

ANNUAL NEWS LETTER 2017

**WONDER.
THINK.
CREATE.**

ZAIRZA
Technical Society
CET-B

WIRES BYTES

The present is theirs;
the future,
for which I really worked,
is mine.

-Nicola Tesla

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FROM PRINCIPAL'S DESK

It is a matter of great admiration to observe that the young minds are constantly moving ahead to be a part of technical endeavours taking place across the globe. I find Zairza providing the students with a platform to learn, collaborate and implement innovations that could make a difference to this world.

I would extend my heartfelt wishes to the students to continue their exploration in the field of computer science and robotics and bring laurels for the institution. They must value the opportunities that Zairza provides and work hard to make the technical society and the college proud.

**Prof. (Dr.) Prashant Kumar Patra
Principal**



FROM PIC'S DESK



It gives me immense pleasure to introduce the 2017 edition of the Zairza Technical Society Newsletter. I would like to take this opportunity to thank the editorial team for their efforts in putting together a wonderful and informative newsletter.

Notable achievements by our students, alumni have been highlighted along with the activities here at Zairza.

We welcome your inputs for future newsletter and urge to stay connected with us through email and social networking sites and visit us whenever possible.

**Prof. (Dr.) Rati Ranjan Dash
Professor in Charge, Zairza Technical Society**

FROM ADVISOR'S DESK

It gives me immense pleasure and joy to give my best wishes and encouragement to the enthusiastic young minds of CET, Bhubaneswar who are a part of the Zairza Technical Society.

In the past few years there has been a lot of quality projects and alumnus of the club are doing in their professional life.

Wishing all the best for future endeavours by the students.

**Prof. (Dr.) Chandrabhanu Mishra
Advisor, Zairza Technical Society**



FROM THE CONVENER

From the Convener's Desk,

As the convener of Zairza, I am delighted as we release the annual newsletter of the club.

It all started with the inception of the club in 2008. It was just a small robotics club but with big dreams. As it started attracting brilliant minds of our college, it became a well regulated and efficient club with just one goal -To galvanize young minds and prepare them for the world outside of college. Since then, we have never looked back and are growing stronger than ever. Last year has been amazing for Zairza.



We have advanced our talent pool immensely and our members have performed marvelously. We had the highest number of acceptance into Google Summer of Code Internship Program in the history of CET. Our members have been selected into extremely prestigious fellowships under IAS. We have made the college proud in numerous hackathons around India and our members have published 4 research papers in the last academic year.

I feel thankful to be a part of these amazing times when the club is at its zenith and the members are coming out with flying colors in all their endeavours.

Rishav Agarwal
Convenor
Zairza Tech Society

FROM THE EDITOR'S PEN



The year 2017 has been breathtaking for scientists, data scientists and researchers around the globe. This is the year when computers are figuring out how to do things that no programmer could teach them, tractors and trailers would soon barrel into the highways near you and the mystery of what life is made up of might be unravelled. Now computer vision systems authorize payments in China, unlocks new smartphones and circumspectly entering into the horizons of agriculture as well, deep learning has been all over the places and life has getting easier and better with each new day. The calling devices has been transformed into full blown mini computers and advances at Google, Intel, and several research groups indicate that computers with previously unimaginable power are finally within reach, quantum computers being practical. It's been a while for augmented virtual reality to actually force us to buy new phones but the recent endeavors by Apple and Google unleashed the ability to create augmented reality apps on their mobile platforms, giving developers the tools to start using the camera on phones to enhance the world around with information and games. Enormous data is being collected from billions of devices and is analysed to make people's choices, healthcare, economy and living a lot better.

Smart wearables, fitness apps and healthcare monitoring systems has stormed the markets and this has been all possible with an increased connectivity and a blooming telecommunication business. Seeing all this, I have a dream and a certain belief that soon artificial general intelligence would be a reality in the coming decade and who knows, by the time get into my old aged boots I would have my own personal assistant doing all of my mundane work in less than half of the time I would even take to think.

This year has been a tremendous year for the Zairza Technical Society so far. We have had the opportunity to collaborate with academia and industry as well, our members have been the recipients of prestigious scholarships and fellowships and the junior members have been working more than ever before. With a vehement determination and an indomitable will to explore the horizons of technology nothing seems impossible. We are overwhelmed for the unparalleled support from our esteemed principal Sir, Dr. Prashanta Kumar Patra, Our PIC, Dr. Rati Ranjan Dash and our advisor Dr. Chandrabhanu Mishra for their years of expertise and experience and being our guiding light. I would also thank our beloved alumni for being a source of unprecedented inspiration and support as well. I hope "Wirebytes" would continue to showcase the technical prowess of CET and would always be a leader in technical advancement of the college.

The author is also the Technical Secretary of CET Students' Forum.

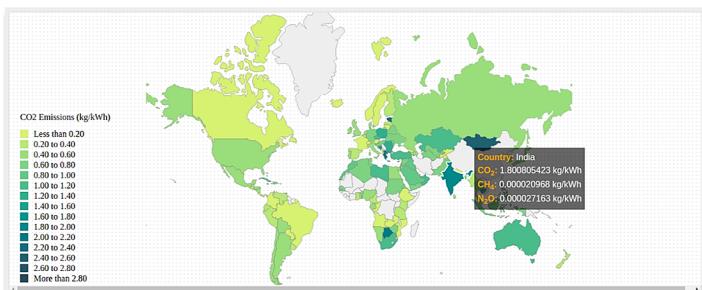
Asutosh Hota
Editor, WireBytes

FROM THE ARTISTS WHO CRAFTED IT...

CO₂-EMISSION API FOR AOSSIE.

I am grateful to be a part of Zairza family for the past three years. It has been an amazing journey with some great experiences. We have worked on some inspiring projects, been a part of exciting hackathons, and some quality research work.

Most recently I had an opportunity to work as a Google Summer of Code Intern for AOSSIE (Australian Open Source Software Innovation and Education). Thanks to my supportive peer group we had the courage to believe that we could achieve this. And this is the first step towards achieving anything. Don't let that hamper your chances. Me and friends worked on different projects starting from the month of February. A good point to start would be to start early and look out for organizations that had been a part of the program for the past few years. List out the skills and frameworks you are familiar with. For me it was python based or javascript based projects. I started contributing to the project "Bassa" under the organization "Scorelab". It was an automated download management tool that made sure smart download management and resource optimization. Firstly making a local setup of the project and tinkering around with it is very important. This gives you a good understanding and helps you decide whether you want to work on it or not. This helped me find small changes that could improvise the project. Making issues and discussing how important it is before jumping on to solve it is the right way to approach an issue. Over the course of time I made numerous improvements and established contact with the organization. On April 3rd the organizations list was announced, I was happy to find Scorelab a part of it. Along with Scorelab, I decided to contribute to "AOSSIE" as one of the project "CarbonFootprint" intrigued me. I made a few small contributions in the CarbonFootprint Extension and also a sample application demonstrating my capability to complete the project I was planning to propose for. The application phase is crucial and you need to come up with a solid plan how you plan to complete the project you plan to propose for. It would be great if you could attract the attention of the mentors of the particular organization into application. Keep it crisp and to the point, don't oversell and do ample research before you start writing it. And make it a point to prefer quality over quantity. I did manage to put two applications and my proposal for CarbonFootprint REST API went through.



ZAIRZA 2017 in a NUTSHELL

CO₂ Emissions API for AOSSIE

DOOT: Now everyone can speak

GraphSpace API

Zairza Issue Register

Semantic release validation bot

Tesseract

Smart Energy Meter

GAIT Recognition using KINECT

Control & Stabilisation of Combat UAV

Power Line Communication

Train Track Change System

Working over CarbonFootprint REST API was a great learning opportunity. I was working on creating a full stack application that could help users find all CarbonFootprint related information at one place. You can try it out at - carbonhub.xyz . We decided to work with Express, MongoDB and React. I had no previous experience with React and it was quite an adventure to pick it up over a short span of time. We managed to complete the project under the given timeline and document it. That was all about my share of experience at GSoC. It's a great platform for students all over the world to contribute to open source projects and learn in the process. I would encourage you all to try your hand at all the contests happening RGSOC and Outreachy to name a few. Contributing to open source teaches you how to communicate and work in collaboration with a diverse community of developers, which is an important life skill you need moving forward in life. Adios.

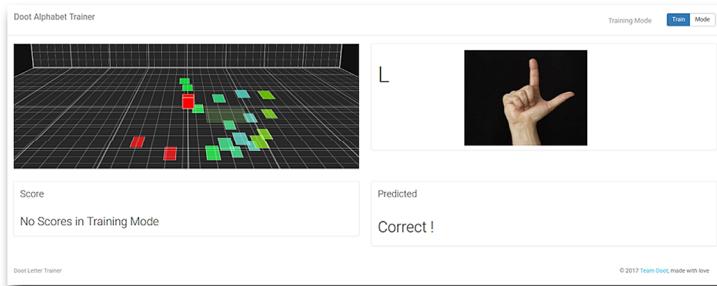
Sai Sankar Gochhayat
Summer Intern,
Google Summer of Code,
4th Year, Computer Science Engineering

Technology is anything that wasn't around when you were born.

- Alan Kay

DOOT

Sign language is a communication method used by the speech and hearing impaired individuals. It involves articulated hand movements, minute gestures and expressions as opposed to acoustically conveyed sound patterns. It is the natural medium of interaction for communication between a normal and a specially abled individual. However, there is a disparity and a communication gap based on this disability as not everyone has an understanding of the sign languages adopted in different parts of the world. Moreover, this standardized language that is well accepted throughout India needs to be taught to the differently abled individuals by skilled professionals and experts. But there is a scarcity of teachers skilled in ISL and these numbers has resulted in a detrimental student and teacher ratio throughout India. As a result, an alternative to the human teaching system is necessary for India as well as whole world as well. The model should also be equipped with a testing and revising platform which would help the users improve themselves without any expert human supervision.



Our solution to the problem involves the use of latest gesture recognition techniques to predict what the speech and hearing impaired individual is trying to say. We aim to build a communication model which can bridge the communication gap for speech impaired individual and help them in their day-to-day life.

We use the LEAP motion device to get positional data of different parts of the hand. We use this data to train a Machine Learning Model. The model predicts the word/phrase/letter that corresponds to the input gesture. This text then can be shown to the other individual or it can be converted to speech.

Currently we have prepared a prototype of the project that works with an accuracy of over 95% for the single handed alphabet model of the Indian Sign Language.

Rishav Agarwal
Sai Sankar Gocchayat
Sandeep Mahapatra
Asutosh Hota
3rd Year, Computer Science Engineering

GRAPH SPACE API

This summer, unlike any other summer, started with a lot of excitement as I was selected for working on a project under the Google Summer of Code 2017 program. This year the list of the organisations that participated in GSoC was declared in February. Each organisation had a list of projects to work on. Following the declaration of organisations, I skimmed through the list to search for a suitable project that matched my skill set. On finding the project I wanted to work on, I communicated with the mentor of that organisation regularly, discussing about the project and he also assigned me some warm up tasks related to the project which I completed in time. After building up a concrete idea of the implementation of the project I drafted a proposal for the same and eventually the content was polished day-by-day and I finally submitted it before the deadline in April.

In May, the list of selected students was announced, and I was selected to work on the project: "GraphSpace Python" under the organisation GraphSpace (parent organisation: NRB). As the name suggests, it was a project based on Python programming language. I had to implement a Python client library which would interact with the GraphSpace REST APIs. This may sound complex but it is not. GraphSpace is a web platform in which users can upload and interact with their programmatically generated graphs. So, the Python library will be an alternative of using the web platform for graph related operations. The library could be used in any Python program to work on graphs (in network analysis projects).

I got a good head start as my mentor had already started work on the project and I continued it. I was already familiar with the concept of REST APIs and how to consume the REST API through Python code, which helped me in implementing the project in a faster pace. The Python library that I implemented was completely object-oriented. Everything was implemented in class starting from the client to the graph and graph layouts. This helped me in being more familiar with object oriented programming. Documentation was a very integral part of my project. For the library to be used by a developer, it is important that the documentation regarding the usage of different modules (classes and functions) should be clear and understandable. So, while writing code, I also maintained a easy-to-understand documentation simultaneously. I documented every class and class methods using docstrings, which were then converted to HTML documentation using the Python Sphinx documentation library.

After the completion of the library, I had to test its functionality. For this, I developed a test suite which consisted of test codes for individual modules of the library. To match up to the open source standards, I also integrated Travis CI (Continuous Integration) with the project which helped me test the functionality of the library automatically, every time I made some change in the code.

Sandeep Mahapatra
4th Year, Computer Science Engineering

DUE ISSUE LIST						
Item	Quantity	Issued by	Phone no.	Issue date	Issue verified by	
Table	2	Rishav Agarwal	9154221361	Wed Oct 11 2017 01:30:00 GMT+0530 (IST)	Sohini Roy Choudhury	<button>Return</button> <button>Edit</button>
Chairs	4	Chirmay	8065432210	Tue Oct 10 2017 01:33:00 GMT+0530 (IST)	Alice Anjali	<button>Return</button> <button>Edit</button>
Projector	1	Sandeep Mahapatra	9823330921	Wed Sep 06 2017 12:25:00 GMT+0530 (IST)	Sanjay Reddy	<button>Return</button> <button>Edit</button>

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HISTORY						
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Screw driver	1	Saisankar	9832014321	Tue Aug 15 2017 15:22:00 GMT+0530 (IST)	Abutosh Hota	<button>Delete</button>
Chairs	2	Manaswini	8765432219	Fri Sep 08 2017 01:36:00 GMT+0530 (IST)	Sanjay Reddy	<button>Delete</button>

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SEMANTIC RELEASE VALIDATION BOT

I am sure that whenever we hear the word “bot”, the very first thing that comes to our mind is a human like figure, made out of steel, ready to execute any instruction we give it. But wait there, it's not what you think. The bot that I am going to talk about is not the same. In fact, it's a lot different.

Open-source software are programs or applications whose source code are publically available in development platforms like Github, GitLab etc. In these platforms there are many organisations who work on different projects, say, developing NPM packages which are being used all over the world. After some new feature is implemented to the package or a bug is fixed, new version of the project is released. Many organisations have standardized protocol for the commit messages to be according to the Conventional Commit messages otherwise merging invalid commits might lead to releasing a bad version of the package. It helps the maintainers to track down the bugs in the previous commit messages and to manage the project efficiently. It is very difficult for the maintainers to validate each and every commit message manually. This is when “Semantic Release Validation Bot” comes into light. We have been working on this project in collaboration with Hoodie Open Source Community. Semantic Release Validation Bot is a Github integration which gets triggered as soon as a pull request has been made in the repository in which this bot has been installed. The bot extracts the commit messages of the pull request and validates if they are in accordance to the conventional commit messages or not. If not then the status of the pull request is set as “error” else it is set as “success” and in addition to that a comment is made displaying all the changelogs as well as the next version is calculated.

This bot is very useful for the maintainers as it automates their redundant work as well as for the contributors who will not have to wait for the maintainers to validate their commit messages as the bot does it for them instantly.

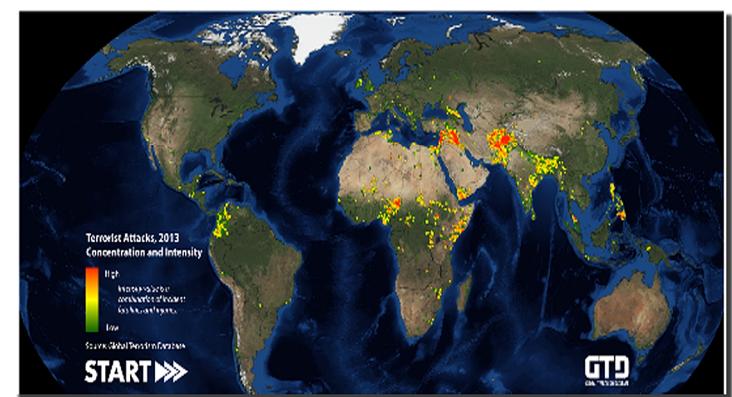
Alice Anjali Tiriya, Sohini Roy Choudhury,
4th Year, Computer Science Engineering

ZAIRZA ISSUE REGISTER

Apart from the validation bot we have build a robust Zairza issue register. We used to maintain a register which had details of all utilities borrowed from the club written in it. Since it could have been easily manipulated, hence it had to be digitised. Functionalities are as simple as described above. Only core members can log in into the register, create issue whenever anything is issued, edit an existing issue, mark it as returned if the utility has been returned or delete it altogether if it's too old an issue. Technology stack includes HTML/CSS, Bootstrap, Express.js framework and MongoDB. Now it is way easier for members to keep track of issues from their own laptops and create issues simultaneously.

Sohini Roy Choudhury
4th Year, Computer Science Engineering

TESSERACT



I did this project as a part of GDG DevFest '17 Hackathon finals. My project is on machine learning with Global Terrorism Database. There are times when most of the people are visiting a foreign unknown lands, which at time are perilous. So it would be better if they knew how safe they are before visiting it. So the app developed here plots all the Terrorism acts on a world map that has taken place all over the world within the last three years. It also takes in the GPS location of the user and predicts if they are in or approaching any danger area or not.

Basically the app uses the concept of a Machine Learning Algorithm called, K Nearest Neighbours. It uses the haversine distance to calculate the distance between two coordinates over the Great Circle of the Earth. This formula gives a very accurate distance between two points on earth. So here a circular area of radius 500 kilometers about the user's location is scanned for any danger area. If there is one, then the user is notified that they are in close proximity with a danger area along with the name of the nearest city. Else, they are notified as they are safe.

Ashutosh Panda
3rd Year, Computer Science Engineering

Any sufficiently advanced technology is equivalent to magic.

- Arthur C. Clarke

THE ROBOTIC WING THAT FLIES

Zairza Robotics wing is a group of self motivated technology lovers who passionately try to put their knowledge to solve real life problems. We work on a wide range of fields like Embedded systems, IoT, Mechatronics, Robotics, Image processing, Computer Vision and Machine Learning. Our projects also range from simple sensor interfaces to complex robots and self driving prototypes. Here at Zairza we rate the projects on the basis of their innovativeness rather than on the complexity involved. We accept all the weird ideas and try to convert them into reality. We believe in teamwork and try to put more stress on the basics before diving into the complex things. We put the theories and concepts that are taught in the classrooms into a building a innovative practically feasible project. The seniors are always eager to help their juniors in all possible ways. We have no work time restrictions. The technologies we work on are not constrained to a few, our members have the freedom to explore any field of technology they wish to. Our members also reach out to help out faculties in their research. "Wonder Think Create" the principle on which our club works perfectly defines what we do at Zairza.



We take part in various robotics challenges and online contests and have also brought glory by winning many of them. Some of our members do freelancing by building project prototypes or software for robots. We are collaborated with various Robotics Startups and also with a few well established companies. Our members continuously put their efforts and hardwork to learn the new technologies and we always try to work on the cutting edge technologies. We support our members by giving them access to all the tools and components that are required to build the projects.

We have a strong Alumni group who are presently working in different giant companies and startups. They are always eager to help our club in all the possible ways. They constantly guide our members in their projects by sharing their knowledge and resources. They also guide our members in getting good internships and fellowships.

Last but not the least, we have a lot of fun in our club by sharing personal experiences and friends, juniors and seniors. We do brainstorms and because of the diversity of the skills of our members we are able to integrate different technologies and put them all together to build interesting cool projects. We love to be a part of Zairza.

The author is also the Technical Convenor of College of Engineering and Technology Students' Forum.

K. Sanjay Reddy

SMART ENERGY METER

Concomitant with one's desire to solve real life puzzles, there's always a desire to dream and think out of the box. Thinking out of the box requires a bit of patience, creativity and self confidence. Zairza teaches you these three things through out your engineering career. Not only engineering, but also it tries to put you into diverse sets of disciplines. From the day I had joined zairza, I was involved in completely creative processes, where I used to think independently and create things for fun. One of the projects that I did in zariza:

Smart Energy Meter

Challenges:

To retrieve the values of total harmonic distortion, power consumed, power factor and the load on the energy meter.

To send those signals to a server in real time using raspberry pi. To make the software user-specific using auth-tokens.

To make it energy efficient.

Phoenix framework of elixir programming language was used to make it efficient enough to handle millions of energymeters on a single thread of a multi-core processor. Python asynchronous programming was used at the machine end to ensure real time data transfer.

Info: <https://github.com/tworitdash/energymeter>

Phoenix IoT Application:

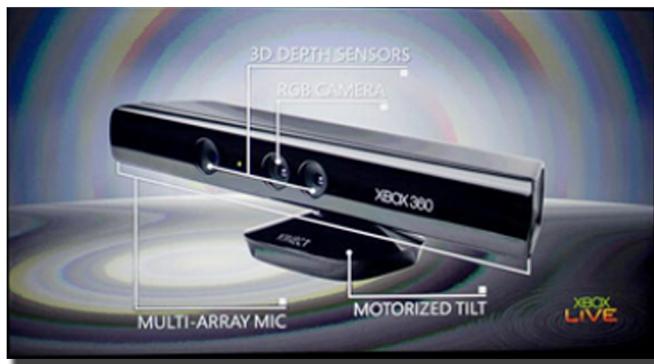
<https://github.com/tworitdash/PhoenixIoT>

Working Video: <https://youtu.be/jkGoKzskMgw>

**Tworit Kumar Dash, Dibya Sundar Rath
Alumuni, Batch of 2015**

GAIT RECOGNITION USING KINECT

We have been working on this project in a group of two members since two months. This idea cropped due to the fact that we have to deal with a lot of data nowadays. This data needs to be stored, personalised and protected from outside intervention and fraud. We have to confide in biometrics for this purpose. Traditional biometric systems such as fingerprint, iris and DNA have encountered drawbacks such as intervention of temperature and humidity, intrusiveness, replication and security. Gait recognition came into existence to counter this problem. When we started, we were new to machine learning. We tried gait recognition with Kinect to get amazing results.



TECHNOLOGY

Gait recognition is an unintrusive means of recognition which involves no knowledge and cooperation of the subject. Kinect is a line of motion sensing input devices by Microsoft for Xbox 360 and Xbox One video game consoles and Microsoft Windows PCs. It is equipped with three types of camera:

Color VGA video camera - This video camera aids in facial recognition and other detection features by detecting three color components: red, green and blue. Microsoft calls this an "RGB camera" referring to the color components it detects.

Depth sensor - An infrared projector and a monochrome CMOS (complementary metal-oxide semiconductor) sensor work together to "see" the room in 3-D regardless of the lighting conditions.

Multi-array microphone - This is an array of four microphones that can isolate the voices of the players from the noise in the room. This allows the player to be a few feet away from the microphone and still use voice controls.

The data recorded with Kinect is stored in a database processed with data mining tools and suitable classifiers to get optimum accuracy.

Anisha Swain
Summer Intern,
INDIAN ACADEMY OF SCIENCES, Bengaluru
3rd Year, Instrumentation and Electronics Engineering

CONTROL AND STABILIZATION OF UNMANNED COMBAT AIR VEHICLE

DRDO "where technology meets patriotism". This year I along with the scientists in DRDO were working on control and stabilisation of the Combat UAVs. I was lucky enough to get a hands on the upcoming UAV which is a surveillance and resonance drone. We were given the task to modify the stabilisation capacities of the drone to meet additional load requirements. For this we used LOS(line of sight) stabilization system. LOS stabilization uses the rate gyro which is a type of gyroscope, which rather than indicating direction, indicates the rate of change of angle with time. The system works on the principle of closed loop servo control. A complete electro-optical tracking system consists of an imaging sensor (typically CCD), which is mounted on a two-axis stabilized servo platform, and a tracker, which controls the position of the platform, based on the scene observed through the imaging sensor.

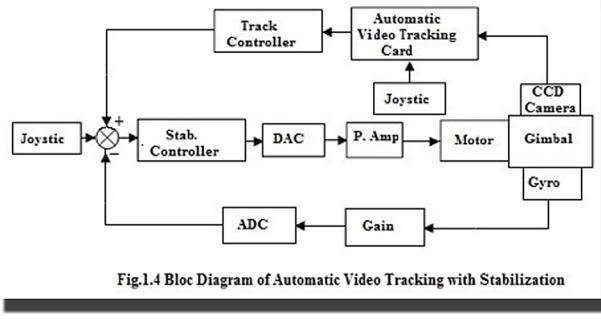


Fig.1.4 Bloc Diagram of Automatic Video Tracking with Stabilization

This is the block diagram for the stabilisation of the UAV with the help of gyro sensor Where the disturbance caused by the Payload due to external factors will be taken care of by the use of Rate Sensors(Gyro) and the actuators. This technology will be seen in the upcoming UAVs that will be indigenously made in house. In the upcoming years we will see a lot of developments in the Unmanned drones as it can do a number of tasks if programmed and trained correctly.

Satyajeet Patnayak
Summer Intern,
DRDO, Chandipur

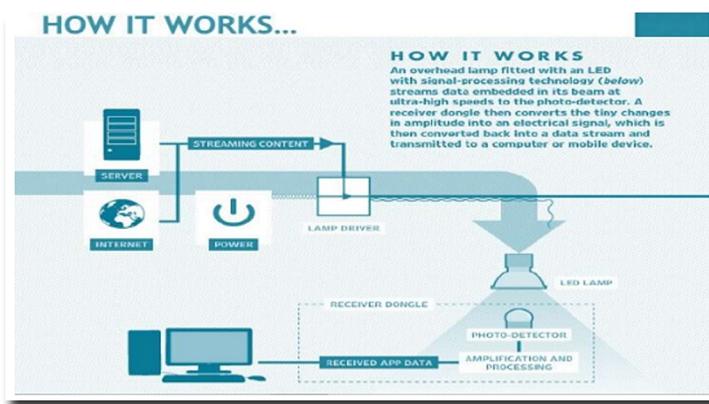
COLLABORATIONS WITH GOOGLE DEVELOPERS GROUP, Bhubaneswar

Members of Zairza have always been a part of GDG, Bhubaneswar. The representatives of the club are handed the responsibility of being the LEAD STUDENT VOLUNTEER of this chapter. They in collaboration with other development group conduct multivarious technical events to create technical awareness in the capital. Recently, a Machine Learning Hackathon was organised by the members of Zairza in CET-BBSR with more than 100 active participants from different colleges over Odisha.

INTEGRATION OF INDOOR VISIBLE LIGHT AND POWER LINE COMMUNICATION

We have been working on this paper in a group of three members since two months. The idea about this concept came to my mind when I saw the TED talk himself by the developer. The concept sounds so well that we started learning the background of it, then one of my friends gave a beautiful idea to combine powerline communication with light fidelity to get an amazing result upon which we are working. When we started to learn about this technology we were completely new towards visible light communication. We started learning different facts, tried to integrate different ideas, tried to study different research papers and finally developed an amazing result upon which we are working currently.

HOW IT WORKS...



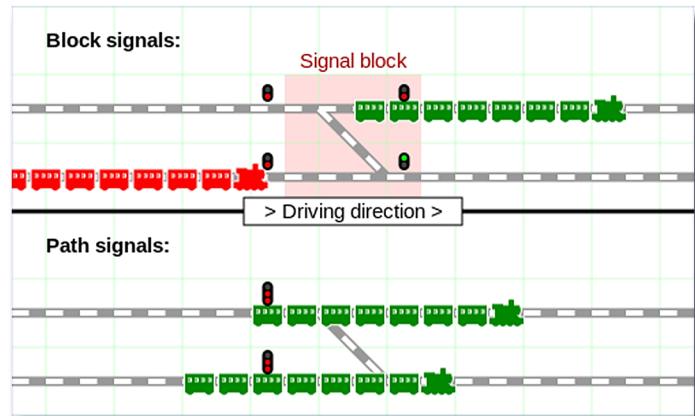
TECHNOLOGY:

Light fidelity is a VLC technology developed by Dr Gordon Povey, Prof Harald Haas and Dr Mostafa Afghani. The visible light communication (VLC) refers to the communication technology which utilizes the visible light source as a signal transmitter, the air as a transmission medium, and the appropriate photodiode as a signal receiving component. In other words VLC uses visible light as optical carrier for data transmission and illumination. Visible light is thus by definition comprised of visually, perceivable electromagnetic waves. The visible spectrum covers wavelength from 380 nm to 750 nm. Visible light is thus by definition comprised of visually, perceivable electromagnetic waves. The visible spectrum covers wavelengths from 380 nm to 750 nm. The visible light communication technology has a short history compared with other communication technology, for example, public old telephone service, Ethernet, high-speed optical communication, wireless cellular communication, IrDA, etc. It is due to that the development and commercialization of light emitting diodes (LEDs) which emits the light in visible wavelength range have been successful for illumination in recent decade.

Amitash Nanda, Keshab Swain, Aman Mohanty
3rd Year, I&E Engineering

AUTOMATIC TRAIN TRACK CHANGE SYSTEM USING RFID TECHNOLOGY

We propose a completely automated train track change system performed by the Radio Frequency Identification (RFID) technology. We don't aspire to change the technical mechanism in the present system of track change administered by the Indian Railways. We would like to add the RFID technology to the present system so that the manual inputting can be automated. The tags will be attached to the train engines and these tags will carry the train route chart. The tags will be encrypted with AES encryption. These tags can be reprogrammed whenever required with a proper encryption key. Wherever track change is required, we could affix RFID readers which would read the data on the tags present on the train engines. The RFID reader has a certain frequency range within which, when the tags come, the tags' data will be transferred to the RFID reader. When the data will be read by the reader, the route chart will be transferred to the reader. The data will first be decrypted, and then will be transferred to a computer system, where the data will be present for the operator to monitor. From the route chart, the current station (or the station from where the train left) will be found out.



From this data, the next station will be known then accordingly, through some predefined set of methods of track change, the train can be put to the required track. In our system, when the data is read the next station is found out, the possible track options are calculated and then the input is provided to the relay and the process that was previously followed by the RRI and SSI mechanism was carried out. Hence, the proposed system is just an addition to the current system aiming to improve the efficiency by automating the inputs given to the system. There will be a switch which will override the automatic input to manual input in case of some emergencies or whenever required by the operator. All the track change information will be fed to the control room.

Amitash Nanda
3rd Year, I&E Engineering

COLLABORATIONS

TENSORWEED

The major contribution of the prototype would be to propose a feasible and efficient solution to replace the cumbersome and expensive chemical and manual weeding process taken up by farmers around the world. Especially for an agriculture dependent country like India it would prove to be quintessential in improving the standards of the Indian farmers. Chemical weeding is hazardous to the soil as well the humans and manual weeding labour is not available cheaply as there is a huge shift in the agricultural workforce. Automation in agricultural practices for a farming intensive population in India would not only lessen the burden on the farmers but attract more individuals to make farming a profitable venture.

The proposed idea is basically to automate the weeding process. The prototype under discussion is an intra row and intra column autonomous weeder that would be an add-on to tractors. It would use the likes of computer vision assisted technologies and use convolutional neural networks to classify crop from the weed (unwanted plants that grow along with the crops and compete for nutrition). A flapping gear mechanism would then instantly remove the weed. This process would be repeated for both columns and rows as well. The project would be divided into two parts, the software and the hardware part. One team would focus on implementation of the hardware design, design of the tractor add-on, the gear and flap mechanism and power supply to the weeder. The central processor unit would be a Nvidia Jetson TK1 , a very powerful GPU integrated board. The computation would be carried on this board. It would be connected to raspberry pi, a microcomputer which would send the camera feed to the Jetson TK1. The trained machine learning model on the Jetson would classify the crops from weed and send signals to the gear mechanism to turn on/off the flaps which would further weed out the unwanted plants.

The project would be divided into two phases. In the first phase, we would focus on developing a tabletop model , i.e, that would be a scaled down model of the future product. We would test the efficiency of the model using 3-D printed cabbages and would try to then go for the 2nd phase, actual on field implementation of the whole product. Although this would be quite challenging but we would build a lot of confidence from the successful implementation of the table-top model.

This is an emerging field and no enterprise has a finished product in this segment. Hence, this gives a great opportunity to build upon a system that could truly revolutionise the whole agriculture market. This project is partially funded by **ESCORTS Group**.

Mohit Nayak, 4th Year, I&E Engineering

Chinmay Das, 4th Year, I&E Engineering

Sai Sankar Gochhayat, 4th Year, CSE

Asutosh Hota, 4th Year, CSE

DESIGN THAT SPEAKS

Design matters! It might be the countless web or android app or millions of iOS apps that floods the smartphones and personal computers, one thing that makes a user use and appreciate any software is its user interface. This proves to be quintessential for the success of apps like Whatsapp, facebook, itunes etc. that billions of people use around the globe 24X7. A designer's work showcases his clarity of the subject and a deep understanding of the user experience. The cleaner and subtle it looks to the eyes, the better it stays in the minds and hearts of the users. It might be the famous Apple's byte or the simple yet elegant MARVEL logo, they express a lot more than we could imagine in a belter of a way and that's why no great successful technical business is ever successful without a clarity in their vision, and the vision is best portrayed with the wittiest designs possible. We at Zairza boast of an efficient and creative design team which works throughout the year to support the other wings of the club. We have a dedicated group of individuals who are equipped with Adobe Photoshop, Adobe Illustrator, Adobe Premier Pro, Aftereffects and Corel Draw which serve all our purposes.

A NEWBIE'S PRIMER TO ADOBE XD

Adobe Experience Design is an user interface experience design software developed by Adobe Labs. It is an integration of Adobe Photoshop, Illustrator and Acrobat into an application that provides real time user experience prototype of any website or application desired. My experience with Adobe XD started back in the early 2017 and my skills were polished by designing multiple interfaces. Some basic reviews of Adobe XD are as follows:

XD is great for designing within parameters, which makes going responsive much easier. XD's feature set and capabilities to just what you need, removing all unnecessary tools and marques. The interface is not overwhelmed by a ton of icons and tools, it is completely to the point. Unlike in Photoshop, it's much simpler to edit a specific item. In Photoshop, you have to select layers. In XD, you can just click on the object and edit it right away. XD allows you to design a full-fledged responsive website, and it offers built-in shortcuts like drag & drop and page linking so you can go from idea to prototype really quickly. To make it even easier, XD provides plug & play templates, like iPhone patterns, so that you don't need to start from scratch. With XD, you can rest your coding minds and your design can actually be implemented from a development standpoint. On the context Adobe XD is a blessing in disguise for the developers and clients.

Kaustuv Bose

4th Year, Intgrated M.Sc (Chemistry)

Design Head, Zairza Technical Society

THE HITCHHIKER's GUIDE TO GSOC



Google
Summer of Code

Google Summer of Code is a 3 months summer program conducted and sponsored by Google to celebrate the world of open source by paying students to contribute over the period. The program starts by selecting organizations that will be allowed to take part. The organizations present a list of projects that they want to focus on during the summer. The students can then submit their proposals for the project.

My story with GSOC began when I was in 2nd year. I had just entered the restaurant and taken a seat during the Zairza farewell party for the batch 2016 when we got to know that our senior Prayash Mahapatra had been accepted into the GSOC program. Not only I was proud for Zairza, it was an overwhelming experience. I assume anyone in my position would get overwhelmed by seeing an immediate senior getting into such a prestigious program. I did not know what exactly GSOC was, but I guess I was not surprising anyone by believing that if it is associated with Google, it must be good !

When we finally got talking with Prayash bhai about how he got in, he started saying it's easier than we all think. Of course I did not believe him. How could I? But I guess tables have turned now. Now it's my turn to explain to you why he was right and why it is much easier to get in than what our initial intuition say. We started in mid-february when the deadline for proposal was in first week of April. As soon as the selected organizations were announced, we started scanning the page for a project that can matched with our skillset. I got my eyes on Aimacode, an organization consisting of people who wrote and maintain the infamous book "Artificial Intelligence: A Modern Approach". I looked through its project and found out that they will be taking students for their JavaScript project this year. The Javascript project was designing and developing interactive visualizations that can demonstrate the concepts of Artificial Intelligence present in the book. The website was supposed to be an educational aid for the book.

I immediately started contributing, my first few contribution was fixing simple typos in their documentation and links. I started talking with the assigned mentor, Mr. Amit Patel, a stanford graduate, discussing about the organization standards and expectations for the project. He told me that this is going to be an experimental project as we don't know what visualizations will be able to demonstrate properly until we have made it.

TOPS FOR JUNIORS

Start early. The earlier you start, the more time you will have to narrow down your choice for organisation and develop the pre-requisite skills. Do not wait for the organization list to be announced. There are many orgs that get selected every year. You can target them. That being said, do not shy away from new orgs in the program. These organizations do not attract a lot of students and hence there is less competition there.

Interact with the mentors. This is a very important thing to do. The more you interact with the mentors, the more insight you will gain on what they are expecting from the students. This will help you decide if the org is for you and also the skills that you may need to work on for this org.

Draft a good proposal. This is the most important part of getting into the program. Every org has a different template for the proposal (some doesn't have any fixed template). Remember to get the proposal reviewed by your mentor before submitting it.

Contribute early. If you contribute to the project even before the summer, it will give you an edge over those who apply late. It helps the mentors see that you are serious about the project. It also shows the mentors that you have the necessary skills.

You have copious time. The schedule for GSOC 2018 is already announced. Link : goo.gl/Ye4XUU. You have ample time to go through the orgs that participated in previous year, see their projects and see what kind of skills you need to work on.

I managed to make several visualizations for chapter 3 before the GSOC period. As the deadline for submission of proposal came closer, I drafted one and shared with my mentor. After minor improvements and suggestions from him, I finally submitted it.

Fast forward the anxiety, I was ecstatic when the results were announced.

Preparing for the 3 months, the first step was to get a stable internet connection. Jio helped during that time (chuckles). The project was really fun. I learned a lot about creating visualizations using popular libraries like d3.js and also ES6 Javascript standards. My mentor was more than helpful. He taught me not only technical skills, but also design and code philosophy. I went to him whenever I got stuck and he was happy to help. I got a lot of insight into the world of open source communities. I got exposed to the practices and standards that open source projects need to follow to maintain the repository and also to attract new developers into contributing to the project. Every monthly evaluation bought with it a little bit of fear and dread, but in the end, it all turned out to be good.

My final submission can be found here: goo.gl/nsdnQL

**Rishav Agarwal,
Google Summer of Code Intern,
AIMA, JavaScript**

ANNUAL NEWS LETTER 2017

ZAIRZA
Technical Society
CET-B

INTERNSHIPS

Google Summer of Code 2017:

Sai Sankar Gochhayat, Rishav Agarwal,
Sandeep Mahapatra, Amitosh Mahapatra.

Collaboration with ESCORTS Limited and Research Internship,

Our team got the seed funding for the proposed model of an autonomous weeder in collaboration with the research team. Asutosh Hota, Mohit Nayak, Sanjay Reddy, Chinamaya Das.

Indian Academy of Sciences, Summer Internship:

Anisha Swain, 2017 and Lalu Prasad Lenka, 2016

JOURNAL AND CONFERENCES PUBLICATIONS

Supervised classification based sign language recognition system for single handed alphabet system of Indian Sign Language , Dr. D.P. Dogra, currently in progress, IEEE Transactions on Biomedical Engineering.

A shallow parser based Hindi to Odia Machine Translation System, Jyotirmayee Rautaray, Asutosh Hota, Sai Sankar Gochhayat, Springer Advances in Intelligent Systems and Computing (AISC) Series, 2017

Gesture to Speech Using Leap Motion Controller, Communication Model for Speech and Hearing Impaired, Asutosh Hota, et. al, INDIACom-2017; IEEE Conference ID: 40353 2017 4th International Conference on "Computing for Sustainable Global Development", 01st - 03rd March, 2017.

Performance Analysis of Supervised Classification Models on Gesture Recognition of Single Handed Alphabet System of Indian Sign Language ", Asutosh Hota et. al, International Journal of Management and Applied Science (IJMAS) , pp. 92-97, Volume-4, Issue-3

Students Colloquium 2016 IEEE Bhubaneswar Sub-section, for Gesture to Speech Using Leap Motion Controller, Asutosh Hota et. al, Oct- 2016.

HACKATHONS

Nagarro Codingblocks Hackathon, 2nd Position, National level Technical hackathon, Cash prize of Rs 60000,
Sai Sankar Gochhayat, Rishav Agarwal, Sandeep Mahapatra (2016)
Sandeep Mahapatra, Sohini Roy Choudhury, Alice Anjali, Asutosh Hota (2017)

COLLABORATIONS

Design Head,
¹KIIT International MUN 2017, ²NIT, Rourkela MUN 2016, ³Utkal University Model United Nations 2016/17, ⁴Ravenshaw University MUN 15/16/17, ⁵Thematic International Conference, Hyderabad

Design Intern, Hewlett Packard (HP) Maketing Team, Kolkata
Kaustuv Bose

ALUMNI SPEAKS

Life is short, and so is your 4 years stay at CET. Yes, you read it right! So don't waste these golden years by thinking that " bhai CET mil gaya, aage naukri mil jaegi, phir life set hai!" Agar life ko set karni hai to phir thik hai, you all can manage with the theory. But if you want to make your life phenomenal, particularly in technical field- be it robotics, software, design, than you are at the right place. Zairza. At Zairza you learn, innovate, build things rather than just gain theoretical knowledge. At Zairza, you get equipment, guidance from mentors as well as fun!

I would like to be a bit biased over here by encouraging girls out there...and boys-this is for you too. This 4 years is short. Make it worthwhile. At Zairza, you will get plenty of exposure to various technologies...at least first gain exposure than decide on which technology you want to explore further. There are many programs in which you can participate, like GSOC, Outreachy- which is particularly for women and lots more. And believe me the day you would actually build something on your own, you will feel as if you are on cloud 9. Have the courage to lead, to be able to do things on your own rather than asking someone else to do it for you.

Last but not the least, ALL THE BEST for your life ahead, hope you all enjoy the bumpy ride to the future. Make friends, make memories and above all Build Yourself, Build You!

Hasta la vista!

AFRIN NAAZ
Batch of 2017