in challenging environment and learning from internal mentors as well as external experts.

The second volume of Muse is a selected anthology of the myriad projects undertaken by students of Cluster Innovation Centre in 2015-2018. A few selected projects have external mentors and a few have CIC faculty members mentoring students from other institutes. In continuation with the previous edition we have broadly categorised the projects under the following sections:

- Delhi University Innovation Projects
- Projects in Tourism
- Projects in Counselling
- Projects in Journalism
- Projects in Education
- Projects in Information Technology
- Projects in Robotics and Electronics
- Projects in Applied Mathematics
- Projects in Systems Biology
- Projects in Social engineering
- Projects in Economics and Management
- Projects in Environment and Ecosystem

Table of Content

Innovation project	05
• The Vanishing Portuguese houses of Goa: Pointer Of Ecological Disaster	05
• Impact Analysis of Programmes for Enhancing Undergraduate Learning and Teaching Experiences through Innovative Projects.	06
• Innovatively designed physics experimental modules with link to interactive website and mobile app.	07
• Exploring Solar Energy And Its Applications: Fabrication Of Day To Day Utility Appliances/Devices.	08
• Innovating for Village Transformation: An Exploration of the Hiware Bazar Model of Rural Development	09
• Holistic Approach of Fighting Cancer: From Prevention to Cure	10
• Developing an Affordable Three-dimensional Bioprinter Facility	11
• Translating “Lilavati of Bhaskara” in the realm of present Mathematics Curriculum	12
• Weaving Dreams for Destitute	13
Tourism	14
• Environmental Management & Tourism Potential: A Case Study of Yamuna Biodiversity Park	14
• Exploring Tourism Potential at Mehrauli Village	15
• Historical Insignia – Delhi University Explored	16
• Hafta Bazaar - Swarming Market Place of Delhi	17
Counselling	18
• Child Sexual Abuse (CSA) Project	18
• Interpersonal Transgender Relationships	19
• Menstrual Hygiene Management	20
• Indian Sign Language and Police	21
Journalism	22
• Mediating Identity: A Case Study on Dalit online media presence in India	22
• Documentary Film Production	23
• In the Depths of Marginalization: Sewage Workers in Delhi	24
Education	25
• Banking of Roads	25
• Representation of Relation Between Radiant & Degree (Working Model)	26
• Developing Prespectives from 3D to 1D	27
• Comparison and applications in real life of Binomial, Poisson, Normal, Exponential and Gamma distributions	28
• The Hungarian Game (Assignment Problem: Hungarian Method)	29

• Magic Polygon: A Game Based Pedagogy	30
• Highlights of Education Reforms Since Independence	31
• 'Not Just Books'	32
• Probability through Geometry	33
• Calculus Behind Arbelos	34
• Probability Slot Machine	35
• Revisiting Tangram for Mathematical Concepts	36
• Mathematics Through Tessellation	37
• Conceptual Mathematics Dictionary	38
• Concretizing Exponents and Powers	39
• Impact Assessment of Bal-Gurukul Model of Child Education	40
Information Technology	41
• Online Marks and Attendance System (OMAS)	41
• Library Management System: DigiLib	42
• Predictive Analysis of Alertness Related Features for Driver Drowsiness Detection	43
• Spatial Intelligence in way finding	44
• Emotion Recognition Using EEG and Facial Expressions	45
• Self-Driving Car	46
• API for Gensim	47
• Book Seekers App	48
• Artificial Intelligence Tool for Assisting in Patent Examination	49
• Text Factorization Using Deep Learning	50
• Exploring Speech Recognition in ROS	51
• Belt for blind	52
• Behavioral analysis of Malware using Machine Learning	53
• Lissajous on Paper: A physics game	54
Robotics	55
• Autonomously Indoor Mapping Quadcopter	55
• Digitization And Analysis Of ECG Paper Records	56
• Self-Balancing Skateboard	57
• Gesture Controlled Robotic Arm	58
• Cell Phone Detector (A handy device to avoid cheating in examination)	59
• Solar hygiene trash can	60
• Arduino based home security system	61
• Effect of absorber plate on efficiency of PVT Module	62
• Autonomous Mobile Robots	63
• Spotter Snake	64

Applied Mathematics	65
• Monetary Policy Shock Analysis Using Structural Vector Autoregression (VAR)	65
• Fix my eyes	66
• The Road Coloring Problem	67
• Develop Quantifying Understanding of Diamond Table: A data analysis Approach	68
• Pollution in India: Trends and Relation with Possible Causes	69
Systems Biology	70
• Brain Computer Interface: Applications specifically for paralyzed persons	70
• in silico analysis of active site of H3ase	71
• Searching Pathogenic Motif-ome with special references to Mycobacterium tuberculosis and Campylobacter jejuni	72
• Finding and analyzing the repeating sequences in a Proteome	73
• Quantification of Retinal Tissue Damage	74
Social Engineering	75
• Communal Harmony	75
• Exploring Dimensions of racial discrimination experienced by Northeast students living in Delhi	76
• Intervening in Dhakka Village: Slum for Clean Delhi	77
• Issues of Sanitation In Kathputli Colony	78
• Impact of Internet shutdowns on society	79
• Data analytics of the demographic data of cancer patients from India	80
Economics and Management	81
• Comparative Study of Techniques for Stock Trend Prediction	81
• Project Management System: Project House	82
• Developing an Effective Algorithm for Logistic Management : A Case of Go4Fresh	83
• Good & Services Tax (GST) and its impact on automobile industry	84
• Influence of Controversial Advertising on Consumer Behavior	85
Environment and Ecosystem	86
• The Study and plotting of Pollution in River Ganga from Major Industries using ArcGIS	86
• Garbage to gold	87
• Birds of India: A perspective of IUCN categories from eBird dataset	88

The Vanishing Portuguese houses of Goa: Pointer Of Ecological Disaster

DU, Innovation Project CIC 301 (2015-16)

Student's Name/s

Ana Sinha, Abhinav Gholap, Abhijit Gholap, Manali, Saurabh Tripathi, Rajnish Kumar, Krishnan Kumar, Abhinav Mandal, Upasana and Nitesh Kumar

Mentor's Name

Dr. Nirmal Kumar, Dr. Jeevan and Ms. Khyothunglo Humtsoe

Abstract

This project did review of literature, undertook field visits to Archives, museums, libraries and Goa, and had focused group discussions with experts on Goan houses and locals of Goa and took photographs of the unique elements of Goan houses. Observations were recorded and analyzed using multiple sources of information. Conclusions drawn include poor awareness about the diminishing traditional Goan houses and the ecological impact, the impact of tourism leading to lesser construction of Goan houses, lack of understanding about the sensibilities of having a traditional house, apathy of decision-makers to address this issue, and arbitrary laws on environment, construction and occupancy worsening the situation further more.

Important outcomes of the project

In the course of our work on the project we observed that there is little or no awareness about the linkages between environment and the traditional houses in Goa. The urban necessity and peer pressure forced them to leave the traditional housing and opt for apartment style or independent housing constructed with new material that does not compliment the local environment.

Future prospects

Consultations with various stakeholders and spread awareness about the research findings.



Impact Analysis of Programmes for Enhancing Undergraduate Learning and Teaching Experiences through Innovative Projects

DU, Innovation Project CIC 302 (2015-16)

Student's Name/s

Jai Verma, Swastik Tejasvi, Kirti Krishan, Prashant Shubham, Ameya Aatman, Divyadarshan C. Ayush Shukla, Ashish Yadav, Harshit Rakheja,

Mentor's Name

Dr. Dorje Dawa & Dr. Deepika Bhaskar

Abstract

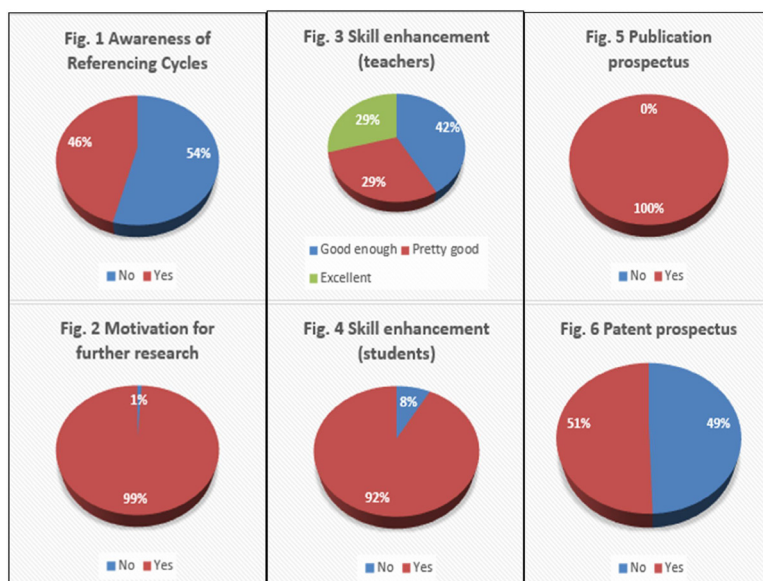
This project aims at studying the scheme of the Research Council called DU Innovation Projects and to identify ways of enhancing the undergraduate learning and teaching experiences through such project oriented schemes. It analyses UG education and the need to shift focus towards learning and teaching experiences. It develops a typology of schemes for UG students run by top public collegiate universities around the world and identifies DU Innovation Projects to be a very effective scheme in addressing several of the big challenges facing Institutes of Higher Education in India. It collects data through an online survey, an offline survey and through case studies and interviews of teachers. It concludes that the scheme has great potential and proposes some administrative changes in the scheme that can help achieve this potential. Also, it emphasises on the need for combination with other initiatives for enhancing the impact.

Important outcomes of the project

Research outputs were both quantitative and qualitative, in terms of innovative approaches to real life solutions (as shown in figure 1-6). Besides, the innovation projects also bring University-Industry linkage and University-Community linkage.

Future prospects

Undergraduate innovation/research projects should be made mandatory in the syllabus.



Innovatively designed physics experimental modules with link to interactive website and mobile app.

DU, Innovation Project CIC-303 (2015-16)

Student's Name/s

Sagar, Rajan Maurya, Pawan Kumar Pal, Animesh Aman Kumar, Anuj Maurya, Anushtha Kalia, Pankaj Baranwal, Rddhima Raghunand, Sumit Lakra And Vinay Raj

Mentor's Name

Prof. Pankaj Tyagi, Dr. Sanjeev Singh , Dr. Ashutosh Bharadwaj

Abstract

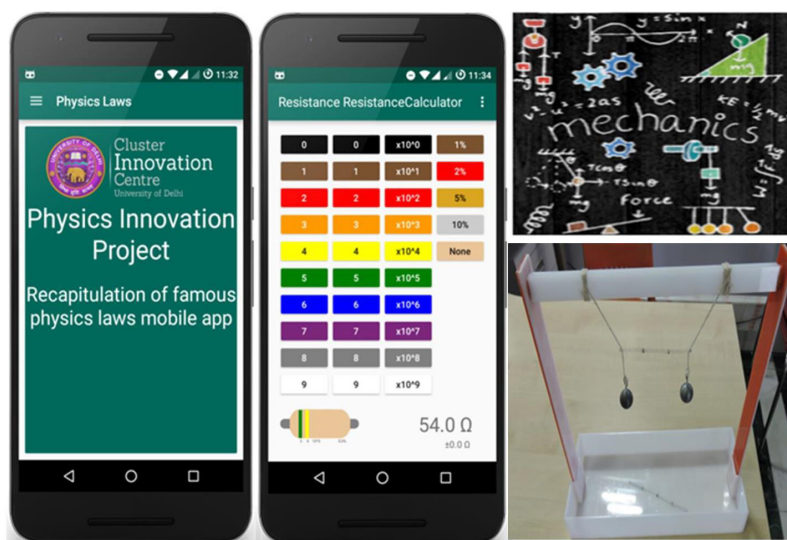
Innovation is must for teaching pedagogy. Physics is both a basic as well as applied science and its clear understanding leads to a strong foundation for pursuing career in any science and technology field. Invention of newer technologies and its integration with the society at much faster rate has brought a change in the aptitude and mindset of learning in the current generation. It is now pertinent that we too integrate technology in our teaching pedagogy and provide to the students innovative methods of learning concepts so that they feel a natural liking for physics. This project proposed to develop innovative kits to make understanding of physics concepts of oscillation, coupled pendulum and alternate energy simpler.

Important outcomes of the project

1. Physics Card Game
2. Mobile app for quick recapitulation of famous Laws of physics
3. Simple pendulum oscillation Kit –, Interactive Website, Mobile app
4. Coupled pendulum oscillation kit – Modes of vibrations, Interactive website, Mobile app

Future prospects

Design of kits shall be improved and then these can be used in schools for teaching physics concept in better manner.



Exploring Solar Energy And Its Applications: Fabrication Of Day To Day Utility Appliances/Devices

DU, Innovation Project CIC-304 (2015-16)

Student's Name/s

Amogh Babbar, Karan Dhingra, Utkarsh Mishra, Yukti Chopra, Shreya Choudhary, Yatharth Aggarwal, Mayank Chauhan, Ridhwanluthra, Vaibhav Sharma, Harshit

Mentor's Name

Dr. Swati Arora, Dr. Vinamrita Singh, Ms. Sonal Singh, Prof. R.P. Tandon

Abstract

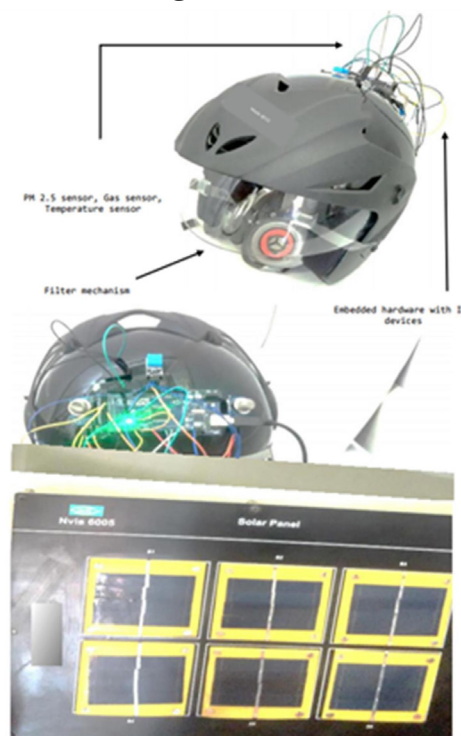
This innovation project presents a unique design and prototype of a helmet capable of providing a comfortable and salubrious experience to the Delhi-NCR riders. The design uses the technology of thermoelectric cooling to provide cool air for the users through solar energy trapped by solar cells placed on the top of the helmet. A fan sucks the hot and polluted air from the outside, and pumps clean and cool air on to the face of the rider. The air first passes through the filters and then through the thermoelectric Peltier cooling unit. Further, temperature sensors are used to adjust the level of cooling or temperature inside the helmet. Also, an adjustable switch is provided, as an alternative to the user, through which he can control the temperature.

Important outcomes of the project

A working prototype with all the mentioned elements and tested for its comfort and usefulness for the user has been successfully developed.

Future prospects

Several iterations would be required to build the prototype lighter in weight and to have on-board solar panel for its efficient working.



Innovating for Village Transformation: An Exploration of the Hiware Bazar Model of Rural Development

DU, Innovation Project CIC-305 (2015-16)

Student's Name/s

Nand Lal Mishra, Saurabh Patel, Tarun Kasana, Vivek Kumar, V. Ashish Suman, Santosh Kumar, Amit Kasana, Natasha Sharma, Vineet, Ananya

Mentor's Name

Dr. Vikas Kumar Verma, Dr. M. Saleem Mir, Dr. Nirmal Yadav

Abstract

Hiware Bazar template of village transformation is a true example of sustainable development approach. This project aimed at creating a development model for rural development based on the transformation in Hiware Bazar, Maharashtra. Our survey revealed that the major problem at Hiware Bazar during the phase earlier to its transformation was that of insufficient water either for agriculture or for other uses. The efforts to overcome this problem brought about massive transformation in the village. On the other hand Garhi Kalanjari of Baghpat district of Uttar Pradesh, faces lack of infrastructure in health, education and transport and lack of adequate funds for development activities. Majority of the population are dependent on agricultural and dairy livestock.

Important outcomes of the project

The innovation shown by the project is both in terms of process and product. Based on transformation model of Hiware bazar and other Adarsh Gaon in Maharashtra, a template has been proposed in order to implement measures in other rural areas to achieve development. Nevertheless, the specific problems of villages in different areas also need to be kept in mind while devising any plan or model. For this purpose, a hands-on approach was chosen by the project team and instruments like documentary, pamphlet and brochure, and blogs were made to approach the villages. The project group members helped set up a public library in the village. A cleanliness drive was also organized as part of the project. The nearest bank was 18 km. from the village. The project group members met relevant authorities to open a branch of the bank in Garhi Kalanjari. The project group members also met relevant authorities to reopen the government hospital in the village.



Holistic Approach of Fighting Cancer: From Prevention to Cure

DU, Innovation Project CIC-306 (2015-2016)

Student's Names

Ronit Kishore, Ishaan Arora, Parul Sethi, Vani Singh, Kunal Rao, Ayush Raj, Awesh, Shivani Singh, Chaitali Saini, Rahul Yadav

Mentor's Name

Dr. Mahima Kaushik, Mrs. Alka Dutt,

Abstract

Cancer is the second cause of premature deaths globally and is one of the topmost concerns in medical field. Under this project, we utilized a four tier approach for working. Using data from Indiastat website and population census 2011, cancer density in various states was calculated, which was further mapped in India. Further, offline and online surveys were conducted for data collection on the basic knowledge about cancer. On the basis of above information, the strategies for providing information on cancer with an aim for creating awareness on cancer had been conceived. This resulted into making a website and different apps on cancer information and awareness. Also, for gathering basic knowledge about cancer, some bioinformatics and wet lab experiments were performed. This resulted into a hands on experience on various laboratory techniques.

Important outcomes of the project

Some of the outcomes of this project are summarized as follows:

- Innovative maps of India were created utilizing available cancer data. These maps show the changing pattern of the cancer ratio from time to time.
- An innovative approach of performing offline and online survey was carried out.
- Interesting and innovative web and android apps were created.



Developing an Affordable Three-dimensional Bioprinter Facility

DU, Innovation Project CIC - 307 (2015-2016)

Student's Name/s

Ankit Kumar Pathak, Kapil Kumar, Sumit Kumar, Ankur Prasad Singhal, Ayush Mehra, Amit Kr. Singh, Abhishek Kr. Sharma

Mentor's Name

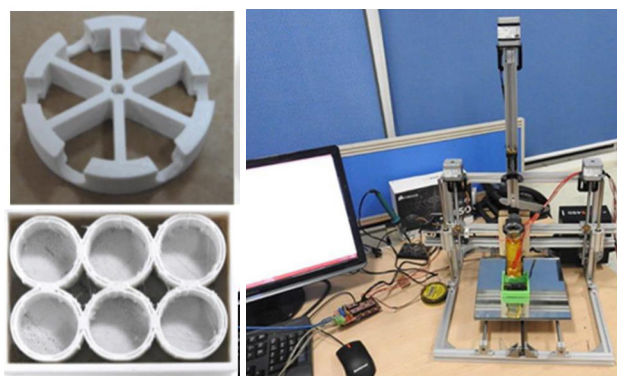
Dr. Asani Bhaduri, Dr. Daipayan Dasgupta

Abstract

The future of tissue engineering and regenerative medicine lies in 3D printing stem cells into precise configurations and letting them do the work growing the living tissue. However, we are very much at the nascent stages of bioprinting and have to go a long way to have a functional organ development in a cost-effective manner. In this innovation project, we aim to create an affordable three-dimensional bio-printer. It could be used to print economical bio-equipment for routine use. We have tried to create certain technological advances in the pneumatic controlled sugar extruder and stepper driven extruder of the 3-D printer. This project has tried to develop removable/partitioned tissue culture plates and semi-natural/bio-scaffold. In continuation of this innovation project we are planning to study temporal and spatial co-culturing of cell-lines and using semi-natural scaffold material will try to understand several cellular functions and try to create mini-tissues.

Important outcomes of the project

The Bioprinter was assembled in a price almost one tenth of the printers available in the market. Apart from the cost-effectiveness by choosing tools and 3-d printing the subsets itself as described above, the 3-D printer is also unique for the sugar extrusion assembly. Several commonly used bio-equipment have also been printed with a novel partitioned six well plate is designed which could be used in the future for cell to cell interaction and other biological studies



Future prospects

The objective of creating a mini-tissue using stem cells was not yet fulfilled due to the paucity of a cell culture laboratory in the Centre. However, we are in the process of setting up the facility and utilizing different mammalian cell-lines for position specific co-culture. Also creating multi-layered cell culture using adherent mammalian cells and iPSC cells, to check cell-cell interactions and effect of drugs on infected cell lines are to be taken up as the next part of the project

Translating “Lilavati of Bhaskara” in the realm of present Mathematics Curriculum

DU, Innovation Project CIC-308 (2015-2016)

Student’s Name/s

Arvind Kumar, Divya Soni, Kuldeep, Lavnish, Ajay, Rajat Tiwari, Dhiraj Kumar, Siddharth, Anil

Mentor’s Name

Dr. Jyoti Sharma, Dr. Harendra Pal Singh, Mr. Anjani Kumar

Abstract

The present project aimed to study classical Indian treasure, ‘Lilavati of Bhasakara’, written by Indian mathematician, Bhasakra II, as a foundation to present mathematics and to connect ancient concepts & methods to the present school mathematics curriculum. Lilavati of Bhaskara is a collection of mathematical concepts, definitions, puzzles and problems situated in interesting contexts. The book is a rich source of logical arguments, mathematical insights and creative expression. Our aimed to explore Lilavati of Bhasakaracharya, translated by Krishnaj, Somashekara and Shyam Lal Singh, as a source to revisit already learned mathematical concepts, analysed standard algorithms of doing mathematical operations and correlating both methods (algorithm proposed in lilavati and standard algorithm).

Important outcomes of the project

The main outcomes of this project is the relevance of Lilavati in Present School Mathematics Curriculum and the development of Mathematical Activities based on Lilavati such as interactive games.

Game: King Banega Kya !

Nature of Game: Board Game Targeted Mathematical Concept: Conversion of Money (from Ancient currency to Present day currency)



Weaving Dreams for Destitute

DU Innovation Project CIC -310 (2015-2016)

Student's Name/s

Ashish Sharma, Prashant Manda, Pragya Agarwal, Simran Sahoo, Vivek Tambi, Shreya Agarwal, Simranjeet Kaur, Sri Vedant, Pappu, Abhishek Chikkara, Gourav Kalbalia and Shashank Tekriwal

Mentor's Name and Affiliation

Prof. Shobha Bagai, Dr Sonam Singh, Mr Sachin Kumar

Abstract

Weaving dreams for the destitute started as an innovation project in Cluster Innovation Centre that aims to identify and propose problems faced by homeless people using the night shelters of Delhi. Delhi faces severe winter, which makes it difficult for the homeless people to spend their nights on the streets. Around 165 people died of cold in Delhi last winters, eighty percent of whom were said to be homeless.

Outcome

The project went through an extensive field visit to understand how night shelters work, who operates them, how they are funded, their capacity, living conditions and sanitation, and their distribution across the city. We surveyed people around above a dozen night shelters in order to get a clear understanding of the problems persisting in the night shelters.



Environmental Management & Tourism Potential: A Case Study of Yamuna Biodiversity Park

Semester Long Project

Student's Name/s

Harshit Rakheja, Jai Verma, Kritika Gosain, Swastik Tejasvi

Mentor's Name

Dr. Mohd. Saleem Mir, Dr. Faiyaz A. Khudsar

Abstract

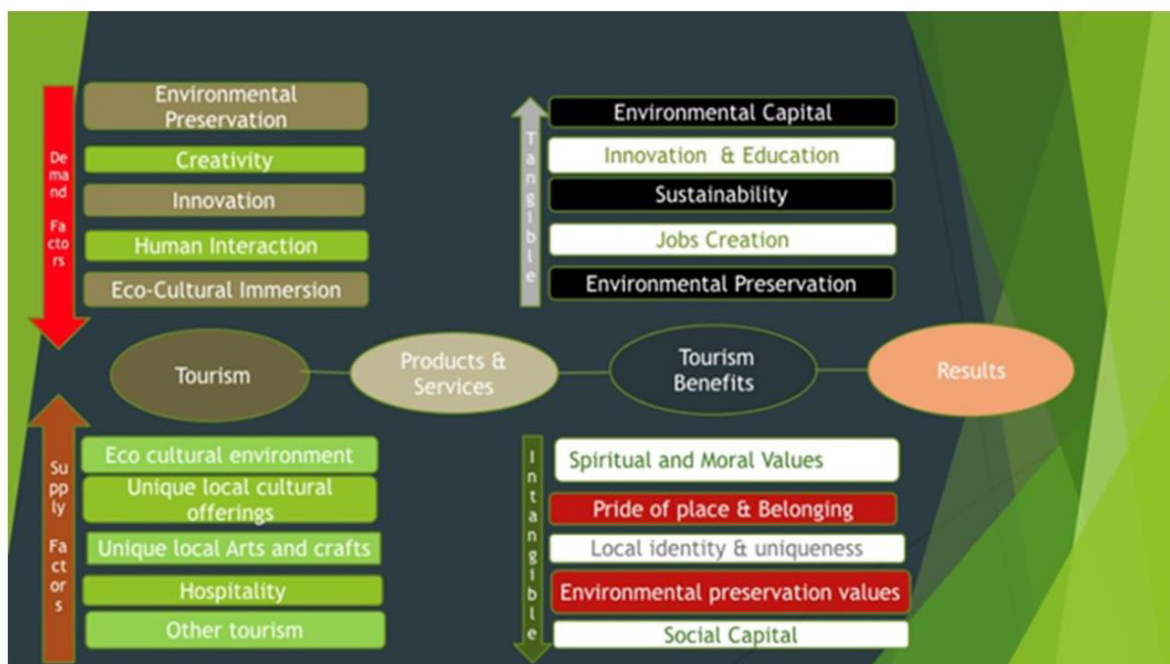
The project aims at (1) exploring the visitors' changing perspective at Yamuna Biodiversity Park; (2) devising and suggesting a ticketing system for the park; (3) exploring various media through which the park can move towards self-sustenance such as devising a revenue model for the park; and (4) understanding the environmental management at YBP. These objectives are addressed through the research tools of survey and questionnaires and the data is analysed through quantitative statistical techniques. Proper Inclusion-Exclusion Criteria are used to select the respondents for data collection.

Important outcomes of the project

This project devised a suitable revenue generation model for the Park through the fiscal instrument of Ticketing to increase the economic, environmental and natural propensity in the Park and the surrounding areas.

Future prospects

The implementation of the Revenue Generation Model can create a stable source of income to compliment the monetary benefits of the Yamuna Biodiversity Park, Delhi.



Exploring Tourism Potential at Mehrauli Village

Semester Long Project

Student's Name/s

Nitish Kumar, Lalit Yadav, Divyanshu Rajpurohit, Altaf Hussain, Suraj Goyal, Arif Ali, Dushyant Yadav

Mentor's Name

Dr. Aadil Zubair

Abstract

Mehrauli is the oldest of the 'seven cities' of Delhi established by Raja Anangpal of the Tomar dynasty in 736 CE. The strategic location of Mehrauli helped it to serve as the capital city of various ruling dynasties during the Early Medieval and Medieval periods. The city held its sway during the Late Mughal and colonial periods as is attested by the presence of monuments belonging to these periods at the place. The present day village of Mehrauli and its immediate environs are full of monuments, structures, architectural features and relics of the bygone ages, reflecting upon a rich cultural diversity and syncretism. It also houses the world famous Qutb Complex and Mehrauli Archaeological Park which see the highest tourist footfall. However, the fact remains that a large number of monuments located within the densely populated alleys of Mehrauli village remain away from a tourist's gaze and are in a neglected state of preservation. This project was primarily focused at scouting for these unsung monuments and remains of the past, cataloguing and documenting them.

Important outcomes of the project

The project helped to locate, identify and document a large number of monuments un-represented monuments located at Mehrauli and helped to devise or create modules for these monuments to be included in the mainstream tourism industry. The projects also helped to create an awareness among the local community about the value and significance of the rich heritage in the area and sensitized people towards its conservation and preservation through community interactive workshops and other activities.

Future prospects

The rich and diverse heritage of the area which largely remains neglected and away from the public purview can act as a treasure house for the development of tourism related activities. The need of the hour is to make efforts towards the preservation and conservation of the vanishing heritage in the area by sensitizing the local population and the concerned authorities before it is too late.



Historical Insignia – Delhi University Explored

Semester Long Project

Student's Name/s

Anamika Bhaumik, Nityanand Tyagi, Lalit Kumar, Dushyant Yadav, Shweta Choker

Mentor's Name

Dr. Mohd. Saleem Mir, Dr. Aadil Zubair

Abstract

The project attempted to explore, study and understand the rich cultural and architectural heritage of the North Campus of the University of Delhi. The aim was to create an awareness among the people who study, work and reside within the confines of these spaces about the historical legacy and significance of the buildings and spaces, which stand witness to several events and happenings of the of the past that shaped and helped the University to evolve over time. A heritage walk was devised and carried out on a designated route/trail covering several collages and historical buildings such as Ramjas College, St. Stephen's College, Miranda House, Hindu College, Viceregal Lodge, Gwyer Hall and several other monuments and spaces in the area.

Important outcomes of the project

The project was a great learning experience for the students to gain an insight into the historicity of the University and also opened them to various new or innovative ideas towards the promotion and conservation of the rich heritage that the University of Delhi houses.

Future prospects

The area is littered with a plethora of monuments and vestiges of the past which can be documented, studied and promoted by bringing out their historical and cultural significance through heritage walks and other such events.



Hafta Bazaar - Swarming Market Place of Delhi

Semester Long Project

Student's Name/s

Abhishek Kumar Sharma, Abhishek Kumar Singh, Ashish Kumar Yadav, Ayush Shukla, Kirti Krishan, Shubhrat Katiyar

Mentor's Name

Dr. Asani Bhaduri

Abstract

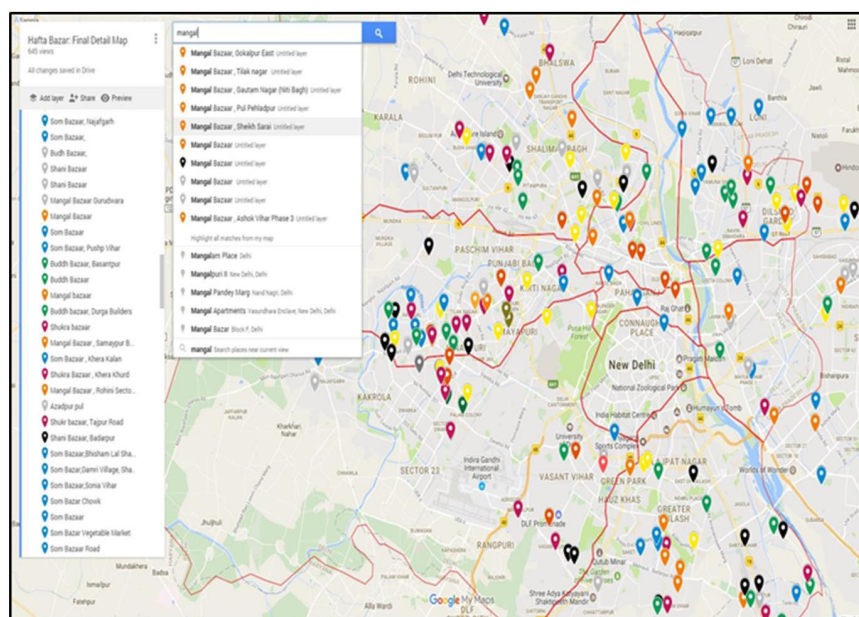
Delhi is an amalgamation of various cultures of our country. Weekly market/Hafta-bazaar/Haata has been part of Delhi's age-long culture and people from different strata of society visit these markets for buying various products like fresh vegetables, clothes, utensils etc. These markets are mobile and shift locations on each day of the week, catering to a diverse spectrum of consumers. Although Hafta-bazaar plays an important role in market dynamics as well as urban planning of Delhi but there is no proper documentation of Delhi's Hafta-bazaar. The Project Hafta Bazaar- The Swarming Market Place of Delhi at CIC aims to document Hafta-bazaars of Delhi. This documentation will help people to get information about their nearest Hafta-bazaar. The information will include the day and timing of the Hafta-bazaar, the exact location of Hafta-bazaar, how to reach market and list of common products sold in the market.

Important outcomes of the project

Currently, the team has mapped over 260+ Hafta-bazaars of Delhi which is the first such documentation of informal markets of India. Visit the web-portal <http://dwm.dudic.io> for a detailed mapping of Delhi's Hafta-bazaars.

Future prospects

After the documentation and survey, the project team is now researching to explore the historical evolution, market dynamics, policy issues and tourism potential of the weekly markets. In future this project will be opened as citizen science project.



Child Sexual Abuse (CSA) Project

Semester Long Project

Student's Name/s

Ened D'Souza, Payal, Shipra Praliya, Pallavi Verma, Shipra, Aniket Bose

Mentor's Name

Ms. Khyothunglo Humtsoe

Abstract

Over the past two years, several students have worked together to spread awareness regarding CSA and break its taboo. In one of the first objectives achieved, the students conducted a survey amongst the University of Delhi students assessing its prevalence. It was found that 45% of the students were sexually abused as children. During the course of the administration of survey, the members of the project came across several CSA survivors. With this in mind, a panel discussion conducted by the students themselves featuring CSA survivors was conducted. Survivors were also provided support by the project members when they chose to open up. The project also assessed the prevalence of myths and misconceptions. From the data gathered so far, a short-film titled 'Breaking the Myth' which tackled the perceived notion of CSA was produced and screened.

Important outcomes of the project

The students have conducted awareness and prevention workshops for trainee-teachers, parents, and students from Jamia Milia Islamia and Cluster Innovation Centre, University of Delhi.

Future prospects

Currently, the work is progressing in the offender's point of view. This includes: narrativizing the experience of offenders, examining the conviction rate against the cases reported, and continuing awareness workshops.



Interpersonal Transgender Relationships

Semester Long Project

Student's Name/s

Aarushi Guliya, Devang Pandey, Divyanshu Rajpurohit, Lalit Bod, Niharika Dabral, Sneha Singh, Yashi Chauhan

Mentor's Name

Ms. Khyothunglo Humtsoe

Abstract

The project aims to investigate the transgender relationships in three domains of life-personal details, relationship dynamics and partner's perspective. The project involved in depth qualitative methodology to assess the meanings attributed by the transgender community to the cultural settings in our male dominated society. The project conducted semi-structured interviews with four couples with each interview extending to three sessions-one with the transgender person, second with his/her partner and third with both of them together.

Important outcomes of the project

The project was able to conclude that the four transgender participants in the study had different experiences in their lives with their partner. But the factor common in all participants was the rejection they faced in their earlier relationship because of their transgender identity. All four participants were trans male i.e. female to male transition.

Future prospects

The project essentially aims to understand transgender as a person and the need for our society to shun the cultural or traditional prejudices about the people of transgender communities.



Menstrual Hygiene Management

Semester Long Project

Student's Name/s

Abhijeet Hazra, Kartik Krishnan, Pururawa Madhav, Riah Rath, Shambhavi Sharma, and Sriya Rane

Mentor's Name

Ms. Khyothunglo Humtsoe

Abstract

Menstrual Hygiene Management (MHM) project was initiated as part of the Semester Project by an enthusiastic team which believed in self-change for seeking change in others. The student team comprised of Neel, Sugandha, Shubham, Mayukh, Tripuresh, Vatsalya and Ashwani. Their work on one year was taken forward by the present team. The aim of the project outlines spreading awareness about menstrual physiology, safe and hygienic menstrual practices and an obvious refutation of falsehood practices and myths surrounding menstruation. Our planned series of action involves identifying the target population through review of theme based literature and demographics of target population. Broadly, it constitutes problem identification, assessment of awareness and myths & misconceptions of menstruation, workshops and door-to-door campaigns and impact analysis.

Important outcomes of the project

The workshops are conducted using innovative exercises that includes Ice-breaking sessions, one-to-one sessions of target population, distribution of awareness pamphlets including one in braille for the visually impaired, emphasis on repudiating the prevailing myths and taboos, demonstration of how to use sanitary pads and safe disposal and consultations with gynecologists to handle more complex physiological issues. The out-reach programmes includes door-to-door campaigns in Jahangirpuri and Dhaka Settlement where more than 150 households have been covered, workshops at Sanskar Ashram, Ministry of Women and Child Development, All India Confederation of the Blinds (AICB), Cluster Innovation Centre and Government Boys Senior Secondary School, Roop Nagar, Delhi.



Indian Sign Language and Police

Semester Long Project

Student's Name/s

Anamika Bhaumik, Ashok Jinja, Fardeen Ahmad, Mridul Jain, Mukesh Roy, Rishi Prasad, Vivek Ranjan

Mentor's Name

Geetanjali Kala

Abstract

Learning sign language is itself an intervention. Throughout the project, the knowledge of sign language served as a bridge between us and the deaf. Hearing disability is the second most common disability in India. As per Census of India 2011, there are more than 5 million Deaf people. The hearing impaired Community uses Sign Language with the Deaf/Hearing community to express their ideas and views. Through this project, the aim is to sensitize the police with the issues regarding hearing impaired.

Important outcomes of the project

- Classes for sign language taken to get acquainted with ISL.
- Organised a workshop with police personnel at specialised police training centre.
- Conception and scripting of radio programmes for DUCR.
- Analysis of two dictionaries: Talking Hands and ISLRTC.

Future prospects

The project aims to extend the work that has been undertaken so far, to the departments of health, education etc.



Mediating Identity: A Case Study on Dalit online media presence in India

Semester Long Project

Student's Name/s

Mridul, Vivek, Niharika, Devang, Shweta, Lalit Bod

Mentor's Name

Mr. Raof Mir

Abstract

Social media have become coordinating tools for nearly all of the world's political movements. In the context of such observation, this study tries to look at the ways in which discourses about challenges confronting Dalit communities in India are produced, distributed and consumed on various social media platforms. The participatory nature of new media technologies have allowed Dalit populations in India to actively participate as social actors by reproducing their versions of social, cultural and political realities. Unlike television or radio, situated largely within the control of government and private sector, social media has facilitated to create new Dalit publics, where they invent and circulate discourses that challenge the discourses on Dalits circulated by the mainstream media in India. The significant purpose of this study is to therefore document new Dalit media patterns that have emerged in contemporary India in the backdrop of the proliferation of social media.

Important outcomes of the project

One of the primary objectives of this study is to enable an informed answer to the question of how social media has allowed Dalits in India to circulate their versions of social, cultural and political realities. The research project integrates online and offline ethnographic methods for collecting the data. The initial findings of the study were presented by the students at various conferences held in Delhi.

Future prospects

The students are willing to continue working on this project in the future. The aim is to have a publication in reputed peer reviewed journal.



Paper Presentation: "Mediating Identity: Dalit Assertion on Social Media Through Literature" organized by Department of English, Maitreyi College on 17th March 2018

Documentary Film Production

Semester Long Project

Student's Name/s

Aarushi Gulilya, Sauradeep Chakraborty, Yashi Chauhan, Yeshwant Singh, Eish Sharma, Udit Joshi

Mentor's Name

Mr. Raof Mir

Abstract

This documentary film project aims to highlight the trajectory of Delhi based sprinter, Nisar Ahmed. Nisar Ahmed, a 16 year old, hails from the Bada Bagh slum of Delhi's Azadpur area. His father pedals rikshaw, and mother, works as a domestic help. Nisar came to the world's attention at the Delhi state athletic meet last September, where he bagged a gold medal for the 100 m event by clocking a time of a mere 11 seconds. In November 2017, Nisar rewrote the Under-16 national record in the 100 metres with timing of 10.85 seconds at the 33rd National Junior Athletics Championships. Nisar has been selected as part of a youth contingent to train at Usain Bolt's Racer's Track Club in Kingston, Jamaica. Nisar has been named in the 14-member contingent of budding young athletes who are selected to train for a training camp in Jamaica.

Important outcomes of the project

The project aims to draw people's attention to the circumstances in which Nisar was born and brought up and the way in which he overcame them. Nisar is just one of many talented sportspersons, who make it big against all odds, and this documentary is a bid to highlight the gems we have in India that need proper polishing so they can shine to their full potential and make the country proud.

Future prospects

The documentary film project is currently in the postproduction stage. The film will be screened at various festivals. To the interest of the larger public, the film will also be available on various social media platforms.



In the Depths of Marginalization: Sewage Workers in Delhi

Semester Long Project

Student's Name/s

Mathias Ipsen, Mukesh Roy, Saayank Besen, Sofie Monster, Vatsalya Yadav, Vishal Kumar

Mentor's Name

Dr. Mohd. Saleem Mir

Abstract

This project is a venture to delve into the lives of a marginalised community - sewage workers - historically subjugated, mistreated and overlooked upon by the common masses of the country. Over 1 million sewage workers in India are involved in the sanitation and hygiene of our surroundings. They plunge bare-bodied into clogged sewers filled with fermented faeces, urine and other chronic waste flushed down by millions to clean this with their hands, without the use of safety equipment. They have been relegated to a status of extreme disdain and exclusion and forced to live a life of unjust, inhumane and downright derogatory conditions. Most of the work on contract basis, unsafe work practices and apathy of the concerned authorities is responsible for the increased vulnerability of these sewerage workers. The frequent accidental deaths and illnesses have only been sparsely reported, as it does not make for saleable news. There have been very few studies undertaken on the health and safety issues of these workers, such as 'Hole to Hell' have established the significant occupational morbidity and mortality among sewage workers. Some studies have triggered policy development around health and safety norms, regardless, the working conditions have remained virtually unchanged for over a century. The main objectives of this project are: (1) To develop a comprehensive understanding on the issue of sewage workers in Delhi. (2) To study the physical, psychological, social, economic impact of sewage workers on the sewage workers. (3) To generate awareness amongst the sewage workers regarding their rights and entitlements. (4) To implement a sensitisation programme for the general public with regard to the problems of sewage workers.

Important outcomes of the project

The presence of online content about manual scavenging in the form of videos is highly scarce which shows that they are marginalized even on these universal platforms. These platforms can help scale down the prejudice if more documentaries are created and uploaded on net for wider publicity.

Future prospects

This project can be taken forward as a base for enthusiastic budding film makers who can make documentaries on the issue, or the general public who can help raise the voice against manual scavenging by taking videos or photos in the areas if they encounter manual scavenging. Awareness has to be increased in the society about this issue.

Banking of Roads

Semester Long Project

Student's Name

Raja Pandit

Mentor's Name

Dr. Jyoti Sharma, Prof. Pankaj Tyagi

Abstract

Made a model to actually demonstrate the banking of roads by comparing vehicular movement on two types of roads, one banked and the other unbanked.

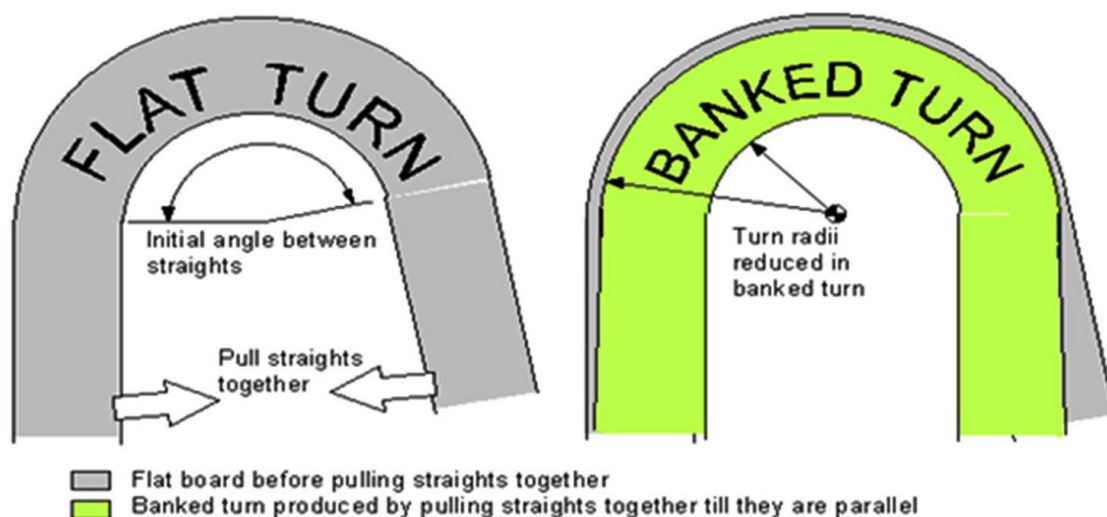
Important outcomes of the project

Students can understand the following with the help of this model and the poster associated with it:

- Importance of banking
- Trigonometry in construction
- Mathematics in transportation (roads, railways, airways)

Future prospects

Concept of centripetal force can be taught using this



Representation of Relation Between Radian & Degree (Working Model)

Semester Long Project

Student's Name

Tarun Aggarwal

Mentor's Name

Dr. Jyoti Sharma, Prof. Pankaj Tyagi

Important outcomes of the project

Students will get a clear picture and able to understand relation between Radian and degree in a better way and learn how to convert between the two units of measurements of an angle.

Future prospects

This model can be used as a hands-on resource to learn more concepts of trigonometry



Developing Prespectives from 3D to 1D

Semester Long Project

Student's Name

Priyankesh Dixit

Mentor's Name

Dr. Jyoti Sharma, Prof. Pankaj Tyagi

Abstract

Understanding mathematics behind the concept of conversion from 2D to 3D using it.

Important outcomes of the project

- Pedagogical Aspects of One Point Perspective
- Model for Understanding 2D to 3D: Using One Point Perspective

Future prospects

More real life example using One-point perspective can be analyzed to explore Mathematical properties.



Models

Comparison and applications in real life of Binomial, Poisson, Normal, Exponential and Gamma distributions

Paper Related Project

Student's Names

Ms. Thanyo Lungleng, Ms. Sangeeta

Mentor's Name

Ms. Ruchi Gupta

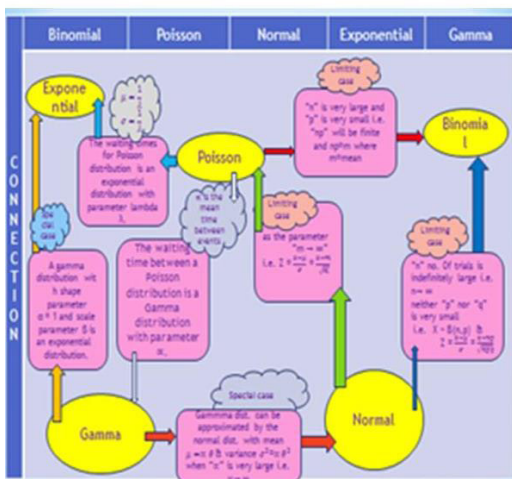
Abstract

Binomial, Poisson, Normal, Exponential and Gamma distributions are connected in a mathematical way and have differences also. But as these distributions seem to have only mathematical formulae to get a mathematical answer, these distribution also have variety of real life application in various fields.

Important outcomes of the project

Connection between distributions:

- Poisson's limiting case is Binomial
- Normal's limiting case are Binomial and Poisson
- Poisson is connected to both Exponential and Gamma distributions
- Gamma's special case are Exponential and Normal distributions
- Differences between distributions:
- Binomial and Poisson are discrete whereas Normal, Exponential, Gamma are continuous
- Binomial is from a finite sample which gives the probability of getting "x" events out of "n" trials whereas Poisson is from an infinite sample which gives the probability of getting "x" events in a population
- The exponential distribution estimates time until the next event whereas the Poisson distribution estimates the number of events that occur in a specified time period



	Binomial	Poisson	Normal	Exponential	Gamma
D I S T R I B U T I O N	Discrete	Discrete	Continuous	Continuous	Continuous
D E S C R I P T I O N	Binomial distribution describes the distribution of binary data from a finite sample. Thus it gives the probability of getting r events out of n trials.	Poisson distribution describes the distribution of binary data from an infinite sample. Thus it gives the probability of getting r events in a population.	Normal distribution describes continuous data which have a symmetric distribution, with a characteristic 'bell' shape.	The exponential distribution estimates time between events occurring, or time until the next event whereas the Poisson distribution estimates the number of events that occur in a specified time period.	The Gamma distribution describes the time until n consecutive rare random events occur in a process with no memory.
G R A P H					

The Hungarian Game (Assignment Problem: Hungarian Method)

Paper Related Project

Student's Name/s

Ms. Amrita, Ms. Priyanka Gupta and Ms. Sangeeta

Mentor's Name

Dr. Harendra Pal Singh

Abstract

The Assignment Problem is one of the fundamental combinatorial optimization problems in the branch of optimization or operations research in mathematics. So, it is important for a child to get the idea behind this problem. Also, it is important to that the child enjoy and learn at the same time. So, a board game has been made based on Hungarian Method of Assignment Problem.

Important outcomes of the project

Can be as a tool for teaching and learning of Hungarian method • To assess the students on Hungarian method

Future prospects

How teachers can use it??

This game can be taken ahead accordingly by teacher, where she/he can increase/decrease matrix size and difficulty level. The teachers can give different types of questions based on maximizing and minimizing things to students. Make them sit in groups and solve the questions using this board game.



Magic Polygon: A Game Based Pedagogy

Paper Related Project

Student's Name

Preeti Chaudhry

Mentor's Name

Dr. Jyoti Sharma, Prof. Pankaj Tyagi

Abstract

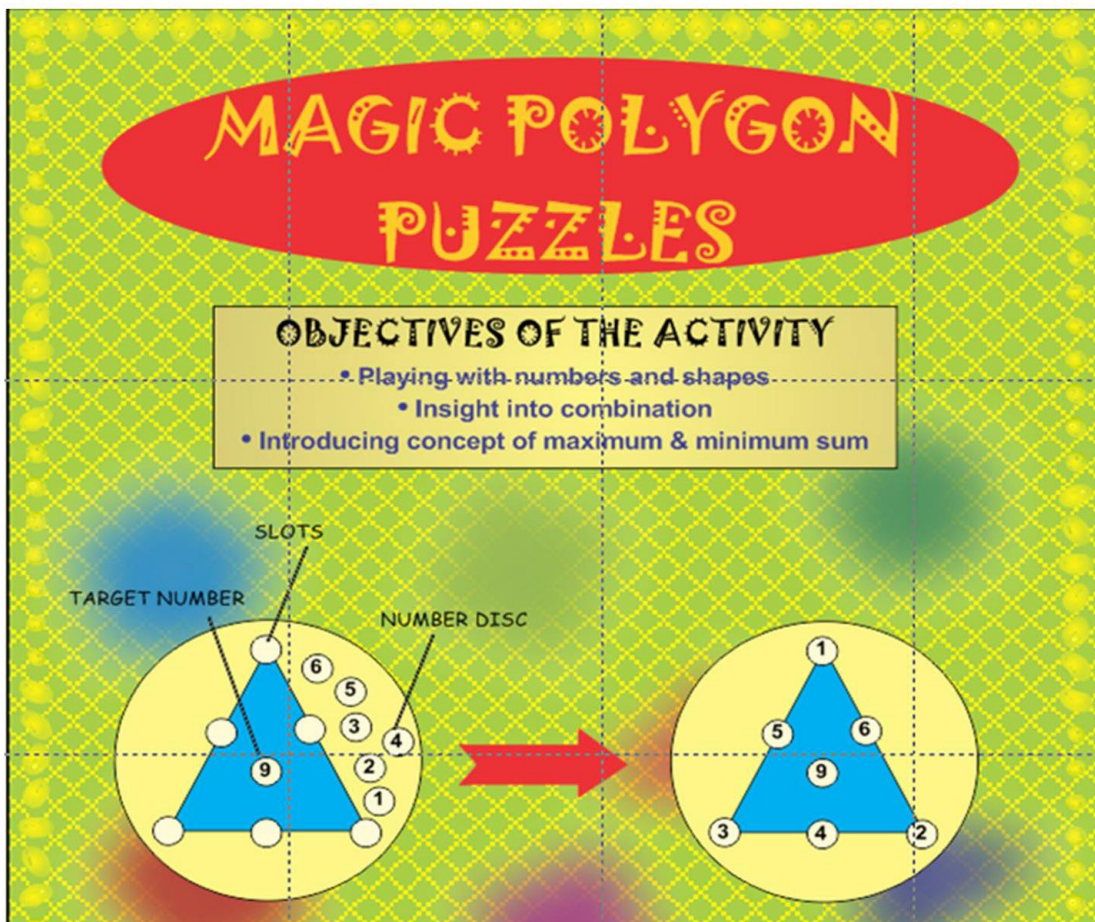
Magic polygon is a game in which student place number discs in provided slot on side of polygon such that sum of numbers on each side is equal to a given target number.

Important outcomes of the project

- Helps students understand combination and permutation
- Helps students understand maximization and minimization

Future prospects

- This resource can be used while teaching permutation and combination.
- This resource can also be used for understanding maximization and minimization.



Highlights of Education Reforms Since Independence

Paper Related Project

Student's Name

Priyanka Gupta

Mentor's Name

Dr. Jyoti Sharma, Prof. Pankaj Tyagi

Abstract

The poster is in the form of a time line and serves few purposes such as firstly, to enable the readers to understand how each recommendation has an impact on future recommendations and secondly, to correlate important developments in education discourse such as Curriculum framework, National Knowledge Commission and Right to Education Act.

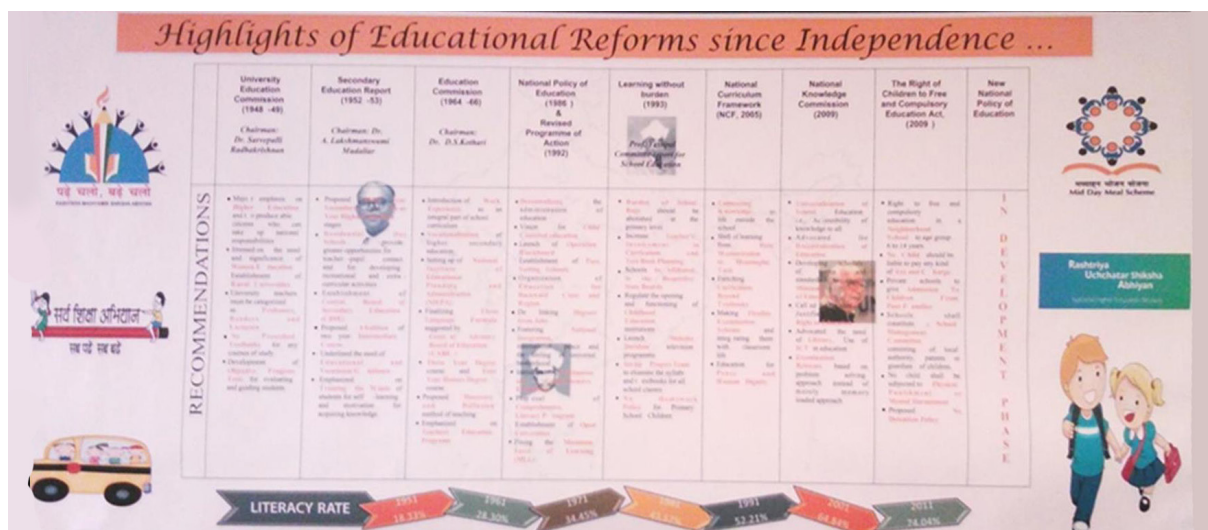
Important outcomes of the project

The timeline is in form of a poster and serves the purpose to make students view the reforms in education at a glance.

Future prospects

Teachers can use it as resource to teach and make students aware about recommendations by various commissions and reports, about curriculum framework, Right to Education Act and National Knowledge Commission. Hence compare the recommendations and analyze them as this will allow the students to view the information at glance.

New Education Policy and reforms can be added in this timeline over the coming years and advancements.



'Not Just Books'

Paper Related Project

Student's Name/s

Kumar Gandharv Mishra, Snehha Tyagi

Mentor's Name

Prof. Dibakar Baneerje

Abstract

As a part project related to 'Art of screen-play writing' a short movie 'Not Just Books' was produced. The movie 'Not Just Books' revolves around the life of a girl passionate for music. She always tries to connect mathematics with music but she is unable to explain it to others. A teacher and motivator like person Andrew comes to help her out and finally Radhika finds her way. The movie tries to reflect the idea that only books are not the medium to gain knowledge, one can always gain some knowledge by observing his or her surroundings.

Important outcomes of the project

Movie for common people reflecting the essence of Mathematics.



URL - <https://www.youtube.com/watch?v=wxX0snVfUIU>

Probability through Geometry

Paper Related Project

Student's Name

Kumar Gandharv Mishra

Mentor's Name

Ms. Ruchi Gupta

Abstract

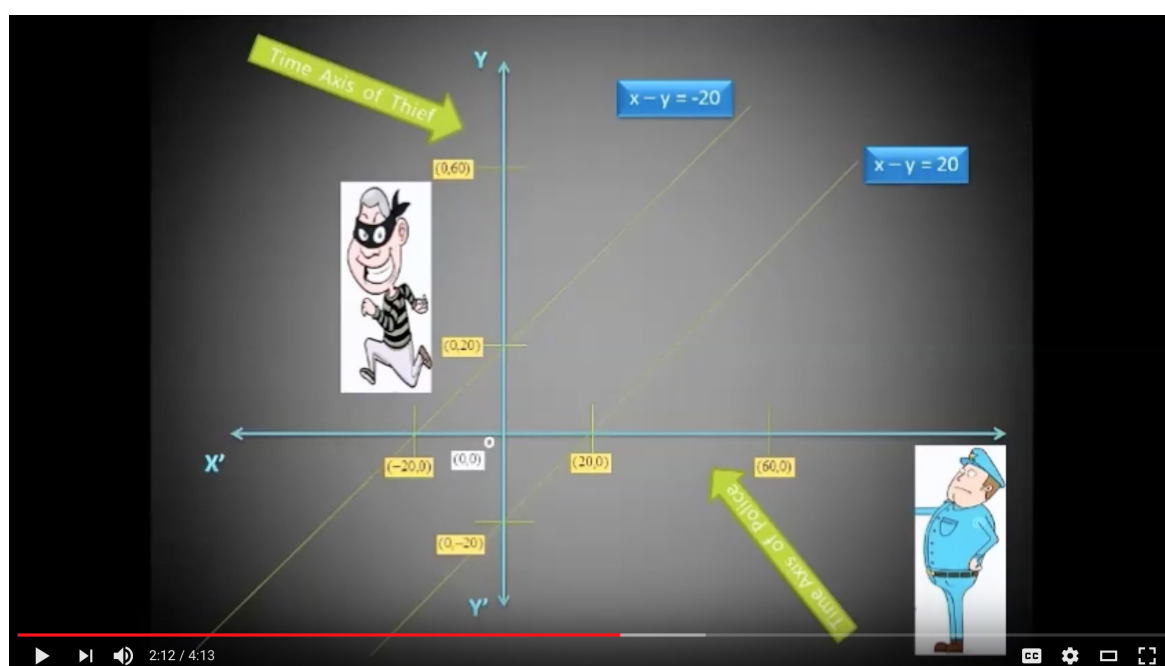
The project is in the form of a video explaining the use of geometry for calculating the probability of an event through geometry. The event was related to catching of a thief by police in a particular interval of time. Through use of linear equations, feasible area (which denotes the feasible time) was calculated and then the probability was calculated by the dividing the feasible area by total area.

Important outcomes of the project

Interlinks two different aspects of Mathematics: Geometry and Probability. Shifts the notion of Probability from numbers to Visualization.

Future prospects

Explaining and solving more problems through interlink of geometry and probability.



URL- <https://www.youtube.com/watch?v=n3EFhxsNVVA>

Calculus Behind Arbelos

Paper Related Project

Student's Name

Tarun Aggarwal

Mentor's Name

Dr. Sonam Singh

Abstract

Learning about the mathematics behind the 'shoemakers knife' also known as 'Arbelos'

Important outcomes of the project

We studied about the calculus behind Arbelos generalizing the results and also formulated relations between area and number of circles.

Future prospects

Various other shapes and combinations can be discussed to make differently shaped knives each suitable for different purposes and having minimum making cost.

ArbeloS



Probability Slot Machine

Semester Long Project

Student's Name

Preeti Chaudhry and Rabia Malik

Mentor's Name

Dr. Jyoti Sharma, Prof. Pankaj Tyagi

Abstract

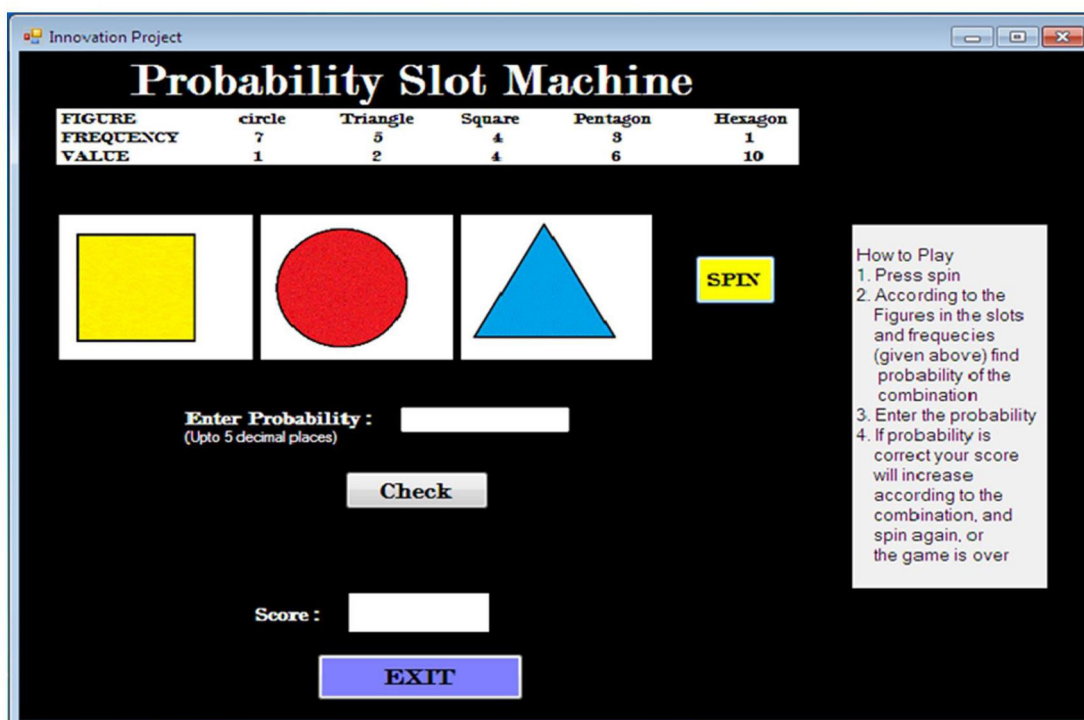
Probability slot machine helps in learning probability. As we all know, probability is vastly used in casinos but in classroom teachers never use casino games to learn about probability. So, we develop a virtual slot machine to learn probability.

Important outcomes of the project

- In class 9, we can use single slot of machine to find the probability of figures in single strip
- In class 10, we can use probability slot machine single slot to learn about sample spaces and complementary events ,
- In class 11, student can learn to find compound probability and combination and permutation from probability slot machine

Future prospects

As of now this is a digital game, it can be converted into an actual machine and can be used in class.



Revisiting Tangram for Mathematical Concepts

Paper Related Project

Student's Name

Amrita

Mentor's Name

Dr. Jyoti Sharma

Abstract

This project aims to provide helps to enable the readers to understand the concept of tangrams and history of tangram. It also helps readers to understand the pedagogical aspects of tangrams.

Important outcomes of the project

This project is in the poster form and fulfills the purpose making students understand the concept of tangrams and also how to use this puzzle.

Future prospects

Teachers can use this poster to introduce the concept of tangrams. Also to tell them the history of tangrams and how to use the tangrams.

TANGRAM

Can you see any similarity in the above figures?
Yes, all these are made up of seven pieces of exactly same shapes and size.
All these 7 pieces belongs to the same family of "Tangrams".

Let's Know About tangrams

The tangram is a dissection puzzle consisting of seven flat shapes, called tans (two large triangles, two small triangles, a medium triangle, a square and a parallelogram), which are put together to form shapes. You can put these seven tang together to make shapes of anything from cats, birds and kangaroos to boats, people and teapots. To do that you must follow these rules:

- You must use all seven tans
- They all must touch
- They must not overlap.

Story of Tangrams

The origin of "tangram" is as old and mysterious as the history itself. Once upon a time a sage, a wise old man was to take a precious sheet of glass to the king who needed a window in his palace. The square piece of glass was wrapped in silk and canvas and carried in the sage's backpack.

The journey was long, the sage crossed a desert and rivers, and he travelled through forests and fields. He arrived at a rugged mountain range and climbed to the summit of a high, rocky peak. At the top of the mountain he looked into the distance and glimpsed the palace he was travelling to. Pleased that he had almost arrived, he stumbled and tumbled down the side of the mountain. The glass was broken.

When he met the king he told of his journey and admitted that the glass was broken. The square glass was unwrapped from its silk and canvas case and the sage was surprised to see that glass was not shattered but divided into seven geometric shapes. The origin of TANGRAMS is very old, but the magic of tangrams still continues to attract people.

PEDAGOGICAL ASPECTS OF TANGRAMS:
It develops:

- Problem-solving and logical thinking skills
- Perceptual reasoning (nonverbal thinking skills)
- Visual-spatial awareness and creativity
- And important mathematical concepts such as congruency, symmetry, area, perimeter, ratio and proportion thinking and geometry.

FACTS REALTED TO TANGRAMS

- Most likely invented in China between 960-1279 AD.
- They were brought home to America and Europe by various merchants in the early 1800s, as gifts and souvenirs from their business trips to Canton, China, and became very popular.
- Originally made from glass, wood, ivory or turtle shell, and are now commonly made from plastic.
- They can be arranged into many different shapes and can be put together in an infinite number of combinations.
- Since the 1800s, there has been over 6500 documented, different tangram puzzle arrangements.
- In 1942, mathematicians proved that there are only 13 possible convex tangram patterns.

GO FOR IT ?
Now try your luck and enjoy the following game:

1. Take out the stencil from the drawer.
2. The stencil represents a design which is to be made using all tans only once.
3. Arrange all tans in such a way that they fill the stencil completely.

GO FOR IT ?

Mathematics Through Tessellation

Paper Related Project

Student's Name

Namrata Nigam and Sana Ahmed

Mentor's Name

Dr. Jyoti Sharma



Abstract

We use this interesting art of tessellation to make students learn various mathematical concepts and reasoning, like: planning, regular shapes, re-entrant angle, congruency, area etc.

We prepare some worksheets for the teachers to help students learn various mathematical concepts. It is designed keeping in mind innovative teaching approach that can be used by teachers for math assessment in a fun and creative way while teaching them tessellation.

Future prospects

Just like the exemplar worksheet (shown below), the teacher can teach students various other mathematical concepts while teaching them through Tessellation.

STEP 1		<ol style="list-style-type: none">1. Which geometrical shape is it?2. What is its area?3. What is the angle formed at the vertex?4. Is it a regular shape?
STEP 2		<ol style="list-style-type: none">1. What is the area and perimeter of the given figure if all the triangles are of same dimensions as in step 1?2. What is the angle subtended by the 6 triangles at the point where all triangles meet?3. Are these 6 shapes congruent?4. Are these 6 shapes similar?5. Is it a tessellation?6. Which type of symmetry is present here?

Conceptual Mathematics Dictionary

Semester Long Project

Student's Name/s

Imran Ahmad, Ruth Sebastian, Kartik , Sheel, Shadab and Kapil

Mentor's Name

Dr. Jyoti Sharma, Ms. Alka Dutt

Abstract

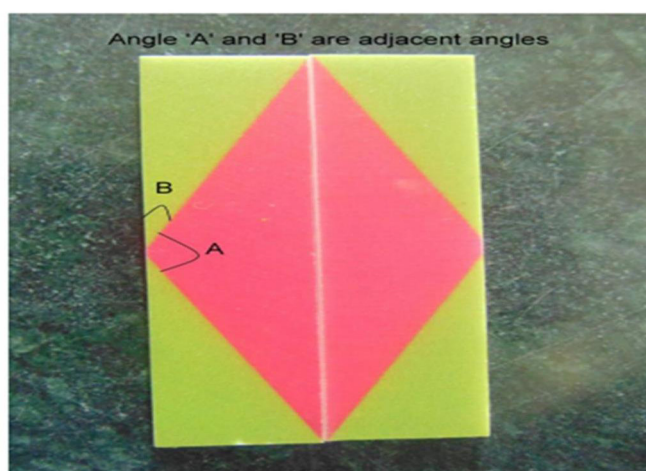
Every discipline has its own unique vocabulary, a group of words and definitions that people use to study or communicate information within that field. Likewise, Mathematics too, has a vocabulary that consists of words and symbols that allow people to have a common base in understanding mathematics. Hence, a mathematics dictionary can be a comforting and valuable resource in the learning of Mathematics

Important outcomes of the project

With over 252 terms defined, this dictionary is ideal for supporting students who are studying mathematics or related subjects. The definitions of terms and concepts included within our dictionary contain majority of the words that students will come across when studying at secondary school. First year undergraduates may also find it a useful reference for topics that they did not cover in the secondary school. The dictionary has been developed in order to provide a comprehensive source of subject specific definitions for students and teachers.

Future prospects

This dictionary can be used a supplementary book along with the main NCERT books for the school students for a better conceptual understanding and to rectify the common misconceptions encountered. It can be used a ready reference book for any student of mathematics to refer to the definition of any term along with its examples and non-examples.



Concretizing Exponents and Powers

Semester Long Project

Student's Name/s

Ishmannan Kaur, Anjali and Shilpa

Mentor's Name

Dr. Jyoti Sharma, Prof. Pankaj Tyagi

Abstract

When 'exponents' are introduced to the students, they find it difficult to understand and its relevance is also unknown.

Initially they commit mistakes while dealing with it like how powers work on numbers, there is confusion between multiplication of a number and expansion of power. They generalize the logic of base 10 on other bases like 2222 as 2^4 and many more.

In this project, we have tried to deal with this abstract concept in concretize form by using wooden cubic blocks which the students can manipulate, use to form their own exponents and also find patterns while dealing with them.

Important outcomes of the project

The learner can visualize the exponents by working with the blocks.

Future prospects

There is a scope to digitize the project to make the visualization possible when higher powers are involved (as the number of blocks is a limitation).

Also, the visualization of negative exponents in the project is to be reviewed and made into something that can be easily manipulated by the learner.



Impact Assessment of Bal-Gurukul Model of Child Education

Summer Internship

Student's Name/s

Awesh Kumar, Preeti Choudhury

Mentor's Name

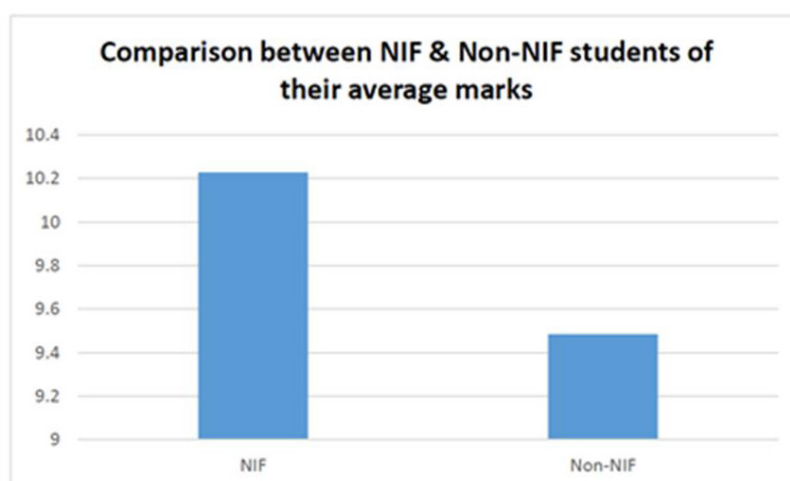
Ms. Neetu Sharma (Executive Director, NIF)

Abstract

Education is of prime importance. Navjyoti Bal-Gurukul projects are a success proven sustainable development model. Navjyoti Bal-Gurukul in its diversified objectives has included village development and education programs into its fold. To stop the crime rates by educating the children as a part of societal development, Navjyoti India Foundation has targeted this area as a part of their objective and opened its Bal-Gurukul education model. After getting the complete knowledge of this program, we assessed the progress of the students of Bal-Gurukul and their Intelligences based on famous Intelligence theory, that is, Gardeners Intelligence theory, a theory of intelligence that differentiates it into specific 'modalities', rather than seeing intelligence as dominated by a single general ability. These are of eight types. For this purpose, we have prepared the questionnaires on these eight types of Gardeners Intelligence theory, which are: Visual/Spatial intelligence, Logical/mathematical intelligence, Naturalistic intelligence, Interpersonal intelligence, Intrapersonal intelligence, Linguistic intelligence, Musical intelligence, Bodily-kinesthetic intelligence.

Outcome

From the project we have seen that NIF (Bal-Gurukul) students are weaker than Non-NIF students in Logical intelligence and Naturalistic Intelligence. So we suggest NIF to focus more on making the students more practice of logical questions to improve their mathematical/logical intelligence. They should also be practiced through the pictorial presentation and ask them to recall anything in nature and draw picture of the recalled images to improve their Naturalistic intelligence. Also children should be made more creative, skilled, self-independence and of more leadership qualities.



Online Marks and Attendance System (OMAS)

Semester Long Project

Student's Name/s

Anmol Goel, Mohit Balhara

Mentor's Name

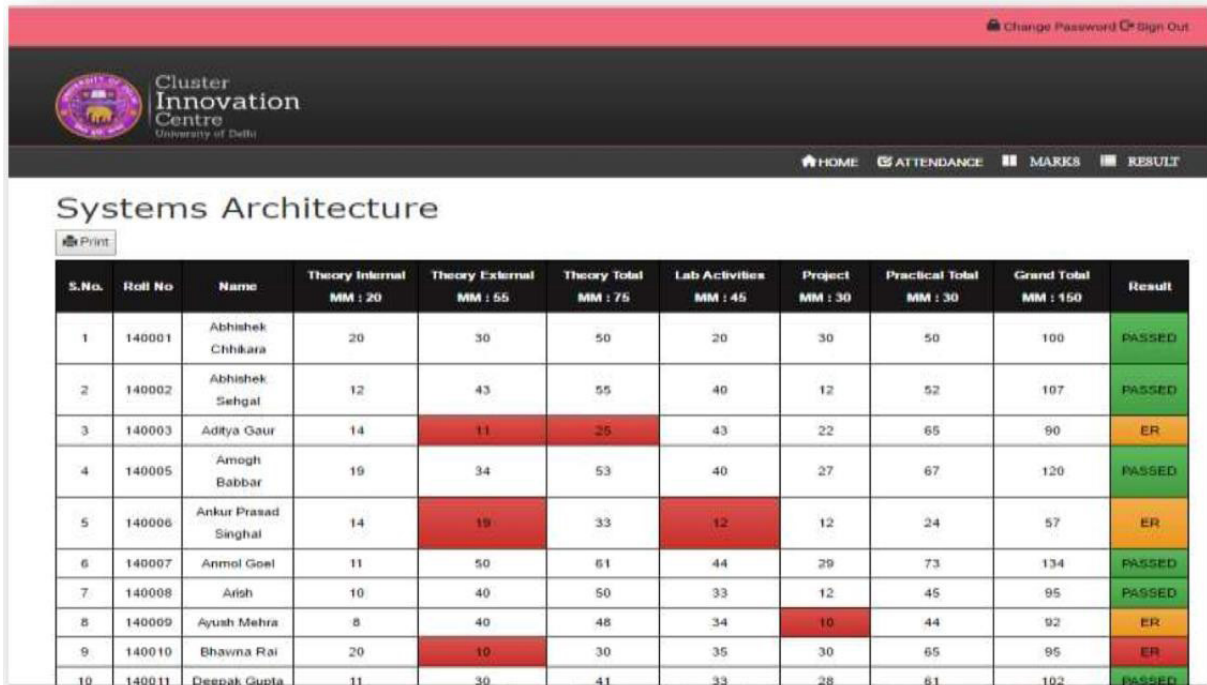
Prof. Shobha Bagai, Mr. Anurag Singh

Abstract

O.M.A.S. [Online Marks and Attendance System], is an online content management system developed for the Students to view their Marks and Attendance for their current semester and for Teachers to maintain the Marks and Attendance records of the Students. It is an online portal in which the marks and attendance is monitored centrally at one platform. It can be accessed by the teachers and students from anywhere respective to their rights given to them with the login and password which is unique for everyone.

Outcome

The system has been used at CIC to generate the result and marksheet of the students of B.Tech at CIC.



The screenshot displays the OMAS web application interface. At the top, there is a navigation bar with a 'Change Password' and 'Sign Out' link. Below this is the logo of the Cluster Innovation Centre, University of Delhi. A secondary navigation bar contains links for 'HOME', 'ATTENDANCE', 'MARKS', and 'RESULT'. The main content area is titled 'Systems Architecture' and includes a 'Print' button. Below the title is a table with 11 columns: S.No., Roll No., Name, Theory Internal (MM: 20), Theory External (MM: 55), Theory Total (MM: 75), Lab Activities (MM: 45), Project (MM: 30), Practical Total (MM: 30), Grand Total (MM: 150), and Result. The table contains 11 rows of student data, with some cells highlighted in red to indicate lower marks or 'ER' (Exam Referred) status.

S.No.	Roll No	Name	Theory Internal MM : 20	Theory External MM : 55	Theory Total MM : 75	Lab Activities MM : 45	Project MM : 30	Practical Total MM : 30	Grand Total MM : 150	Result
1	140001	Abhishek Chhikara	20	30	50	20	30	50	100	PASSED
2	140002	Abhishek Sehgal	12	43	55	40	12	52	107	PASSED
3	140003	Aditya Gaur	14	11	25	43	22	65	90	ER
4	140005	Amogh Babbar	19	34	53	40	27	67	120	PASSED
5	140006	Ankur Prasad Singhal	14	19	33	12	12	24	57	ER
6	140007	Anmol Goel	11	50	61	44	29	73	134	PASSED
7	140008	Arish	10	40	50	33	12	45	95	PASSED
8	140009	Ayush Mehra	8	40	48	34	10	44	92	ER
9	140010	Bhavna Rai	20	10	30	35	30	65	95	ER
10	140011	Deepak Gupta	11	30	41	33	28	61	102	PASSED

Library Management System: DigiLib

Paper Related Project

Student's Name/s

Vishesh Sharma

Mentor's Name

Mr. Anjani Kumar

Abstract

The project is based to develop the platform that will be managing the books record, searching facilities, add records features. It is designed on the local host to keep the records of books in the library and has different operations to view the book, search, add guest to hold the books in his/her account etc.

Important outcomes of the project

The main outcome is to develop a web portal to manage different type of books which will not require any human intervention as a physical presence in the library.

Future prospects

This can be extended to web app for commercialization for any academic institute as well as other public libraries for interactive environment.

The screenshot displays the DigiLib web application interface. At the top, there is a dark header bar containing the University of Delhi logo, the text 'Cluster Innovation Centre University of Delhi', and the 'DigiLib' logo with the tagline 'Simplifying Libraries'. Below the header, the main content area is divided into a sidebar on the left and a central form area. The sidebar contains a 'Welcome Guest' message with a user icon and a list of navigation links: Home, Search, Add books, Login, Sign Up, Help, and Contact Us. The central form area is titled 'Sign Up' and contains four input fields: 'Username', 'Fullname', 'Password', and 'Re-enter password'. A blue 'Sign Up' button is positioned below the 'Re-enter password' field.

Predictive Analysis of Alertness Related Features for Driver Detection

Semester Long Project

Student's Name/s

Arjun Sharma, Anustha Kalia

Mentor's Name

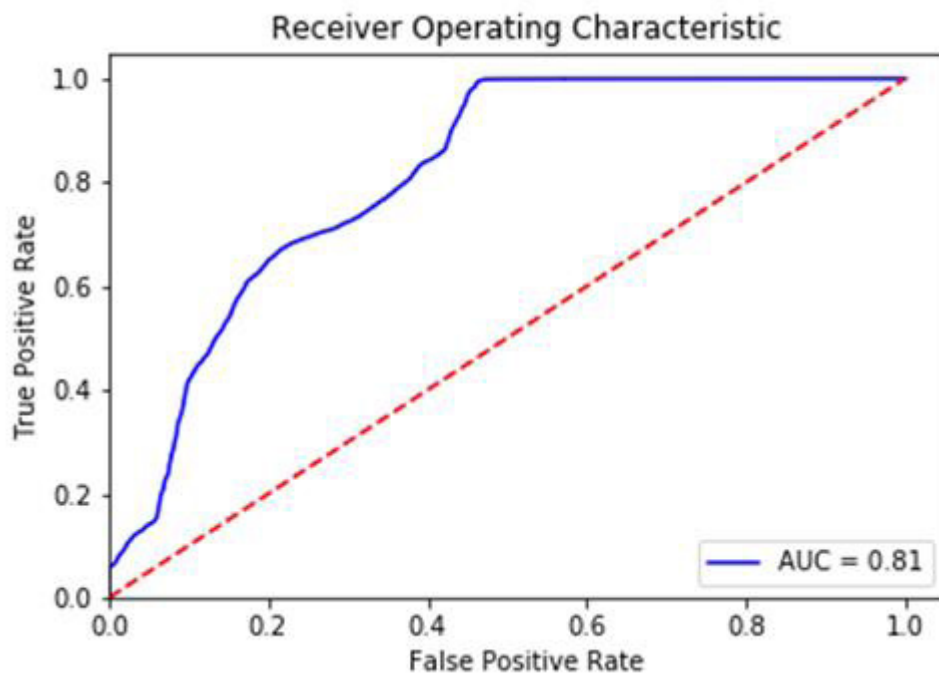
Mr. Sachin Kumar

Abstract

Intelligent Transport Systems (ITS) are a necessity of today, which can help tackle problems related to safety and efficiency of the transportation system. For this project we decided to work on a drowsy driver detection system, a technology which is related to ITS. We took up a dataset available on Kaggle, which included features related to Physiological (P), Environmental (E) and Vehicular (V) modalities. Our aim was to come up with an efficient model based on these features to accurately differentiate between the drowsy and alert state of the driver at any point of time. The final results that we achieved with a logistic regression model trained on the aforementioned set of selected and generated features are given in Table 1. ROC curve obtained is given in Fig. 1.

Important outcomes of the project

Kumar S., Kalia A., Sharma A. (2018) Predictive Analysis of Alertness Related Features for Driver Drowsiness Detection. *Advances in Intelligent Systems and Computing*, vol 736, pp-368-377. Springer, Cham



ROC curve for the Logreg model

Spatial Intelligence in way finding

Semester Long Project

Student's Name/s

Yash Kaushal

Mentor's Name

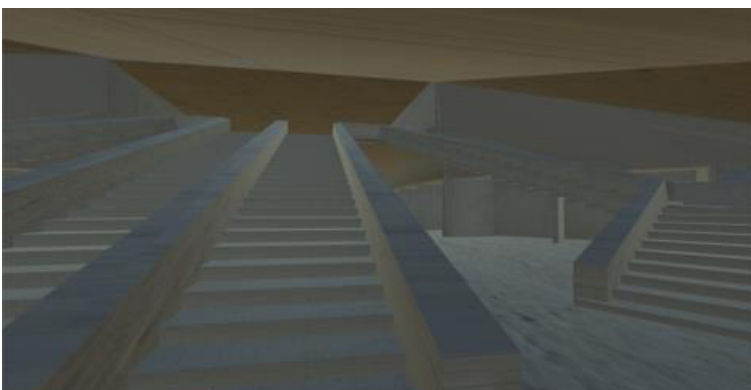
Dr. Sonam Singh

Abstract

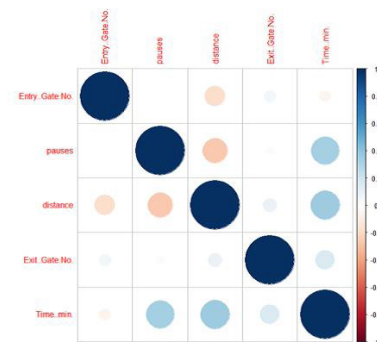
The project aims at better understanding of human mind in the field of spatial cognitive abilities and it's improvisation through the means of advancing technological facilities. It was executed in two parts, first, a study was conducted which aims at empirically analyzing pedestrian movements to investigate architectural flaws. It was accomplished with the assistance of some robust cognitive principles associated with an individual's brain in order to facilitate way-finding of a person in a complex shopping building. This was essentially a blind randomized study where none of the subjects were aware of the purpose of study. Second part is creation of a simulation through the use of 3D technologies for demonstration of way finding techniques used in the field of battle by the Indian infantry. This prior simulation may help to overcome the changes in terrain often occurred by them. The device demonstrated is Bund Blasting Device MK-2 which is used with changing angles in terrain. This simulation may also be used for spatial training purposes of soldiers in the Indian Army to prevent environment effects.

Important outcomes of the project

- Successfully Created a 3D replica of Palika bazaar
- Conducted survey with a total number of 131 people
- Analyzed captured which yielded following information that; Architecture of the structure exposed can create changes in brain patterns and create neurological changes too, i.e. the environment can influence the thinking pattern of the person. In case of Palika the architecture exposed changes the decisions of the person whether they would like to roam more or take an exit, even their direction seems to be influenced. This is referred as architectural neuroscience, change in patterns influenced by the architecture exposed.



FPS View Palika



Emotion Recognition Using EEG and Facial Expressions

Semester Long Project

Student's Name/s

Sanjeev Dubey, Utkarsh Mittal

Mentor's Name

Mr. Sachin Kumar

Abstract

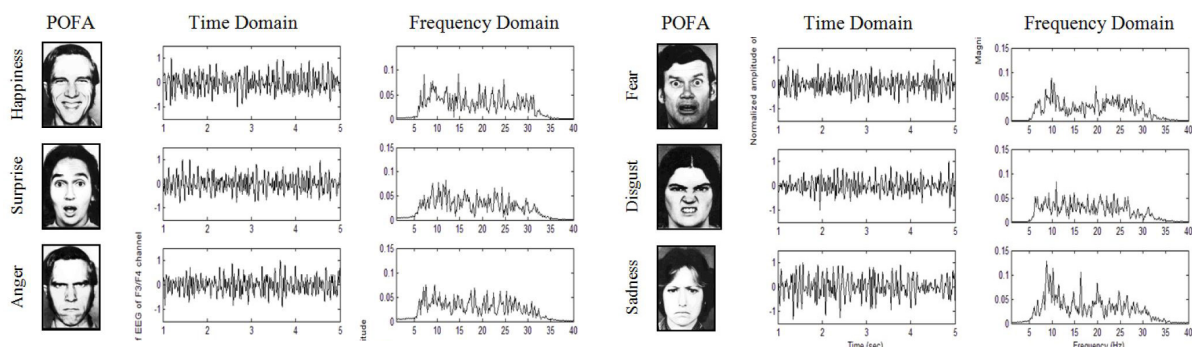
Understanding mind and emotion has been fascinating for researchers. Understanding emotions and linking with mind may help us in developing devices for disabled people, to understand another person better and how to interact in what way with another person. This can also help us in understanding emotional needs of a person at a particular point of time and how to satisfy them. This Brain Computer Interfaces (BCI) research has a wider range of applications. In our project, we focused on study and analyze human emotions using EEG signals. The participants has been exposed to various stimuli media such as text, audio, video, and his/her emotional state would be judged in real time using the developed model and may be extended by adapting the stimuli with user preferences.

Important outcomes of the project

The project has been broken down into the following stages :

1. Understanding EEG signals as a way of studying brain activity and the format of EEG data to be obtained.
2. Explore how EEG data may be obtained from humans and existing datasets (such as DEAP). Also, collect more data using appropriate hardware, if needed. A basic understanding of the anatomy of the human brain may be required to be developed here.
3. Analyse the data obtained by trying various machine learning techniques in order to recognize patterns within the same.

A vast amount of literature has been reviewed to explore the work done on emotion detection from EEG data. The following features have been extracted - time series difference of Intrinsic mode functions of EEG signal, instantaneous frequency and normalized energy of IMFs, GLCM based features. These features have shown a strong potential for this purpose.



Self-Driving Car

Semester Long Project (in collaboration with Indraprastha Institute of Information Technology)

Student's Name/s

Ridhwan Luthra, Vikas Kamboj, Vinay Raj, Aditya Sharma Shashwat Yashaswi

Mentor's Name

Ms. Shobha Rai

Abstract

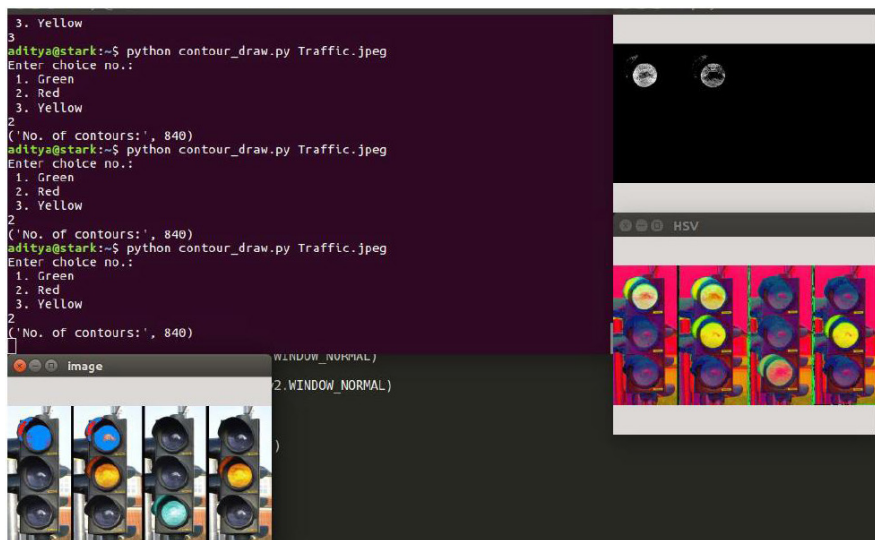
The project aims to develop an in-house prototype of self-driving car. Autonomous vehicles are going to be an integral part of our society in the future. This project aims to bring down the cost of the car by reducing the cost of the number and cost of sensors as much as possible without compromising on the safety of the vehicle. We aim to help in the acceleration of development of affordable and reliable self-driving cars that can reach the hoi polloi. The prototype will be able to navigate through a test arena without human intervention and in real time. We aim to use the images from the camera to detect lanes and traffic signs and navigate through arena while following the traffic rules. When implemented in the real world, it has the potential to make the roads much safer by removing human errors.

Important outcomes of the project

- A computer simulation of the self-driving car model.
- Creating an in-house prototype with required sensors
- Integrating the software model with the prototype and testing it in test arena.
- Publishing a research paper on the viability of reducing the cost of self-driving cars.

Future prospects

Autonomous vehicles are going to replace human driven vehicles in the future. By creating an in-house prototype, we seek expedite that process by reducing the cost so that it can be seen as a viable option by the masses.



API for Gensim

Summer Internship

Student's Name/s

Chaitali Saini

Mentor's Name

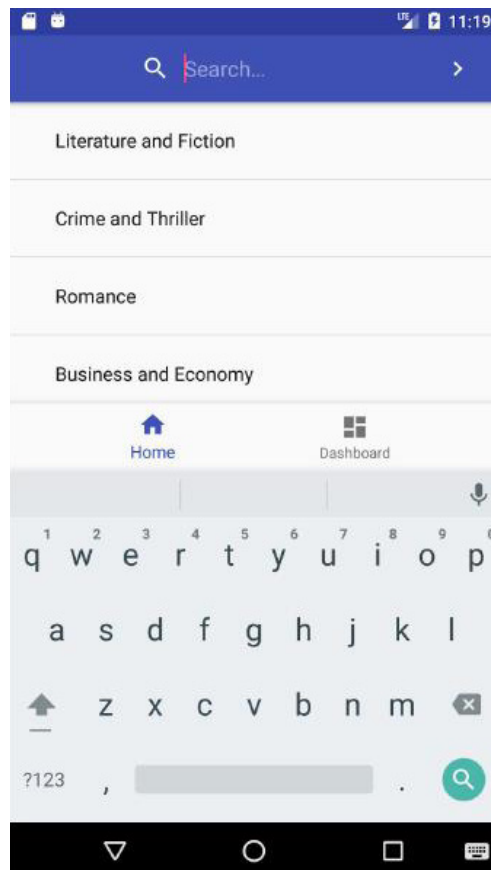
Ivan Menshikh

Abstract

Gensim is a Python library for topic modeling, document indexing and similarity retrieval with when you have a large corpus. All the algorithms implemented in gensim are memory-independent, i.e corpora/models larger than the RAM can also be processed. I developed an API that helps the user to easily access the corpora/models they want o use. Firstly, I had to store the dataset/model and the code for loading it to github releases. Then, I implemented an API that the user can use to download and load these datasets/ models. Earlier, users had to spend hours to find the datasets/models, but using the API they can get detailed information about datasets/models, list of datasets/models, load them and download them by writing just 2-3 lines of code.

Outcome

<https://rare-technologies.com/new-download-api-for-pretrained-nlp-models-and-datasets-in-gensim/>



Book Seekers App

Summer Internship

Student's Name/s

Aditya Sharma, B Kartheek Reddy, Shashwat Yashaswi, Vanita Arora

Mentor's Name

Prof. Anirban Mondal

Abstract

The objective of our project was to make an application to guide and aide the users in selecting books depending upon various factors including the type of user (new/old), popularity of books in the opted field (genre)ic reviews/ratings, trending authors etc. The user is able to make a more informed choice. More services depending upon the book selected shall be provided such as suggestions, substitutes and information regarding movie adaptations etc. It will take reviews from various sources, rate them using sentiment analysis and the provide the user to make most apt choice.

Outcome

Our application uses a complete book recommending system which uses NLP for feature extraction from the book reviews obtained from various sites. Research in this area is of great interest as the world is looking for building better recommending systems. In this project, we have also built efficient books recommending system using the reviews presented by amazon and our research interest is in improving its efficiency further on so that it could help the book lovers to select their books.

Artificial Intelligence Tool for Assisting in Patent Examination

Summer Internship

Student's Name/s

Kunal Rao

Mentor's Name

Prof. Prabhat Ranjan, Mr. Yashawant Dev Panwar

Abstract

Patentability search is a challenging and hectic task, involving finding out the similarities between the subject of innovation of an applicant and the same of a granted patent, finding existing patents to that particular field and checking out the patentability to grant the patent. This task involves the knowledge of experts and lot of time (days to weeks) checking out patentability. The main purpose of this research is to prepare AI tools, which would take much lesser time for checking out class of application, scaling down of application for prior art and checking for patentability. Dataset is trained using IBM Watson's cloud services and the results are obtained by running the python script.

Important outcomes of the project

I have developed an AI classifier that yielded the top 10 classes relevant to the text (patent abstract). Secondly, I have developed an AI tool that analyze the new patent data and selects the similar patents for the prior art.

Future prospects

The implementation of the task of Novelty Search is ongoing.

Text Factorization Using Deep Learning

Semester Long Project

Student's Name/s

Kunal Rao, Vivek Patle

Mentor's Name

Dr. Nirmal Yadav

Abstract

The handwritten digit and character recognition is the most fascinating and challenging topic these days. In this paper, we will be using the convolutional neural network to recognize the character. Deep learning is a powerful set of techniques for learning in neural networks. Neural networks and deep learning currently provide the best solutions to many problems in image recognition, digits and character recognition, speech

recognition, and natural language processing. The proposed method is based on the use of feed forward back propagation method to classify the characters/ digits. The convolutional neural network (CNN) is trained using the Backpropagation algorithm. Neural network followed by the Backpropagation Algorithm which comprises Training.

Important outcomes of the project

We trained a model which could accurately recognize the handwritten digit.

Future prospects

To design a Multiple- digit recognition system.

Exploring Speech Recognition in ROS

Summer Internship

Student's Name/s

Pankaj Baranwal

Mentor's Name

Arseniy Gorin

Abstract

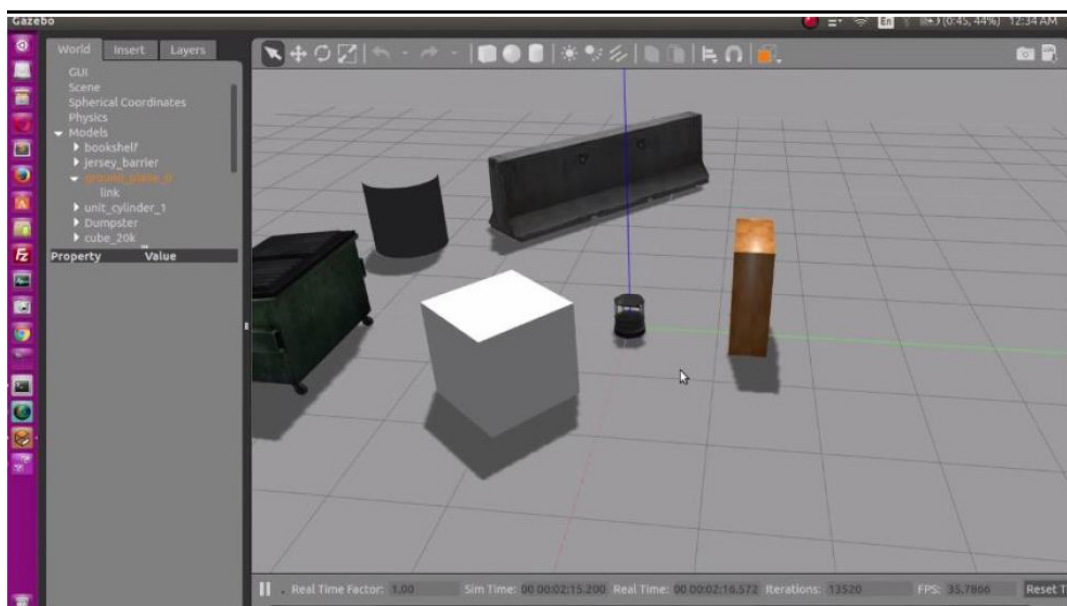
The CMUSphinx toolkit is a leading speech recognition toolkit with various tools and packages for building powerful voice-enabled applications but many important features still require further development. Things like building a phonetic model capable of handling an infinite vocabulary, postprocessing of the decoding result, sense extraction and other semantic tools still need to be added. So, during this internship, I had taken up the task of filling the void for some of these "missing" features and updates in pocketsphinx. Specifically, my work involved creating a new package for pocketsphinx in ROS(Robot Operating System) which would provide ROS users enable voice interaction in their robotic platforms. I also worked on improving the existing speech recognition system of pocketsphinx. At later stages,, I also devoted some time towards speaker verification using pocketsphinx which still a topic of research.

Outcome

The development of the ROS package for pocketsphinx is complete and it has been integrated in the official CMUSphinx repositories.

Github Link - <https://github.com/cmusphinx/ros-pocketsphinx>

The speaker verification module has also reached a stage where it could be used for further development and research work. I was able to get a Word Error Rate (WER) of 33%



Belt for blind

Project for IIT Bombay's eYIC competition

Student's Name/s

Pankaj Baranwal, Ridhwan Luthra, Sreyash Sachan, ShashwatYashaswi

Mentor's Name

Dr. Harendra Pal Singh, Mr. Sachin Kumar

Abstract

Since centuries, visually impaired people have relied on a stick or dependence on another person to find their way around. But using the advancement in computer vision and machine learning technologies, we have developed a prototype belt which could be used to provide detailed information about a person's surroundings using both audio as well as haptic feedback.

Outcome

A blindfolded person was able to navigate a complex environment with multiple moving objects.

Future Prospects

Right now, the module only provides information regarding whether there is an object nearby and how far it is. Information related to the road's terrain, and traffic, and details about the object can be added to provide better feedback to the visually impaired.



Behavioral analysis of Malware using Machine Learning

Summer Internship

Student's Name/s

Arjun Sharma, Anushtha Kalia

Mentor's Name

Dr. S. K. Muttoo

Abstract

With the recent increase in malicious attacks via ransomware and the losses incurred by various segments of the society, both in terms of data and money, the need of the hour is to find novel techniques to improve detection rates and performance. Current anti-virus techniques rely on hash or signature comparisons via static analysis, which makes zero-day detection impossible. In order to cope with this many antivirus companies are now incorporating behavioral approaches.

In this project we have worked on how machine learning can be combined with behavioral analysis in order to cluster the malware samples into distinct similar-behavior families which can further facilitate a paradigm shift in detection techniques. Alongside proposing a behavioral profile based malware detection, we have also used machine learning to reveal inconsistencies associated with antivirus labels of malware.

Important outcomes of the project

Through various experiments we concluded that a paradigm shift needs to be brought in the current malware analysis and labelling techniques to promote both automated detection and further research in the field. The results showed significant differences between the groups created via Self Organizing Maps and those via Majority Vote and Microsoft labels, highlighting the fact that the behavioral aspect of malware is not given due consideration by the AV vendors. This was further validated by the classification accuracies secured by the random forest classifier on these labels. Adequate knowledge about the behavioral properties of a certain malware type can help in development of a generic protocol to neutralize it, a technique whose current application is inefficient with inconsistent and behavioral-profile-independent AV labels. As an elementary solution to this, a cluster-based classification model can be adopted which will not take AV labels under consideration. The approach would consist of two main phases: the clustering phase, where various samples would be clustered on the basis of their behavioral profile and the classification phase, where new unseen samples will be allocated an ideal cluster. This would help with the current labelling inconsistencies and would also act as a catalyst for further research on the subject in order to bring out better solutions.

Lissajous on Paper: A physics game

Summer internship

Student's Name/s

Abhinav Gupta, Shardhha Puri

Mentor's Name

Prof. Pankaj Tyagi

Abstract

This game is based on a very important phenomenon in nature called Lissajous curves. The motive of the game is to teach the variations in the Lissajous curves by varying phase difference between the two orthogonal simple harmonic oscillations. For playing the game one is to have the knowledge of basic concepts of physics. It consist of having 30 cards, each one with a simple physics question. The person playing game needs to take out any two random cards, solve the question and the answer to each of them would be in numeric form .The two answers will give the two phase angles of the two orthogonal simple harmonic oscillations and their difference will be the required phase difference. The Lissajous figure depends on the amplitudes of both the waves, frequency ratio of both the waves and the phase difference between them. Here we are trying to learn the variations in Lissajous figure with phase difference only so we will be keeping the amplitudes of both the waves same and constant and the frequency ratio to be 1 :1.

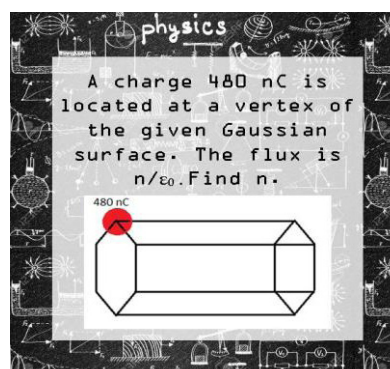
The interns derived the formula using which they find the points where to fix the pins and then by pins and loop method they draw required Lissajous figure corresponding to that phase difference!

Important outcomes of the project

It is an innovative method to explain the concept of physics at undergraduate level. It is based on hands on learning concept.

Future prospects

Students shall be encouraged to find new pedagogies for physics concepts.



Autonomously Indoor Mapping Quadcopter

Summer Internship

Student's Name/s

Arvind Singh, Shreyas Sachan

Mentor's Name

Prof. Shobha Bagai

Abstract

Nowadays, UAVs (Unmanned Aerial Vehicles) are used in almost every field be it in military operations, agricultural surveillance, infrastructure inspection, film production etc. Their uses have been increased dramatically as they are cheaper to purchase, smaller in size, and easy to operate. This project aims to design the system and algorithms necessary to allow a quadcopter to follow a marker autonomously.

Outcome

We built our own quadcopter which is capable of carrying a payload, such as a camera (used to determine the location of the marker). A system was devised such that quadcopter can correctly determine the location of the target (marker) while hovering and then follow the marker accordingly. Only commercially available components and open source softwares were used in this project making it easily accessible to future researchers and UAV enthusiasts.



Digitization And Analysis Of ECG Paper Records

Paper Related Project

Student's Name/s

Harshit, Saurabh Gupta, Vaibhav Sharma

Mentor's Name

Prof. Shobha Bagai

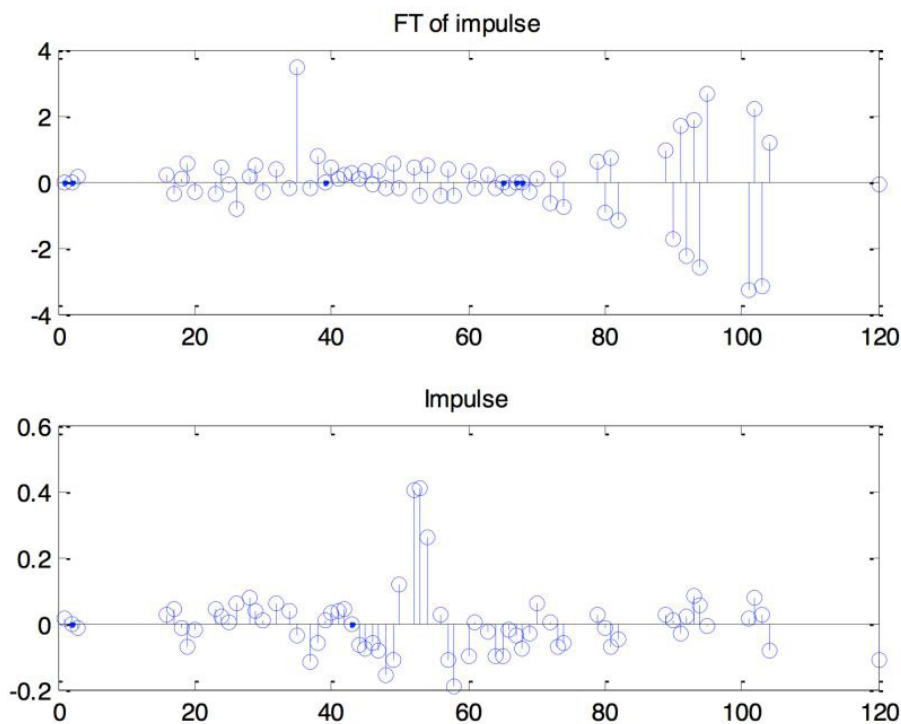
Abstract

Digitization of the ECG Waveform, can be used to convert the ECG waveform that we obtain from the ECG Scanner on thermal papers, to a digital form. Once we have the wave in digital form, we can apply operations such as sampling, scaling, modulation etc. for the analysis of the wave. The impulse response can be generated using the pacemaker to remove the abnormalities of the heart and achieve a regular ECG waveform.

Outcome

Digitization of the ECG Waveform, can be used to convert the ECG waveform that we obtain from the ECG Scanner on thermal papers, to a digital form. Once we have the wave in digital form, we can apply operations such as sampling, scaling, modulation etc. for the analysis of the wave.

The impulse response that is calculated can be generated using the pacemaker to remove the abnormalities of the heart and achieve a regular ECG waveform.



Fourier Transform of impulse response and impulse response

Self-Balancing Skateboard

Summer Internship

Student's Name/s

Vikas Kamboj

Mentor's Name

Prof. Shobha Bagai

Abstract

With the advancement in technology we need to improve the quality of our machines. The increasing rate of urbanization causes over consumption of energy and pollution. Therefore switching to an electric vehicle reduces the greenhouse gas emissions and the chances of pollution. In this project we have designed a prototype of a self balancing skateboard which works on the principle of inverted pendulum. We have used PID controller to optimise the motion of the bot, and a battery is used to provide supply to the transporter.

Outcome

The bot was capable of adjusting itself with respect to changes in weight and position. We have developed the Balance System from MPU-6050 which is a combination of a single gyroscope and an accelerometer. The stability of the system is to show the capabilities of the Arduino in doing PID loops even with limited accuracy in position readings. PID control system is designed to monitor the motors so as to keep the system in equilibrium. It should be easily reproducible given the right parts and code.



Gesture Controlled Robotic Arm

Summer Internship

Student's Name/s

Vaibhav Jain

Mentor's Name

Prof. Shobha Bagai

Abstract

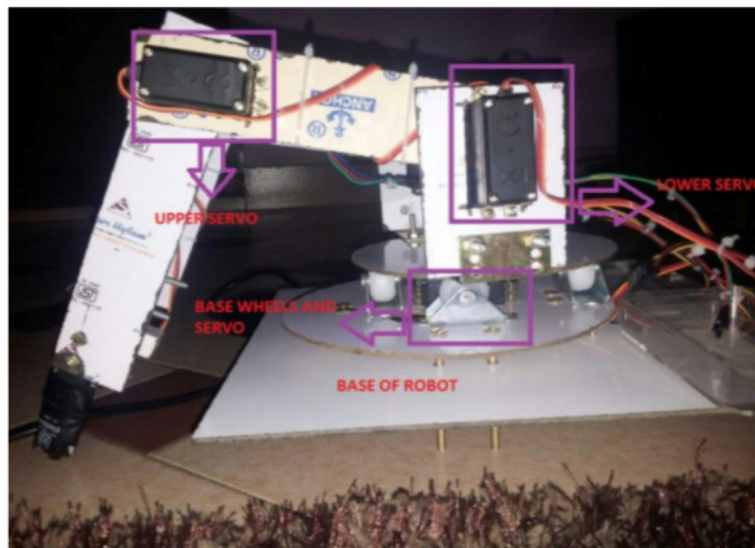
This project aims at developing a user-friendly interface to control a robotic arm using the gesture recognition. This package will allow a user to just stand in front of the camera and move his hands. The robotic arm will try to mimic the motion of the user's hand. It allows fluid movements of robotic arm possible which are not easy to perform in real-time using even high-end controller.

Outcome

In this project, we were able to program a prototype robotic arm model to be able to operate through gestures of a human arm.

Demonstration Video

<https://drive.google.com/file/d/1ufUPcnmxvdqWDNiEiGb61mIIHE10ahAu/view?usp=sharing>



Complete assembly of the robotic arm

Cell Phone Detector (A handy device to avoid cheating in examination)

Semester Long Project

Student's Name/s

Hemant Singh, Deepak Gupta, Neeraj Chauhan

Mentor's Name

Prof. Pankaj Tyagi

Abstract

Lots of electronic gadgets are now-a-days misused. For example, the misuse of mobile phones for cheating in examination is a matter of great concern. Everyday people invent new methods of misusing mobile phone in examination centers. This projects aim to make a portable handy device that can detect a hidden mobile phone within its proximity (a range of about a meter). This will help in avoiding cheating during examination.

Important outcomes of the project

The device is developed using basic electronic components about which they studied in their theory classes. This device detects radio frequency signal from mobile phone, which introduces an induction current in the circuitry, which in turn beeps the buzzer. An antenna catches the frequency from mobile phone and induces a current in the circuit. The current is detected by Schottky diode and is thus amplified by a transistor. Finally an Op-Amp acts as comparator and allow the current to go ahead and buzzer the beep.

Future prospects

The device successfully detected the presence of a mobile phone within a range of 1 meter.

The device can be fooled by another device emitting radio frequencies of same range as emitted by mobile phone. Further, device is not able to detect a phone, which is on aeroplane mode. We need to overcome these shortcoming to make device effective and useful



Solar hygiene trash can

Semester Long Project

Student's Name/s

Karan Dhingra, Amogh Babbar, Utkarsh Mishra

Mentor's Name

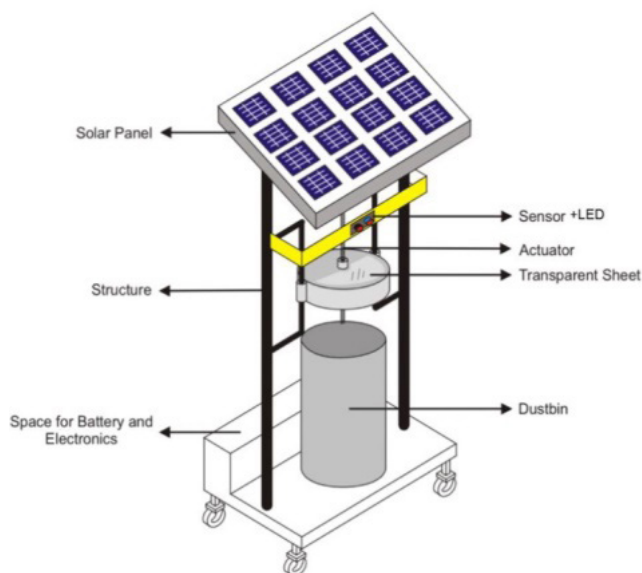
Dr. Swati Arora

Abstract

This project was undertaken to have a noble way to use the trash can, which is cheap, hygienic, self-sustained and sturdy. Filthy trash cans not only emit bad odour and draw mosquitoes and other insects to them which can be a public health hazard, they also spoil aesthetics of a city's landscape. There are two types of the trash cans, with and without a lid. In this study, a solution has been proposed which contains merit of both the type of cans while skipping any demerits. The lid of the trash can open up intuitively when a user comes closer to it and closes when the user walks away. It uses solar power and is also equipped with a solar tracker, which automatically aligns the solar cells in the direction of the sun to maximise the energy input.

Outcome

The outcome of the project was a publication in DU Journal of Undergraduate Research and Innovation Volume 3, Issue 1, pp 110-117



Protoype Design



Working Model

Arduino based home security system

Semester Long Project

Student's Name/s

Aayush Kumar, Awesh Kumar, Ravi Pratap Sahu, Tapas Kashyap

Mentor's Name

Prof. Pankaj Tyagi

Abstract

The project aimed to enable students of open source electronic platform Arduino system and its use for practical application in real world. Students opted to make an Internet of Things (IOT) based device. They fabricated a home security system, which can be installed into one's home without any tussle and can be controlled using the remote device. The specific objective of the project was to create a door locking system and fabricate the designed layout into a final commercializable product. Following technologies were used:

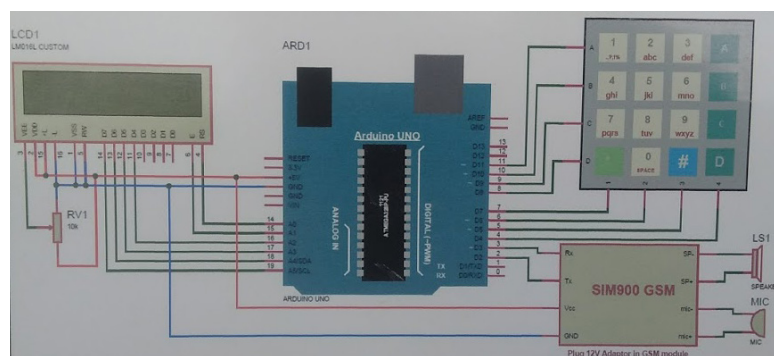
- GSM (Global System for Mobile communications)
- General Packet Radio Services (GPRS)
- ESP8266 Wi-Fi Module
- Arduino Wi-Fi 101 Shield and Arduino UNO

Important outcomes of the project

Students were successful in developing a home security system in product form using Arduino Uno, an LED display and a Numpad. The product is quite handy and facilitates easy installation without much involvement of a complicated wiring network and pre installation charges. It can easily be connected to any door and locks the door using the electromagnets. One can authenticate and gain access by entering the password into the numpad directly attached to the device and correct password will turn off the electromagnet thus, unlocking the door. One can also control the door and unlock it without giving anyone the password from anywhere using a simple SMS or by using the simple internet browser in his mobile or laptop.

Future prospects

The field of IOT and home automation seems quite promising in the near future along with the development of much more complex and rigid programmable devices to ensure the ease of access in the daily life and further incorporation of the technology in the lifestyle.



Effect of absorber plate on efficiency of PVT Module

Semester Long Project

Student's Name/s

Aayush Jain, Arvind Singh, Jatin Pawar

Mentor's Name

Dr. Swati Arora, Dr. Harendra Pal Singh

Abstract

Photovoltaic-thermal (PVT) technology is a relatively new technology that comprises a photovoltaic (PV) panel coupled with a thermal collector to convert solar radiation into electricity and thermal energy simultaneously. It is well known that PV cell efficiency is a function of their temperature; increasing temperature reduces the photovoltaic conversion efficiency of sunlight to electricity. One of the central advantages of coupling a PV panel with a thermal collector is that the latter can reduce the former's temperature by circulating a coolant into the collector, thereby increasing the cell's efficiency.

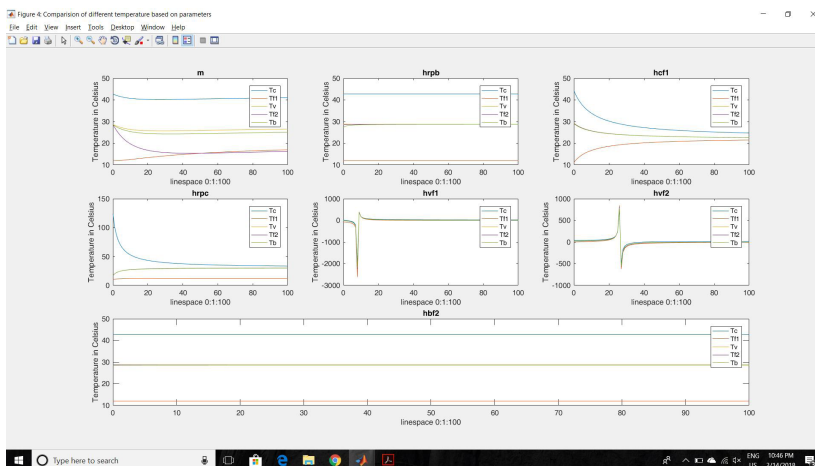
The main objective of this paper is to increase the efficiency of the thermal absorber by changing the shape of the absorber plate. The shape of the absorber plate plays an important role in the efficient working of the thermal absorber. The efficiency of the thermal absorber is directly proportional to the surface area of the absorber plate and indirectly proportional to the temperature of the coolant used. So, the main work revolves around finding the best suitable shape.

Important outcomes of the project

1. Understanding how PV module works and its drawbacks.
2. Understanding how PVT module works and how to make it more effective.
3. Calculating the effect of shape of absorber plate on efficiency of the system.
4. Plot and optimize the parameters of the system

Future prospects

1. Formulating our own mathematical model for a PVT system.
2. Changing our model to see the effect of shape of absorber plate on efficiency of the system.



Effect of Different Parameters on different fragment Temperatures in V- Groove Model

Autonomous Mobile Robots

Semester Long Project

Student's Name/s

Lakshay Juneja, Pankaj Baranwal, Ridhwan Luthra

Mentor's Name

Dr. Harendra Pal Singh

Abstract

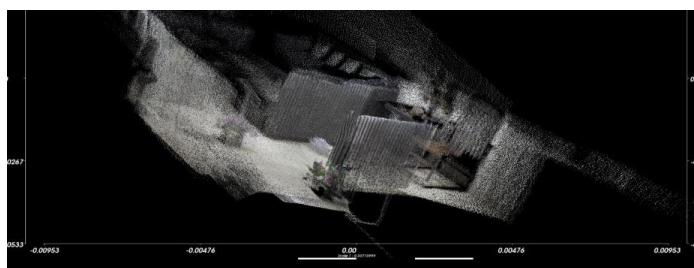
A mobile robot is any autonomous or semi-autonomous robot that is capable of locomotion. We built an autonomous robot, which means that all the actions taken by the robot are guided by the program in the robot without any human intervention. For a robot to move in any environment, it should know the path it has to follow to get from one location to the other (motion planning) and it should also know its current location (localisation).

Important outcomes of the project

The robot was able to autonomously move from the initial point to its final destination using our path planning algorithm.

Future prospects

The technology developed here will be used for autonomous mapping of unknown areas, delivery of items from one place to another, etc. We will also be expanding the locomotion in 3D to enable the same tech to work with drones.



Spotter Snake

E Yantra Project: eYRC - 2017

Student's Name/s

Vikas Kamboj

Mentor's Name

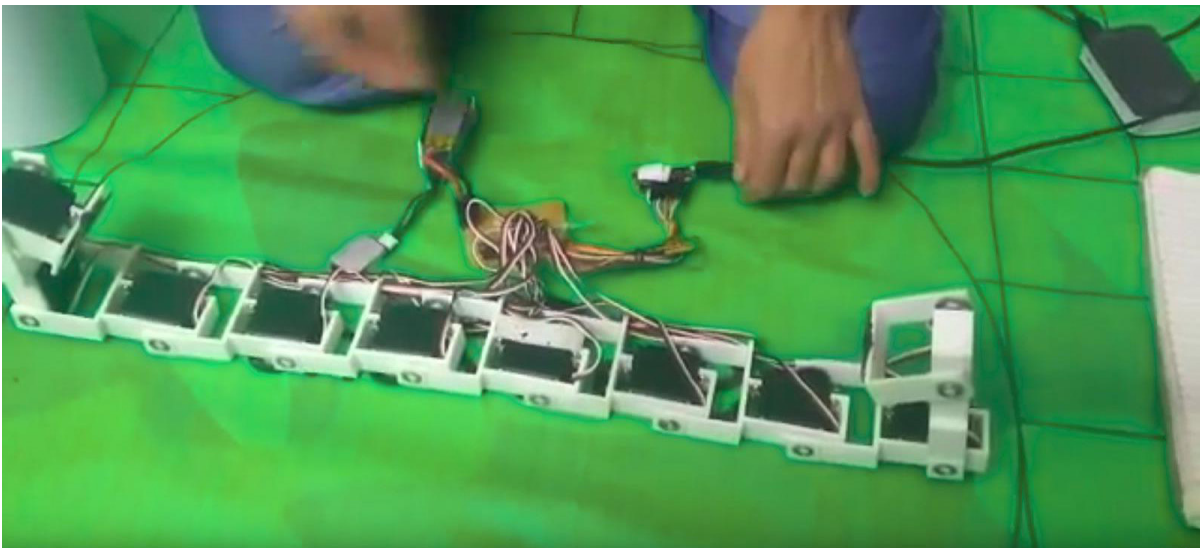
Kalind Karia

Abstract

Snake Robot which moves by rolling itself into a circle

Outcomes of the project

A robot that can move very fast than other snake robots.



Monetary Policy Shock Analysis Using Structural Vector Autoregression (VAR)

Paper Related Project

Student's Name/s

Rushil Agrawal, Ishaan Arora

Mentor's Name

Prof. Shobha Bagai

Abstract

A wide variety of theoretical and empirical models have been employed to analyse the relationship between monetary policy and stock prices. These have provided some evidence to justify that monetary policy can impact asset prices and vice versa. We aim to analyse the interaction between monetary policy and asset prices in India, using structural VARs, as given in Bjornland and Leitemo (2009). Their results indicate great interdependence between stock prices and interest rate in the United States. We follow a similar methodology here because the behaviour of the US Stock Index is similar to the Indian Stock Indices, over the years. Annual frequency of data is used. The first data is the Stock Index of India, which we've taken to be NIFTY. The second data is the MIBID or the Mumbai Interbank Bid Rate. This is the interest rate that a bank participating in the Indian interbank market would be willing to pay to attract a deposit from another participant bank. This paper seeks to explore the extent of interdependence that exists between stock prices and monetary policies in India. A structural VAR model is employed in the study.

Outcomes of the project

- A monetary policy shock first increases the output, which then decreases back to its mean value.
- A monetary policy shock also decreases the inflation, but in the long run the inflation slowly approaches its mean.
- Inflation increases initially with a stock price shock and then approaches the mean in the long run, which is expected because positive changes in the stock prices have a chain effect which ultimately causes inflation to rise, but this increase in the inflation wears out over time.
- A shock in the stock prices decreases the interest rate, which is an expected result.



Figure 1: NIFTY Index

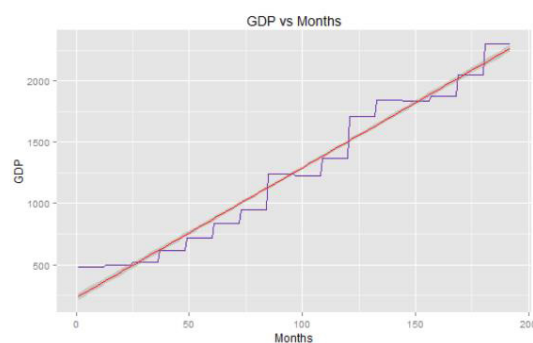


Figure 2: GDP

Fix my eyes

Paper Related Project

Student's Name/s

Lakshay Juneja, Sanjeev Dubey, Utkarsh Mittal

Mentor's Name

Dr. Nirmal Yadav

Abstract

The gradient of images can be directly edited to perform useful operations; this is called gradient based image processing or Poisson editing. For example operations such as seamless cloning, contrast enhancement, texture flattening or seamless tiling can be performed in a very simple and efficient way by combining/modifying the image gradients.

Important outcomes of the project

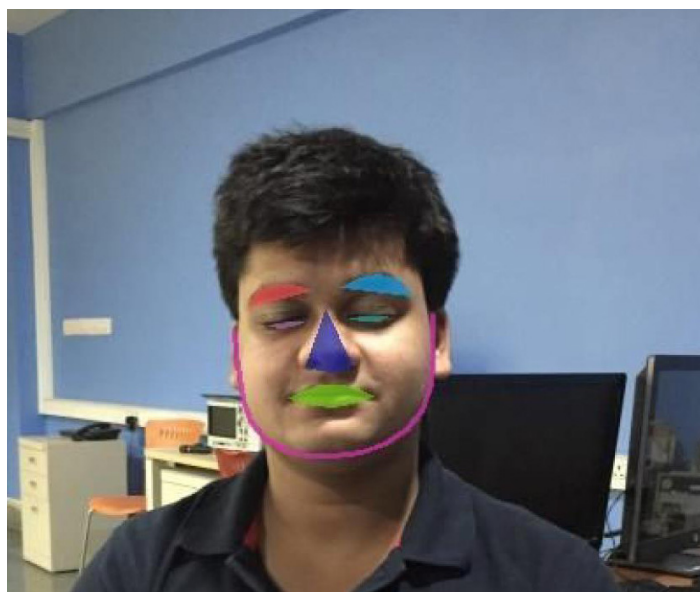
We have successfully developed a system that automates the entire process of Poisson image editing techniques. The user needs to input an image with closed eyes and one with open eyes. It has been observed that after successful localization, closed eyes are correctly replaced in almost all the cases.

Using Poisson editing and blending techniques, we get much more fruitful results compared to other techniques like copy-paste, simple cloning etc.

Future prospects

Using GANs (Generative Adversarial Networks) for the same which may improve results.

Handling extreme cases like tilted heads, spectacles etc.



The Road Coloring Problem

Summer Internship

Student's Name/s

Naira Noor Rafiquee, Shaista Manzoor, Syed Azka Manzoor (IUST, J & K)

Mentor's Name

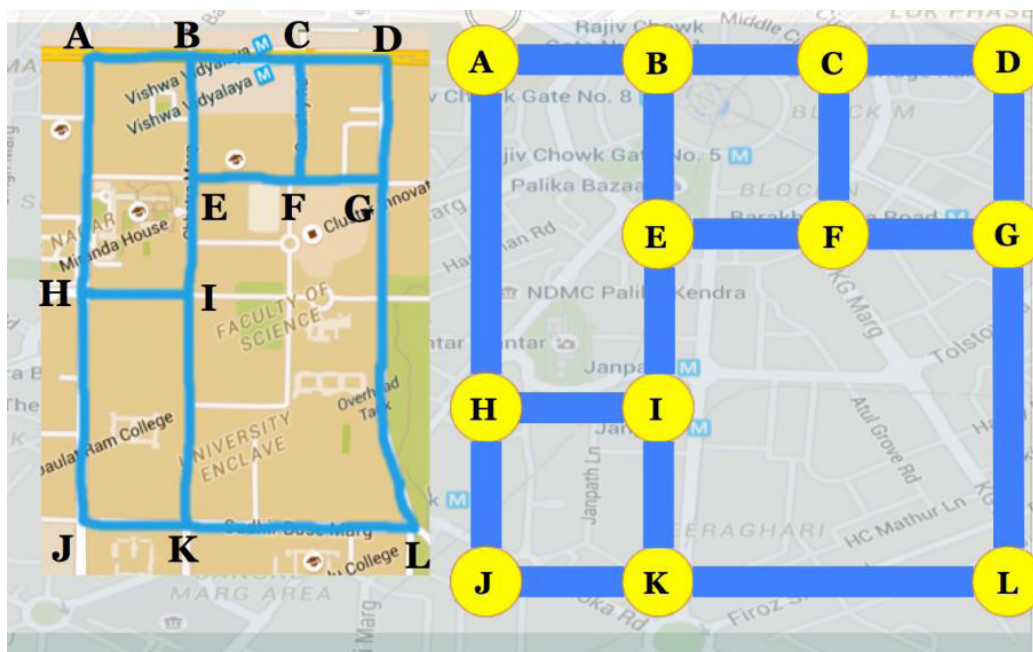
Prof. Shobha Bagai

Abstract

This project deals with an interesting concept in the field of graph theory i.e. the road coloring problem that was conjectured in the year 1970 by Adler, Goodwyn and Benjamin Weiss. The problem was applied on finite, strongly connected directed graph that had constant out-degree and were aperiodic. The project deals with finding synchronized paths for vertices. Synchronized paths are paths that would lead to the same vertex no matter what the initial vertex is selected.

Important outcomes of the project

An example of the problem given in the paper "The Road Coloring Problem" by Weifu Wang was studied and was solved using mat lab. The problem was applied on the roads around the Cluster Innovation Centre. The graph was formulated and various trees, cycles, paths arising from the graph were studied.



Develop Quantifying Understanding of Diamond Table: A data analysis Approach

Paper Related Project

Student's Name/s

Ishaan Arora, Rushil Agrawal

Mentor's Name

Prof. Shobha Bagai

Abstract

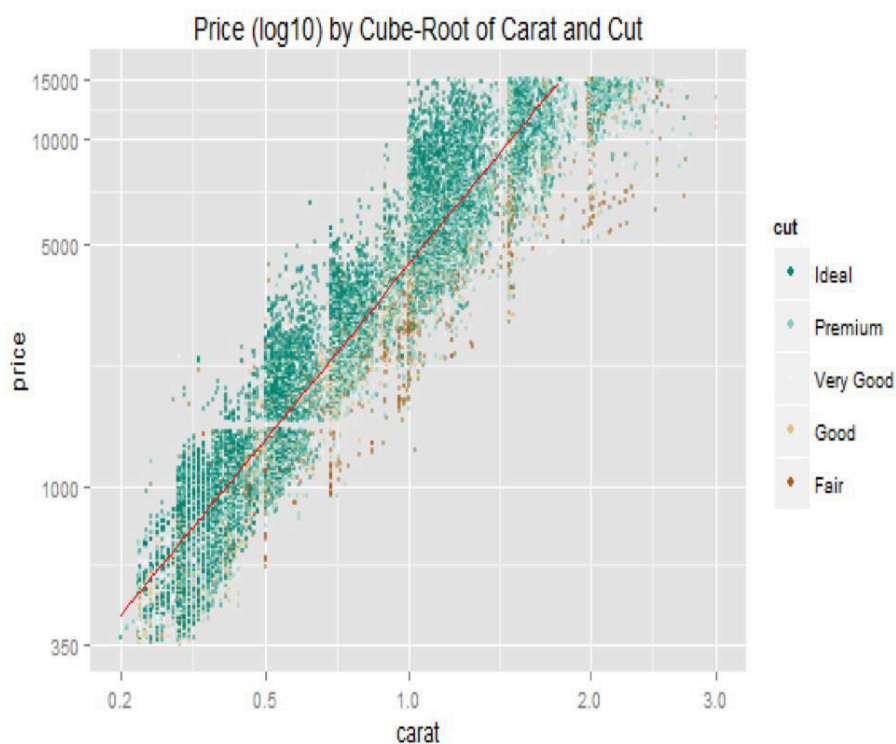
A mathematical model to quantify the commerce of Diamond trade by statistical inference and data analysis is developed. The linear model predicts the price of a diamond depending upon the various parameters like clarity, cut, color and carat. The data set under consideration has been extracted from a certified diamond information portal. The data frame has over 54000 observations and 10 variables (carat, cut, color, quality, depth,

Table, Length of Diamond (x),Width of Diamond(y),Height of Diamond(z)). R, which is an open-source data analytics compiler has been used throughout the research.

Outcome

The study has successfully developed a mathematical model to predict the price of a diamond depending upon the various parameters like clarity, cut, color and carat. The resultant equation is

$$A * \text{price}(\log 10) + B * (\text{carat})^{1/3} + C * \text{cut} + D * \text{clarity} + E * \text{colour} = 0$$



Pollution in India: Trends and Relation with Possible Causes

Paper Related Project

Student's Name/s

Vedant Kohli, Vaibhav Sharma, Saurabh Gupta, Harshit, Archit Garg

Mentor's Name

Prof. Shobha Bagai

Abstract

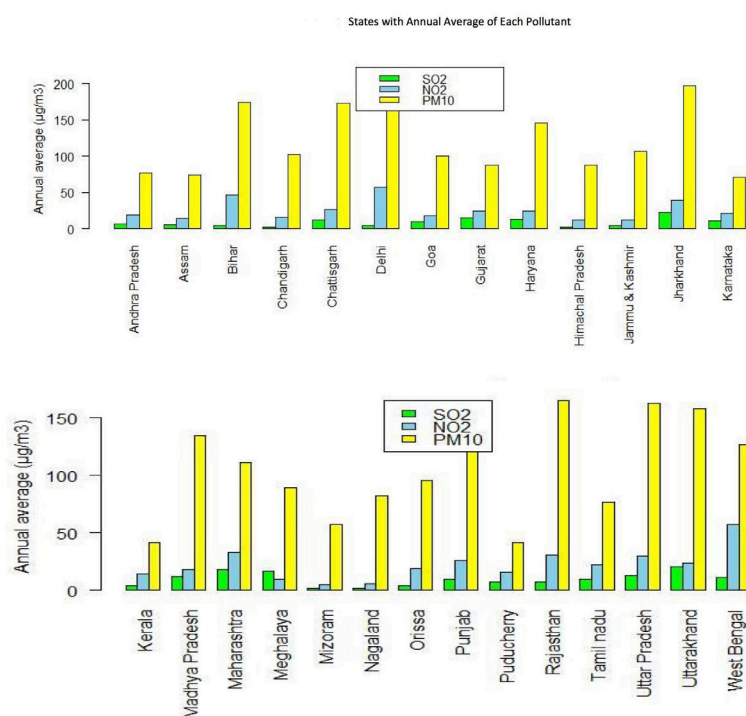
Pollution depends on several factors, ranging from factories to no. of vehicles running in the state. The paper presents an analysis of the trends of pollution in India, over the years, specially focusing on the data of 2011, and its dependence on various factors like Population, Vehicular Density, Forest Cover, Industries in the State/City.

Outcome

The relation of pollution with industrial density and vehicular density is positive, which is indicative of the fact that the two can be possible causes of pollution.

The trends of pollution (levels of SO₂, NO₂, and PM₁₀ particles) indicate that while some states like the north western and northern part of India need to reduce their pollution concentrations, some states like the north eastern states and southern states have shown improvement in the same, and are approaching more appropriate levels of pollution.

Analyzing the hourly data available for Anand Vihar and Dwarka districts in Delhi, we find that while the claim that the average concentration of NO₂ in Dwarka is 45.62 is true for two of three samples at 5% level of confidence, the concentration of NO₂ over different regions in Delhi (Anand Vihar and Dwarka) is significantly different.



Brain Computer Interface: Applications specifically for paralyzed persons

Paper Related Project

Student's Name/s

Pankaj Baranwal, Harshit

Mentor's Name

Dr. Mahima Kaushik

Abstract

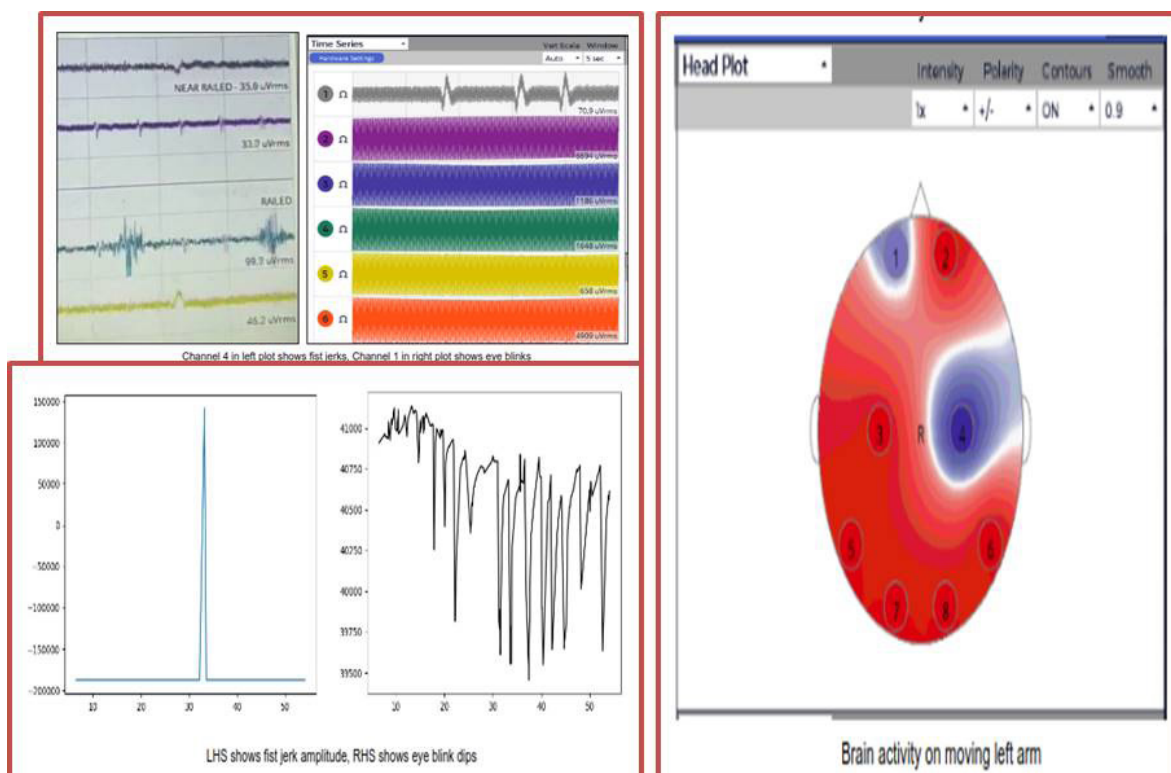
Electroencephalography or EEG is an electrophysiological monitoring method which is widely used to monitor and record the brain wave patterns. These patterns can then be used to analyse the brain activity and derive meaningful information about a person's mental state. A brain computer interface (BCI) is a medium of communication established between a brain connected to an external device through wires or implants, which monitors and analyses the EEG signals. The aim of this project was to utilize a BCI to analyse brain waves and find out unique patterns so that physical functions can be mapped to brain signals.

Important outcomes of the project

During this project, some brain activities/ signals were recorded by moving various body parts on a computer interface, which were later analyzed and interpreted for correlating them with various functions of the body.

Future prospects

Development of an app or software to actually control a device / program using brain waves, which might be quite beneficial, specifically for paralyzed persons.



in silico analysis of active site of H3ase

Paper Related Project

Student's Name/s

Ankit Pathak

Mentor's Name

Dr. Jogeswar S Purohit

Abstract

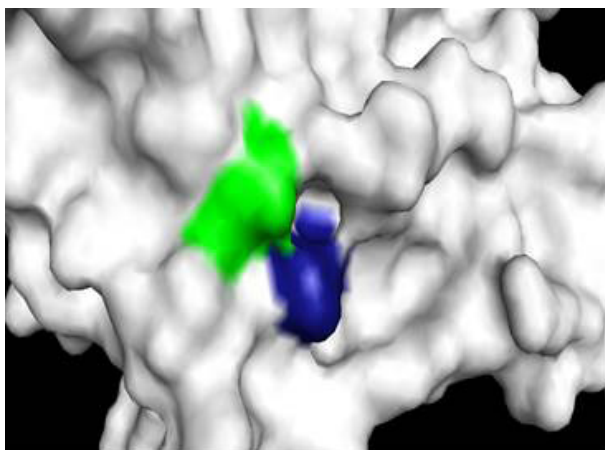
We have identified a H3 specific protease activity in the GDH of chicken liver. This protease specifically cleaves histone H3 from the N-terminus. We have extensively characterized the protease and have named it as H3ase. The H3ase activity is purified upto homogeneity from chicken liver. The GDH activity and H3ase activity in the H3ase has simultaneously investigated. While, both GDH and H3ase activities are regulated in a similar manner by allosteric regulators of GDH; by substrate competition assay it has been established that the H3ase and GDH active sites are distinct. However, the active site for the H3ase activity remains elusive. In the present work we intend to map the active site for the H3ase activity in the GDH.

Important outcomes of the project

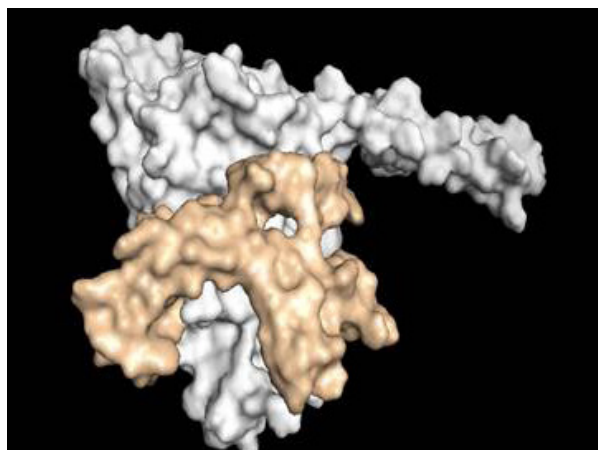
This will be first such protease activity site of GDH.

Future prospects

The active site region for H3ase activity will be mutated to experimentally confirm the in silico data.



H3ase active site



H3ase docked with H3

Searching Pathogenic Motif-ome with special references to Mycobacterium tuberculosis and Campylobacter jejuni

Semester Long Project

Student's Name/s

Ankit Pathak, Vani Singh

Mentor's Name

Dr. Asani Bhaduri

Abstract

Pathogenic bacteria have been plaguing mankind since time immemorial. Although several genome and proteome of pathogenic microbes have been unearthed, the analyses are mostly dependent on a few model organisms. We have tried to find novel and hitherto unreported motif in several pathogen proteome utilizing brute-force and expectation-maximization algorithm. The protein sequence stretches of length 2 to 20 in pathogenic proteomes were scrutinised for repetition and subjected to analysis for finding common and unique repeat sequences subtracting the repeats from those observed in common model organisms like Escherichia coli, Bacillus subtilis. We are pursuing a special subset of these hypothetical motifs unique in Mycobacterium tuberculosis and Campylobacter jejuni.

Important outcomes of the project

This process resulted in collection of several unique repeats which could be represented as unique protein motifs. Based on the functional, positional and/or structural similarities between the proteins that possess these unique repeats we are proposing several novel motifs.

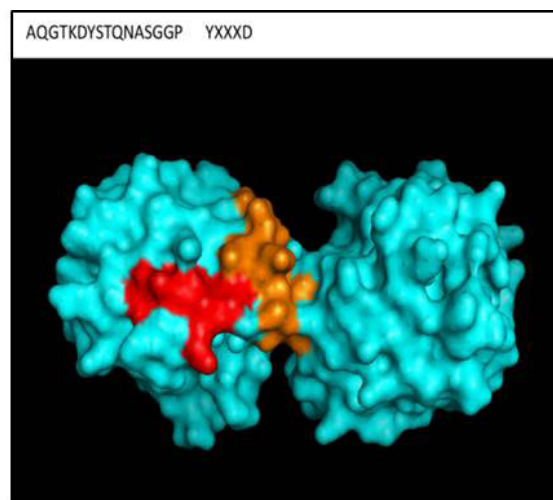
We presented a Poster on Unique Protein Motifs: The Mycobacterial Slice at Keystone Symposia 'Tuberculosis Co-Morbidities and Immunopathogenesis' (2016).

Future prospects

We are working on motifs of several pathogenic and non-pathogenic mycobacteria

Representative table of Putative motifs in M. tuberculosis Two motif stretches in 3-D protein structure

Length: 11	Length: 12	Length: 13
"GGAGGAGGAGG" 71	"AGGAGGAGGAGG" 28	"WLTNREGIEVAR" 16
"AGGAGGAGGAG" 28	"GGAGGAGGAGGA" 19	"GSSRRYPPELRER" 16
"GGAGGAGGNGG" 25	"VGCAETVRKWVR" 16	"FLRGRARPASTLI" 16
"GGAGGNGGAGG" 24	"LLGVGCAETVRK" 16	"ASTLITRFIADHQ" 16
"GAGGAGGAGGA" 24	"GVPIAPSTYYDH" 16	"ELGVPIAPSTYYD" 16
"GGGGAGGAGG" 23	"STWAGFAYVAFV" 16	"ANYGVYGARKVWL" 16
"GGNGGAGGAGG" 22	"YQYCGDVPVVEL" 16	"ERLAEAGIQPSVG" 16
"GRPLIGNGANG" 17	"YCGDVPVVELEA" 16	"RWVDWFNHRRLYQ" 16
"GGTGGTGGTGG" 17	"AELKRLRDNAE" 16	"RLYQYCGDVPVVE" 16
"LRWGVESICTQ" 16	"PADLVQRRFGPP" 16	"GVGCAETVRKWVR" 16
"YVSTWAGFAYV" 16	"REPSRRELRDGE" 16	"AYVAFVTDAYARR" 16
"RANAILKTASA" 16	"WAAISEVARLLG" 16	"CAETVRKWVVRQAQ" 16
"RRFGPPAPNRL" 16	"RLRDNNAELRRA" 16	"KTELKPGKPWRS" 16
"ATSMVLDALIEQ" 16	"DAGARPGTITEE" 16	"QRRFGPPAPNRLW" 16
"AEIRGQHDSEW" 16	"RLWVADLYVST" 16	"QYTSIRFSERLAE" 16
"AAYAQRQPAA" 16	"DRVGLRGRARP" 16	"KEHISRVAHAANYG" 16
"VQRRFGPPAPN" 16	"RGSQYTSIRFSE" 16	"RRANAILKTASAF" 16
"IHHTDRGSQYT" 16	"NREPSRRELRDG" 16	"ESICTQLTELGV" 16
"GKARRTTIADP" 16	"AANYGVYGARKV" 16	"MVLDAIEQAIWTR" 16
"EAGIQPSVGAV" 16	"ILGWRVASTMAT" 16	"VARLLGVGCAETV" 16



Finding and analyzing the repeating sequences in a Proteome

Paper Related Project

Student's Name/s

Shobhit Maheshwari

Mentor's Name

Dr. Mahima kaushik

Abstract

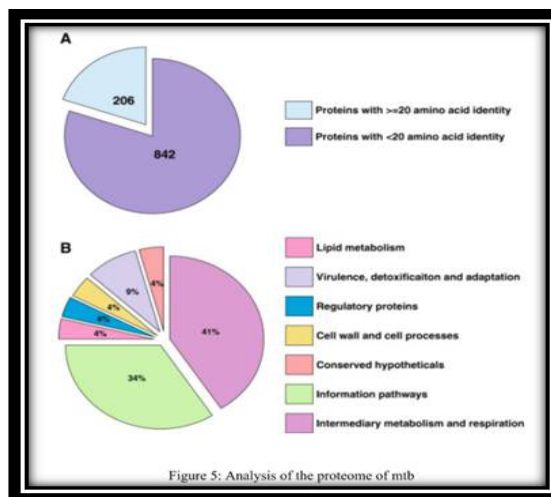
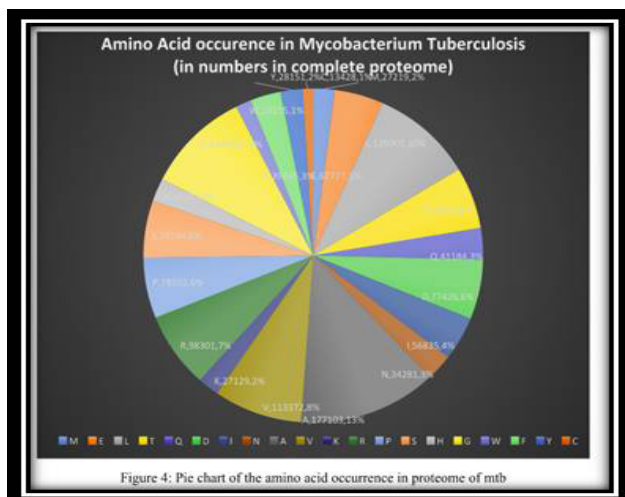
Various protein sequences in a proteome have a very similar chain of amino acids. Slight changes among these sequences may be a result of either a mutation or the similar properties of the changed amino acids, for example in case of Mycobacterium Tuberculosis EsxP and EsxK gene only the third amino acid from the start varies, while all the other parts of the sequence are exactly the same. In case of the EsxP the third amino acid is Threonine (T), while in case of EsxK third amino acid observed was Serine(S). Threonine and Serine have almost the same physical and chemical properties. Thus, we can draw a conclusion that both these proteins have almost similar functionalities, which can be verified from the vast database of functions of proteins. The first step towards the problem is obviously to find the recurring sequence. The recurring sequences in this project were found using a self-written code. The next step was to find the protein sequences corresponding to those recurring sequences and analyze them using the tools and databases available online.

Important outcomes of the project

The project involved study of the properties of the changes in amino acids and their functionality or in case, if the changed proteins have dissimilar properties etc. In case of the dissimilarity of the changed proteins, we might make a guess that the sequence is mutated and get it validated from databases available online.

Future prospects

Correlating the change in amino acids with the structure and function of a protein may facilitate our understanding of the complex biological machinery of all organisms.



Quantification of Retinal Tissue Damage

Semester Long Project

Student's Name/s

Raghav Singh, Sanjeev Dubey, Utkarsh Mittal

Mentor's Name

Dr. Nirmal Yadav

Abstract

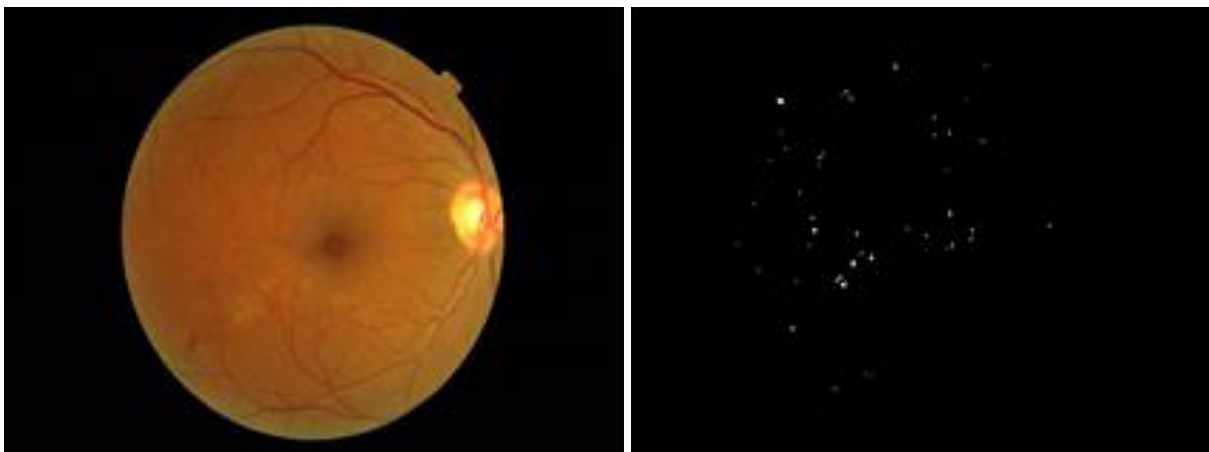
Retina is the outer lining of human eye where the image formation takes place. Any threat to retina causes severe eye defects and may lead to complete blindness. During a defect the retina gets distorted. To measure the severity of a disease we need to determine different retinal tissue damages. These damages must be quantified to make useful predictions. Here we attempt to quantify retinal tissue damage through various image processing techniques. To verify our estimate we applied machine learning algorithms to create a classifier for detection of diabetic retinopathy and macular edema disease.

Important outcomes of the project

Our image processing techniques have been very consistent. We have been successful in detecting blood vessels, microaneurysms and exudates. Results of extraction of blood vessels are found to be better than most of other works. A binary classifier system has been designed for diabetic retinopathy retinal defect has been developed and tested. This system provides an early warning of diabetic retinopathy abnormalities for diabetic patients. Extraction of haemorrhages has a lower accuracy. Microaneurysms are most important factor With correlation matrix we have been able to find that fractal dimensions and entropy have a positive correlation. This makes us free to drop one of these features without having much impact on accuracy.

Future prospects

Applying deep learning networks on existing data to produce even better results. Achieving optimal levels of specificity and sensitivity.



Communal Harmony

Semester Long Project

Student's Name/s

Aniket Bose, Anish Kumar, Payal, Piyush Kumar, Rishabh Yadav

Mentor's Name

Mr. Ashu Mishra

Abstract

The birth of nation states such as India and Pakistan is closely connected to the question of communalism. Learning from the past, one of the primary responsibilities in the post partition India therefore has been to preserve the sanctity of communal harmony. This project tries to offer an academic analysis of communal harmony by taking vast amounts of primary and secondary data as a reference material. The project initially aims to trace the roots of the problem of communalism and then tries to suggest corrections that can be made for the betterment of the national integration.

Important outcomes of the project

One of the primary findings of the study was that for India to progress, communal harmony must remain as one of the pivotal concerns for all the sections of the society. Communal harmony must be a principle as well as the practice.

Future prospects

The project continues to sensitize not only the researchers but all those who participate in the discussions over need for communal harmony in India. The project therefore aims to extend the results of the analysis to the wider audiences.



Exploring Dimensions of racial discrimination experienced by Northeast students living in Delhi

Semester Long Project

Student's Name/s

Azar Hussain, Amal Ahammad, Gaikhuanlung, Heisnam Deepanjali Devi, Nikita Sharma, Yurreimung Amos Sharon

Mentor's Name

Dr. Shaweta Anand

Abstract

This project is aimed at helping NE students from within and outside CIC to get along with their peers from other communities in Delhi. This project is especially relevant at a time when crime and racial discrimination against North-East people is increasing in Delhi and other metropolitan cities. To get a sense of reality of racial discrimination at the ground level, the project students conducted a pilot study among peers and based on preliminary findings, they prepared a detailed and anonymized Google online survey form. This was circulated among a large number of Northeast and non-Northeast students who live in Delhi. The findings were compared for an understanding of the issues involved that also shaped ideas for subsequent social intervention by the team.

Important outcomes of the project

A day-long sensitization workshop was organized based on the theme of 'race and caste in India' at CIC where students from many colleges of Delhi participated and interacted with each other across communities. Relevant documentaries were screened followed by discussion and talk by many eminent panelists that included NE and non-NE academics, social workers, NGO representatives and government officials. What made the workshop special was its interactive format where student's participation through conversations, games, impromptu sharing of experiences. The idea was to provide catharsis to participants and build bridges between the student community to cultivate understanding and acceptance for each other's cultural differences in our own small way, towards reducing racial discrimination in the city.

Future prospects

Awareness modules to be prepared and workshops will be conducted in different parts of Delhi to sensitize people about the discrimination NE people are facing.



Project students interacting with Mr. Robin Hibu (IPS), former Nodal Officer for Northeast People

Intervening in Dhakka Village: Slum for Clean Delhi

Semester Long Project

Student's Name/s

Fardeen Ahmad, Nitish Kumar, Pradip Parsure, Rishi Prasad, Suraj Goyal, Vivek Ranjan.

Mentor's Name

Dr. Komuha Jajuo

Abstract

This project focuses on Dhakka Village Slum (G.T.B Nagar) of Delhi and looks at the life activities performed in and around the slum. For the data collection purposes, the project depended on primary as well as secondary data. Research Papers, Journal articles, Annual reports of Swachh Bharat Mission by MoUD (Government of India), Reports and statistical publications of MCD, DDA, DUSIB regarding slums and sanitation were used as a text to analyze the problems faced by the local inhabitants of the area.

Important outcomes of the project

The study was able to find that due to prevailing unhygienic conditions, slum dwellers face health problems like dengue, malaria, typhoid etc. More than fifty percent of the respondents have been living in the slum since their birth. There was a link developed between unemployment and living in a slum.

Future prospects

The research highlights some of the severe problems faced by the dwellers and opines that some actions must be taken to make changes in the living conditions of the people of the slum. As a part of this understanding, we managed to intervene at some level in providing some basic raw material related to cleanliness processes. The project aims to involve civil society and various government bodies to develop the living conditions of the slum dwellers.



Issues of Sanitation In Kathputli Colony

Semester Long Project

Student's Name/s

Praveer Singh, Mozammil Ahmad, Shivam Rawal, Sanjana Saxena

Mentor's Name

Dr Mohd. Saleem Mir

Abstract

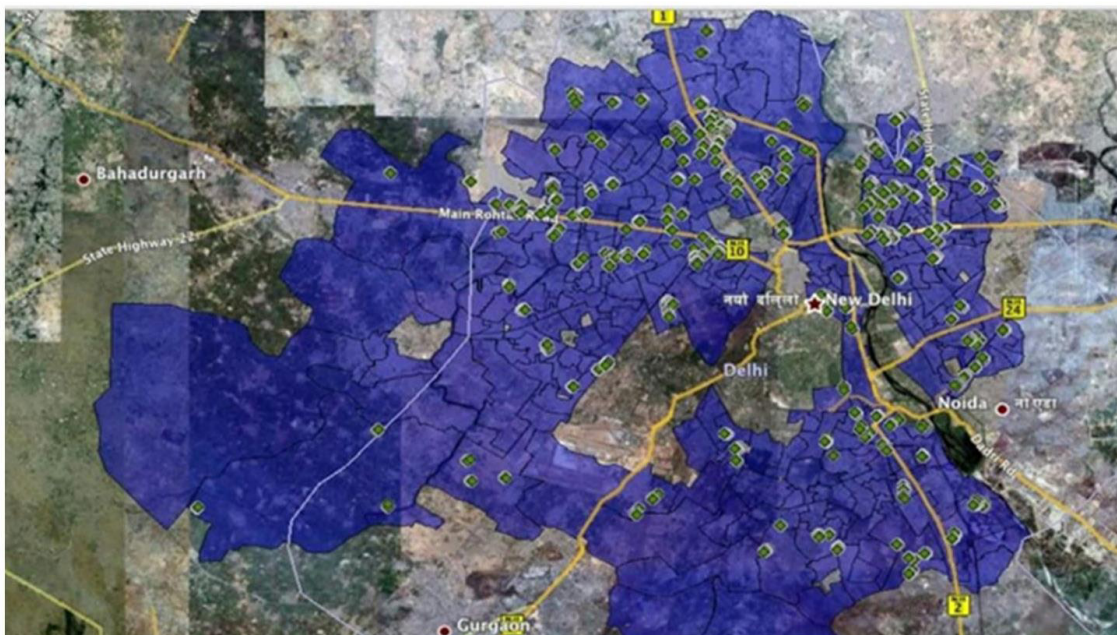
Kathputli Colony is a slum renowned world over for street performers, hidden in the narrow lanes of Western Delhi. It is home to twelve indigenous communities of different states of India, mostly dominated by Rajasthan and Bihar. Like other slums Kathputli Colony slum is also facing various problems but cleanliness and sanitation are the main issues there. This project aims at: (1) spreading awareness about the cleanliness and sanitation, (2) provision of facilities of health and hygiene at low cost through innovative means and social engagement, and (3) inculcate the values of self help and community participation in addressing the problems.

Important outcomes of the project

Awareness campaigns were held at the slum and through the participation of community leaders and local youth groups. Workshops were organised for women and girls and the youth groups highlighting the importance of sanitation and the role of education in achieving the desired goals.

Future prospects

The Kathputli Colony slum is being relocated in phases so the suggestions put forth in the project can be applied to other similar slums with proper modifications.



Map of Delhi showing the distribution of all slum clusters (green dots) in 102 wards of New Delhi (Map created via google world 2011)

Impact of Internet shutdowns on society

Paper Related Project

Student's Name/s

Arjun Sharma, Lakshya Juneja & Uttkarsh Mittal

Mentor's Name

Dr. Dorje Dawa

Abstract

The structure and makeup of the Internet has adapted as the needs of its community have changed. Today's Internet serves the largest and most diverse community of network users in the computing world. Initially we begin by learning the development and growth of Internet for the past 48 years. We studied about Internet Shutdowns. Our research on Internet shutdowns forms the basis for understanding the importance and necessity of continuous telecommunications and Internet access in human life. We learnt about the summary of significant components in the making of today's Internet to set the stage for understanding the challenges of interfacing the Internet and the steps to build scalable internetworks. Afterwards, we hypothesized that Internet shutdown which is nothing but a brute display of authority by the governments will usually have a negative impact on the general sentiments, and can be enough to impact the overall emotion of the entire affected society.

In order to validate our hypothesis, we conducted an analysis of the state of Jammu and Kashmir. We first scraped newspaper images of Kashmir Times corresponding to the days when an internet shutdown occurred (which would report incidents from the day before) and the next day (which would report incidents from the day of the shutdown) from their website. In order to quantify the emotional content, we made use of sentiment analysis, a technique that aims to determine the attitude of a speaker, writer, or other subject with respect to some topic or the overall contextual polarity or emotional reaction to a document, interaction, or event. We keep the scale for these values between -1 (extremely negative) and 1 (extremely positive).

Important outcomes of the project

Corresponding to the 25 shutdowns, a dataset of 50 instances was generated and scores were then obtained for each of them. The first 2 rows of the results obtained can be seen in table given below. The sentiment score was usually affected negatively every time an internet shutdown occurred, showing that disruptions to internet services lead to an inherent downcast of emotions of the citizens of that region.



Data analytics of the demographic data of cancer patients from India

Semester Long Projects

Student's Name/s

Anamika, Mayukh, Neel, Subham, Sugandha and Tripuresh, Yatharth

Mentor's Name

Dr. Jogeswar S Purohit

Abstract

With the alarming increase in cancer cases in India there is a need of cost effective and early diagnosis and screening of the disease. There is also a need of primary and secondary Prevention, awareness and advocacy, database management system, design and proposal for use and equip local healthcare centres and educational institutes with cancer awareness modules and development of a DBMS for awareness of the demographic data. The present project is aimed at collection of demographic data from cancer patients and development of a DBMS.

Important outcomes of the project

This will be one of such effort to make a DBMS for demographic data of cancer patients of India

Future prospects

The DBMS can be hosted by the CIC website for patient use.



Comparative Study of Techniques for Stock Trend Prediction

Semester Long Project

Student's Name/s

Rddhima Raghunand, Shobhit Maheshwari

Mentor's Name and Affiliation

Prof. Shobha Bagai

Abstract

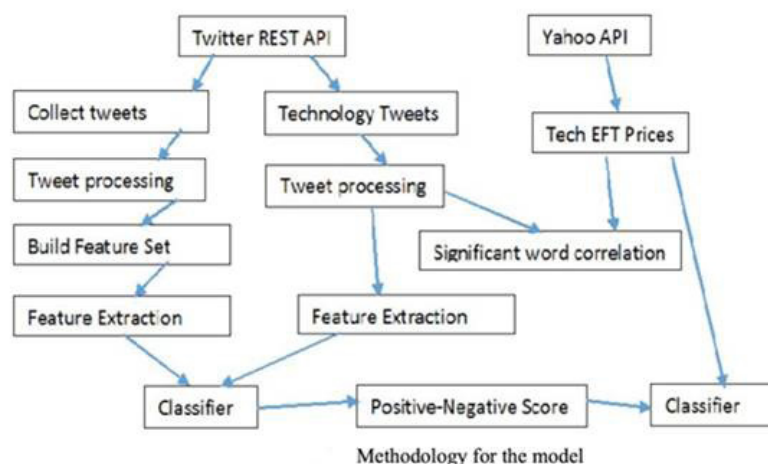
In this project, we examine the effectiveness of various technical and fundamental models in predicting stock market movements (or trends).

We first focus on predicting stock trends based off of the historical values of the stock. To achieve this, we use two different techniques - ARIMA (Autoregressive Integrated Moving Average) model and SVR (Support Vector Regression) - and conclude with a comparison of these two methods. We then try to establish a correlation between Twitter sentiments and stock market movements. We accomplish this by examining the Pearson coefficient and cross-correlation plots of inter-day closing values of stocks and their corresponding Twitter sentiment score retrieved using Python's Textblob library.

Additionally, we make use of the correlation established above and use Python's sentiment analyzer (AFINN Score library, specifically) to predict stock trend. We mine for the latest tweets pertaining to the stock of interest and use the aggregate AFINN score of these tweets to predict the future trend of said stock. Next, we improve on the sentiment analyzer by building our own feature set of training data. This data contains 'stock-related' words instead of generic words thereby making our sentiment analysis more specific in nature. Lastly, we compare and contrast the various machine-learning and statistical techniques and list their limitations, along with the different scenarios suited for different techniques.

Important outcomes of the project

We examine approaches like sentiment analysis. Our training set consists of only 7000 stock-specific tweets. Expanding this may/may not improve accuracy of sentiment classification. Also, since Twitter sentiments are only partly correlated to stock market movements, there will always be some degree of uncertainty in predictions.



Project Management System: Project House

Paper Related Project

Student's Name/s

Mohit Balhara, Anmol Goel, Mukul Yadav

Mentor's Name

Mr. Anjani Kumar

Abstract

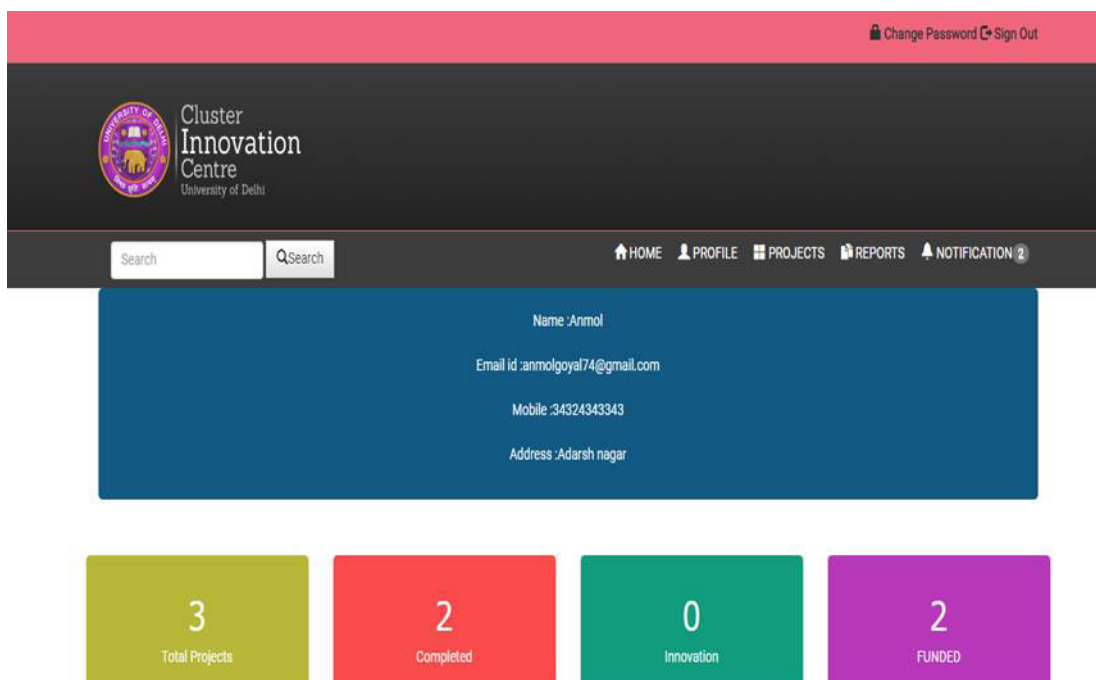
The project is based to develop the platform that will be managing the timeline and status of the projects which are being carried out in the CIC by students, teachers and will be handling the CRM for anyone who wants to see and study about them. It will be consist of dashboard which will be having the user and public front with displaying all the details of the projects, users and all the necessary details which should be displayed as according to the privacy. There will be a timeline displayed for each and every project which will be displayed according to the status of that respective project. The main outcome is to develop a web portal to manage different type of projects in an Institute. This can be extended to web app for commercialization for any academic institute as well as industry for interactive environment.

Important outcomes of the project

The main outcome is to develop a web portal to manage different type of projects in an Institute.

Future prospects

This can be extended to web app for commercialization for any academic institute as well as industry for interactive environment.



Developing an Effective Algorithm for Logistic Management : A Case of Go4Fresh

Paper Related Project

Student's Name/s

Abhishek Sehgal, Aditya Gaur, Naman Rathi, Shubham Jain

Mentor's Name

Mr. Vikas, Mr. Narendra Borde

Abstract

Go4Fresh is an online store delivering fresh fruits and vegetables. Being a company providing perishable goods, timely delivery of their customer's order is of prime concern for them. Any delay in delivery will result in spoiled fruits and vegetables resulting in heavy loss for the company and moreover less customer retention. Currently, the organization uses Microsoft Excel to schedule their orders. They manually calculate the number of trucks required to deliver and the route to be taken. Thus, they are bearing a huge amount in logistics. The purpose of investigation is to automate their scheduling system. Given the number of locations, the developed application is able to tell the number of trucks required, which are the locations a particular truck will cover, and in which order.

Important outcomes of the project

The application gives following results:

1. Number of trucks require in each zone
2. Which type of truck among TATA Ace, TATA Pickup required.
3. What are the particular locations covered by a particular truck.
4. What is the total weight being carried by the truck.

Future prospects

There is a need to generate a menu so that the user can select which locations demand delivery and algorithm will work on that locations only. Currently, the program considers only 48 locations only. But, we will give the user this privilege to add a new location, delete a new location and update a previously enter location. Moreover, this application does not have any GUI. So, we can add a GUI on this, or can develop a web-application on it.

Fig 2. Navi Mumbai Results

```
shubham@jain:~/Desktop$ python go4fresh.py
Site Weights
0 Hindustan Unilever Ltd. 727.0
+++++
Site Weights
0 Oberoi International School 442.0
2 ICICI Venture Funds Management Company 116.0
1 JSW Steel Coated Ltd 106.0
+++++
Site Weights
1 Wockhardt Hospitals 340.0
0 JSW Steel Pvt. Ltd. (Marketing) 358.0
+++++
Site Weights
2 HDFC Ltd. 128.0
0 Hinduja Healthcare 239.0
1 Goldman Sachs 192.0
3 Hindustan Unilever Ltd. Regional Office West 117.0
+++++
```

Good & Services Tax (GST) and its impact on automobile industry

Summer internship

Student's Name/s

Astha Bharti Jaiswal, Pradyumna Agarwal, Surya Soni, Mayank Sood, Shivam Deswal, Pooja Meena, Hanuman Meena

Mentor's Name and Affiliation

Professor Deepak Agarwal

Abstract

Goods and services tax will be considered as a major tax regime in the Indian economic reforms. It will definitely affect the various sectors of Indian economy. Our aim was that of studying the concept of GST and the new changes that it would introduce in the Indian taxations system. We have to analyse the impact it would cause on the automobile industry. further, how it would bring changes in the economic growth.

Outcome of the project

We have seen that, now there would be only type of tax called as GST in place of the complex structure of Indirect taxes. There would be taxes levied at both central and state level. We have seen that it would bring decrease in the economic growth of India in the initial phase.

In automobile industry, the various items are placed in different tax slabs having different tax rates for example, 5%, 12%, 18% and 25%.

Initially it would bring a downward phase in the growth but the it would be fruitful in the long run.

It would be amazing to see how the Indian economy grow with the new tax regime. Various data analysts argued that it would bring positive changes in the economy. The concerned committee take steps regularly to work with present time and thus handling the problems arose due to the new tax regime

Influence of Controversial Advertising on Consumer Behavior

Semester Long Project

Student's Name/s

Astha Bharti Jaiswal, Niranjana Kumar

Mentor's Name and Affiliation

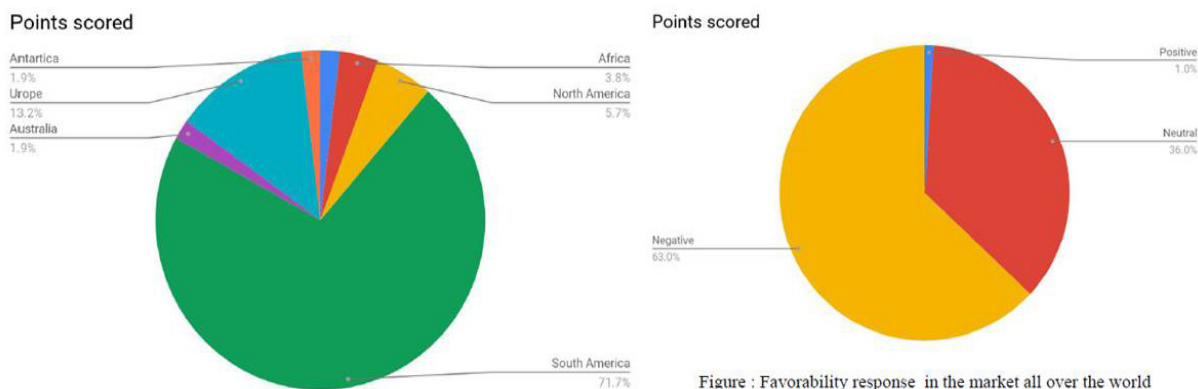
Ms. Parul Gulati

Abstract

In marketing strategy, mass media advertising is one of the key factor to influence consumer behaviour but one important issue related to advertising is controversial advertisements. It is observed that when the advertisements are perceived controversial by people, such advertisements create negative effects not only on product or brand, but can also affect the organizational reputation. It is evident that there is a relationship between advertisements and consumer behavior, but there is still an extreme lack of research articulating relationship between controversial advertisements and consumer behavior. There is a need to consider and investigate what are the nature of consumers in controversial & offensive ads and how do they respond to controversial ads differently. Here, we will investigate two controversial advertisements: Pepsi 'Live now moment anthem' and Dove 'Choose Beautiful'.

Outcome of the project

Advertising is not only the exposure of the products which may lead to change the mind of customer and increase the capability to purchase the products. These days' emotional and heart-touching ads are working effectively. Since, attention is the oxygen for every brand, which is also the reason for different advertisements which company brings into the market. Here, however the two controversial advertisements taken had a positive effect on the brand but it is not necessary in other cases too. Pepsi had a great strategy of first justification to change consumers' minds and then suddenly apologizing to gain the trust from the customers further. Despite of 'Dove controversial ad' sales of dove products increased.



The Study and plotting of Pollution in River Ganga from Major Industries using ArcGIS

Semester Long Project

Student's Name/s

Shashank Singh, Prakhar Agarwal, Devansh Gupta, Harshit Joshi, Mayank Malik

Mentor's Name

Dr. Dorje Dawa

Abstract

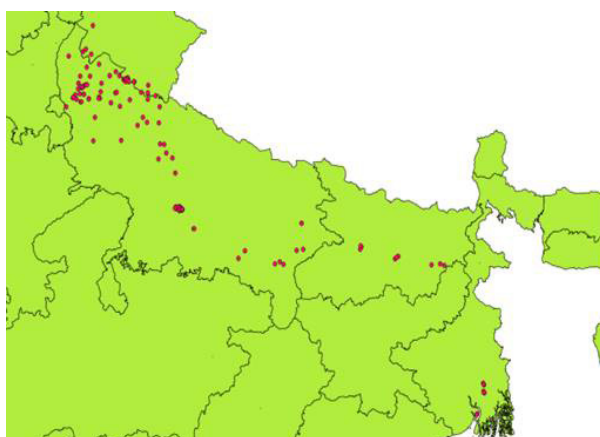
In this project, we firstly collected the data of the major drains flowing into Ganga and the Industries alongside Ganga in Microsoft Excel, then used ArcGIS to put it on India's Map with the weightages of the places according to their pollution.

Important outcomes of the project

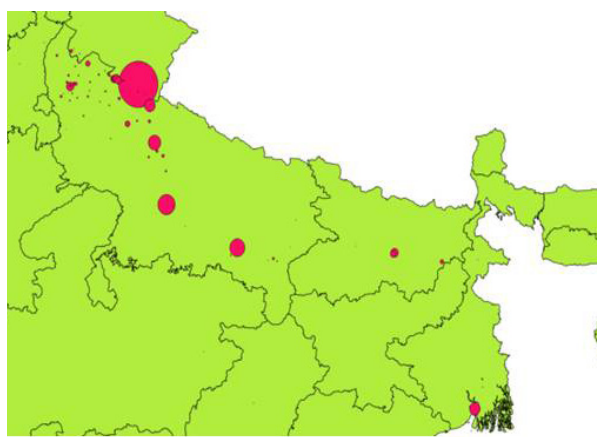
We were able to classify different types of industries as well as the places that had many industries and could be controlled so as to control the polluted water flowing into the holy river Ganga.

Future prospects

In the future, we could use more data sets with data of more industries so as to get a better idea of the pollution sources for the river (if possible, going by ourselves to get the data). Also, this project can be extended to the tributaries of the river Ganga too.



Industry Mapping



Industrial Waste Generation

Garbage to gold

Semester Long Project

Student's Name/s

Abhishek Kumar Sharma, Kautuk Chaturvedi, Pallavi Verma, Pulkit Sharma, Rasmus Houman, Shipra Praliya, Shubhrat Katiyar, Tobias Hansen

Mentor's Name

Dr. Jogeswar S Purohit

Abstract

Garbage is one of those commodities which people pay least attention to, unless it is stinking in front of their houses and troubles their everyday existence. But, trash is one of our best friends who has followed humanity wherever it has set its foot on. Be it the Mt. Everest peak or the glaciers of Antarctica, trash has found its presence almost everywhere. Garbage has a plethora of opportunities to offer to everyone. Be it the beautiful rock gardens of Chandigarh or the amazing artwork at Google Office made from trash, Garbage has always been an ocean of opportunities for all of us. This project titled "Garbage- the Hidden Gold" was one of those initiatives which tried to exploit that opportunity of generating revenue from food waste that was originated in the hostels.

Important outcomes of the project

Awareness for segregation of waste in community with special emphasis on children.

Future prospects

This project was further extended to DU staff quarters.



Birds of India: A perspective of IUCN categories from eBird dataset

Project for a Competition: eBird India Data Challenge

Student's Name/s

Anushtha Kalia, Pankaj Baranwal, Rddhima Raghunand, Shobhit Maheshwari, Tanishq Kumar Dhangar, Vani Singh

Mentor's Name

Dr. Asani Bhaduri

Abstract

The list of serious birders and amateur birdwatchers are ever-increasing in India. However, in the search of 'most wanted' birds, the birders and photographers are often targeting certain species and certain areas and in the process several commonly occurring birds along with their distribution and migration are probably being overlooked. It is as important to look out for the Critically Endangered as it is for the Least Concerned birds and similarly a Bird Sanctuary with common birds is equally important as a natural reserve with Endemics.

In this project, we have categorized the given dataset into IUCN categories (From Least Concerned to Critically Endangered). The information was used to find bird hotspots/ most visited areas for each category, in certain categories the unique birds in a specific state were identified. We also utilized the data to track migration pattern and recent records of specific birds.

Important outcomes of the project

This project was performed for the eBird India data challenge competition the details of which can be found at <https://birdcount.in/ebird/ebird-data-challenge/5/>.

The analysis can be beneficial in various ways: Amateur Birders and Birdwatchers can know about locations where birds are easily spotted. Professional Birders could periodically observe the threatened birds and track migration. State Forest Departments can keep track of the birds in the state to update conservation strategy.

Future prospects

We are in the process of publishing article from the data analyses.



A map showing sightings of four critically endangered Vultures in India (2015-2016)

musé verb | \myüz

: to think about something carefully or thoroughly
: to think or say (something) in a thoughtful way

intransitive verb

: to become absorbed in thought

transitive verb

: to think or say reflectively

noun | \myüz

(in Greek and Roman mythology) each of nine goddesses, the daughters of Zeus and Mnemosyne, who preside over the arts and sciences.

synonyms: inspiration

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