MAHAVIR EDUCATION TRUST'S
SHAH AND ANCHOR KUTCHHI ENGINEERING COLLEGE
DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

# COMMUNIQUE

ISSUE 2, JULY 2019

# FROM THE HOD'S DESK

**INTELLIGENCE IS THE SOURCE OF TECHNOLOGY. IF WE CAN USE THE TECHNOLOGY TO IMPROVE INTELLIGENCE, THAT CLOSES THE LOOP AND POTENTIALLY CREATES A POSITIVE FEEDBACK CYCLE.**

-Eliezer Yudkowsky

I am delighted to introduce our second edition of the newsletter. It is a pleasure to put forth the glorious stride of our budding department. The world is going through a tremendous positive transformation, and in education its effects are clearly discernible. We want to be a part of this transformation and hence have indulged ourselves in various activities to go beyond the curriculum for ensuring the holistic development of a student. Stepping into the vast ocean of research domain through small research projects and technical competitions have paved the way for materializing the long pending dream of academia!

I heartily congratulate the team for the dedication and efforts in ensuring the integrity and growth of the department!!

- T P Vinutha
I/C HOD EXTC

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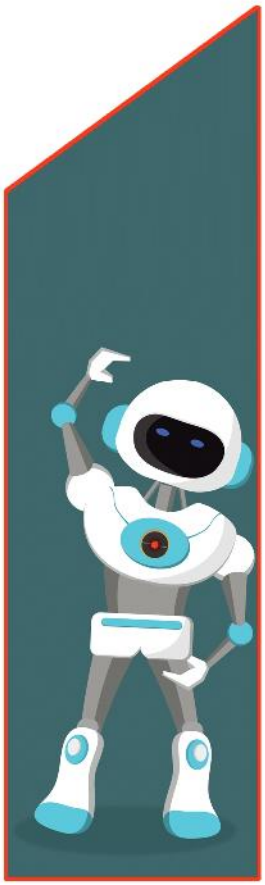





# Meet the faculty

T P VINUTHA
I/C HOD & ASST. PROFFESOR
(Digital Signal Processing, Speech Processing, Pattern Recognition, Machine Learning)

MAMTA TIKARIA
ASSISTANT PROFESSOR
(Soft-computing Techniques in Microwave Engineering, UWB Communications)

ROHAN BORGALLI
ASSISTANT PROFESSOR
(Signal Processing, Digital System Design andQuantum Computing)

GAURI CHAVAN
ASSISTANT PROFESSOR
(Real Time Operating systems, Embedded Systems and Microprocessor Systems)

UMA RAJ
ASSISTANT PROFESSOR
(MIMO and OFDM communications, Communication Systems)

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JAGDISH SARODE
ASSISTANT PROFESSOR
(Embedded Systems and Microprocessor Systems)

ASHISH TANK
ASSISTANT PROFESSOR
(MIMO communications, Network Protocol Design and Analysis)

SUJITHA KURUP
ASSISTANT PROFESSOR
(Image Processing and Forensics and Data Compression)

SEEMA KAWALE
ASSISTANT PROFESSOR
(Mobile Communication, Image Processing, Neural Networks)

BHUSHAN PAWAR
ASSISTANT PROFESSOR
(Wireless Communication, Antenna and Wave Propagation)

GAURI DESHPANDE
ASSISTANT PROFESSOR
(Digital Signal Processing, Speech and Image Processing)

KHUSHBOO SINGH
ASSISTANT PROFESSOR
(Wireless Networks, Network Management)

DEEPAK MISHRA
ASSISTANT PROFESSOR
(Control Systems, Signal Processing)

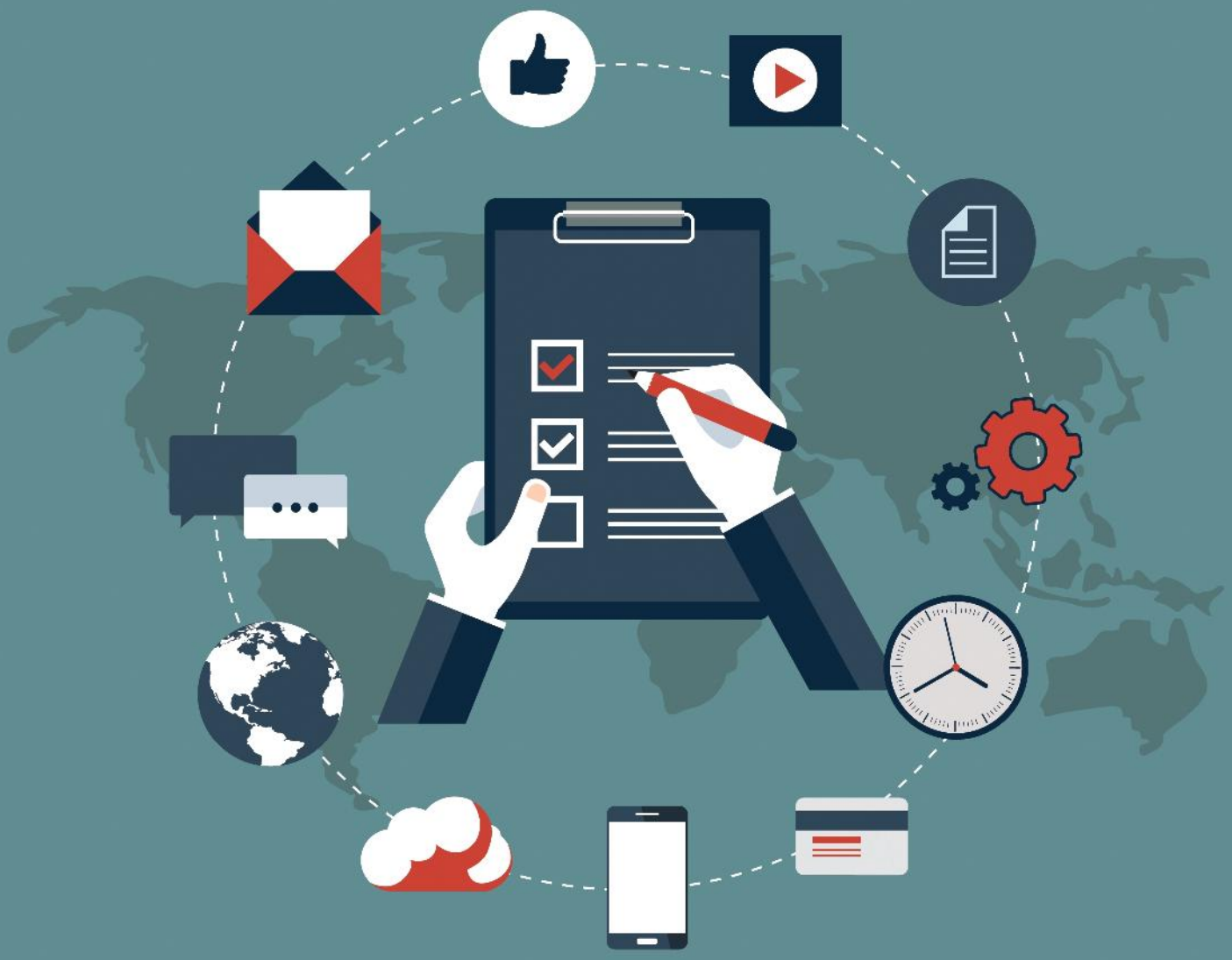
TANUJA MAHAJAN
LAB ASSISTANT

# Meet the faculty


"Those who know, do. Those that understand, teach."

— Aristotle

# DEPARTMENTAL EVENTS



## SAKEC Talks: A Motivational Session

IETE-SAKEC in association with the Department of Electronics & Telecommunication Engineering organised 'SAKEC Talks: A Motivational Session' on 1st Aug. 2018. Speaker for the event was Shaikh Mohammad Salman, from third year EXTC Department. The event was co-ordinated by Mr. Rohan Borgalli, Assistant Professor, EXTC and a total of 30 students from the college attended the same. The session helped motivate and influence students to bring back the spark in their studies and life.

## Industrial Visit to Airport Authority Of India (AAI)

The Department of Electronics & Telecommunication Engineering in association with IETE-SAKEC organised an one day industrial visit to the Airport Authority Of India (AAI), Andheri on 3rd Aug. 2018. It was coordinated by Mr. Rohan Borgalli and Mr. Ashish Tank, Assistant Professors, EXTC and attended by 46 students from the college. The group visited various units of Airport Traffic Services (ATS) and gained knowledge of entire internal process of the air traffic control and management.

## Guest lecture on 'Waveguides and Resonators'

The Department of Electronics and Telecommunication Engineering in collaboration with IE-TE-SAKEC conducted a guest lecture on Waveguides and Resonators for the final year EXTC students on 13th August 2018. The speaker for this lecture was Mr. Sumit Garg, M.Sc. Physics, IIT Delhi. He introduced, to the students, the basics of microwave engineering and helped them to understand the concept of Maxwell's equations. He also explained the working of waveguides and resonators and their applications in industries of the communication field. The students were enlightened by his unique way of teaching and presenting skills. This lecture was conducted in relation to the subject 'Microwave and Radar Engineering' taught in semester 7. Prof. T. P. Vinutha, HOD, EXTC and Prof. Mamta Tikaria inaugurated the event.

## Hands-on workshop and competition on Robotics

SAKEC's Robo Club and EXTC Department in association with Eduprime Technologies had organised hands-on workshop and competition from 27th to 29th August 2018. The workshop and competition had a huge response from our students and a total 97 students (19 teams) had participated in the event. The workshop and competition were successfully conducted and the winning team members of the competition were declared as Jainam Shastri, Nemil Panchamia, Aman Jain, Siddhant Zaveri, Tejas Potekar and runner-up team members of the competition were Nishant Mistry, Ustav Gada, Siddhant Kadam, Nill Shah, and Parth Joshi.

## Hands-on workshop on Arduino

IETE-SAKEC in association with Department of Electronics & Telecommunication Engineering had organised an event 'Hands on workshop on Arduino' on 1st September 2018 from 9.30 am to 5.00 pm. The event was inaugurated in presence of the ISF Coordinator and HOD (EXTC) Ms. T.P. Vinutha and Mr. Rohan Borgalli. The speaker of the event was Mr. Nemeen Shah, a third year student of the EXTC department. It was coordinated by Mr. Rohan Borgalli, Assistant Professor, EXTC and a total of 26 students from college had attended the same. The event consisted of hands-on experience of Arduino Uno board, interfacing of sensors and its programming. During the event, the students were given different tasks to perform and code. The students who were able to crack the code were treated to a 3-months free membership of the Instructables. Finally, he displayed some of the projects based on Arduino like 'Google Assistant Controlled LED Matrix'.

## Workshop on Ethical Hacking

Department of Electronics & Telecommunication Engineering in association with CSI-SAKEC organised an event on 'Ethical Hacking' on 28th and 29th September 2018. The two day event started with an inaugural speech by Dr. Rekha Ramesh and Prof. T. P. Vinutha, HOD (EXTC). On day 1, the session covered topics like introduction to ethical hacking, networking, Linux basics, web technologies, Google hacking, types of attacks and security practices. The event ended with a hacking competition between the participants. All the participants were provided with a participation certificate on successful completion of the workshop. The workshop ended with great feedback from students. The students showed considerable interest in future workshops.

## Hands-on workshop on Java programming

ISTE-SAKEC in collaboration with the Department of Electronics and Telecommunication Engineering had organised a hands-on workshop on Java programming. The workshop was conducted by Mr. Saish Khandare, Mr. Vedant Parikh and Mr. Sainish Tupe. The speakers gave extensive knowledge of Java to the participants during the entirety of the workshop. A number of topics were covered during the workshop. At the start of the workshop, an introduction to Java programming was given. Then the speakers taught the students the basics of Java programming. Topics covered were syntax, operators, conditional statements, looping. A small break was given after the basics were covered. In the second part, after the break, students were taught GUI and JDBC. The session ended with a thanks giving note by Saloni Madlani. Certificates were given to speakers, organizers and students by Prof. T P Vinutha and students left the lab happily due to the knowledgeable workshop.

## Workshop on 'Linux from Networking Perspective'

The Department of Electronics & Telecommunications Engineering in collaboration with SAKEC-ACM Student Chapter, organised 'Linux fromNetworking Perspective' workshop that took place on 6th October 2018. It was a one day event and covered various topics related to Linux and Networking. The event was attended by 26 participants from third year & final year Electronics & Telecommunications Department students. The speaker, Prof. Ashish Tank, EXTC Department, taught installation and basics of RedHat. He covered Linux file system and how files are stored in to different directories along with basic tools, utilities and file permissions. The students were greatly benefited by various Linux commands taught to them in a very interactive manner. The response and engagement during the event from the participants showed that they fully understood the topics taught to them. Event was concluded by taking feedback from students and distributing participation certificates in presence of Ms. Swati Nadkarni, Faculty Sponsor of SAKEC-ACM Student Chapter and Ms. T.P. Vinutha, HOD (EXTC).

## Winter Internship

Department of Electronics & Telecommunication Engineering in association with E-CELL SAKEC conducted 'WINTER INTERNSHIP 2018' from 15th December 2018 to 5th January 2019. In this internship program students were given challenging tasks/mini projects based on their area of interest. This program mainly covered following domains:

> Machine Learning/Artificial Intelligence
> Computer Networking
> Database Management and
> Internet of Things (IOT)

In this internship program each student gained fundamental knowledge of particular domain and applied that to real life problem and implemented mini projects on different problem statements in groups of 2 to 4 students under the guidance of their mentor. After successful completion of internship, the students demonstrated their projects and submitted the project reports. The students then appeared for an online quiz that comprised of objective and subjective questions. It was observed that the overall performance of all students was quite good which indicated that the objective was achieved. Finally, the program was concluded by rewarding every participant with internship letter and useful course material.

## IETE Day Celebration

IETE-SAKEC in association with EXTC Department celebrated IETE DAY along with Intra College Technical Quiz " Quizzical Suspects" on 31st January, 2019. The event was flagged off by welcoming our guests Dr. V.C. Kotak (Vice Principal), Ms. T.P. Vinutha (HOD, EXTC) and staff members from different departments. After the preliminary rounds, selected participants were grouped into 4 teams, namely Team Edison, Team Einstein, Team Volta and Team Tesla. The competition was judged by Ms. T.P. Vinutha and Ms. G. Sharmila. After the quiz, cake was cut as a mark of celebration of IETE Day. The event was concluded by certificate distribution to winners as well as all participants and the vote of thanks.

## Guest Lecture on 'Signal Processing & Applications'

Department of Electronics & Telecommunication Engineering had organised an guest lecture on 'Signal Processing & Applications' on 25th February 2019 from 3.00 pm to 5.00 pm. The event was inaugurated in presence of the ISF Coordinator and HOD (EXTC) Ms. T.P. Vinutha and Mr. Rohan Borgalli. The speaker of the event was Mr. Prateek Verma, Stanford University, USA. It was coordinated by Mr. Rohan Borgalli, Assistant Professor, EXTC and the third year and final year students of EXTC department of the college attended the same.

Lecture Included following topics:

> Fundamentals of Signal Processing
> Machine Learning in Signal Processing
> Applications of Signal Processing
> Speech Processing
> Biomedical Signal Processing
> Image & Video Processing
> Tools useful for Signal Processing

## Guest Lecture on 'DBMS with SQL'

Department of Electronics & Telecommunication Engineering in association with IE-TE-SAKEC had organised a guest lecture on 'DBMS with SQL' on 12th March 2019 from 3.00 pm to 5.00 pm. The event was inaugurated in presence of the ISF Coordinator and HOD (EXTC) Ms. T.P. Vinutha and Ms. Gauri Chavan. The speaker of the event was Mr. Manu Nair , Project Engineer, Wipro Ltd. It was coordinated by Ms. Gauri Chavan, Assistant Professor, EXTC and third year EXTC students attended the same.

The lecture included following topics:

> Fundamentals of Database Management System
> Challenges in DBMS
> DBMS with SQL
> Real Life Projects in DBMS
> Industry Expectations

**Industrial visit to 'BSNL Satellite Earth Station' at Yeur, Thane**

SAKEC's Department of Electronics & Telecommunication Engineering in association with IEEE SAKEC had organised an industrial visit to 'BSNL Satellite Earth Station' at Yeur, Thane on 20th March, 2019. This is the only satellite earth station in Mumbai region. The industrial visit started with the basics of communication principles and their application. In the following session, the students learned about how satellites communicate with earth stations and with each other satellites and about communication between earth stations and other organisations. They also learned about transmission and modulation of signals, communication in adverse climate conditions, etc.

**Project Poster Presentation**

SAKEC's Department of Electronics & Telecommunication Engineering in collaboration with IETE SAKEC organised a 'Project Poster Presentation' on Wednesday, 27th March 2019. The event was coordinated by Ms. Gauri Chavan and Ms. Uma Raj, Assistant Professor, EXTC under the guidance of ISF coordinator Prof. T. P. Vinutha, HOD (EXTC). Dr. V.C. Kotak, Vice Principal, SAKEC, graced the occasion. He gave his valuable feedback to all the groups. A total of 101 students (31 project groups) participated in this competition from all departments. Prof. P.G. Khedkar, Associate Professor, Electronics Department, Prof. Bhakti Sonawane, Assistant Professor, Computer Science Department, Prof. Archana Chaugale, Assistant Professor, Information Technology Department judged this event.

# DEPARTMENTAL ACCOLADES

1. Under the guidance of Prof. Mamta Tikaria, two teams of our final year students launched two products under the umbrella of Indian Development Foundation and Roti Bank Mumbai, namely the Fire Fighter Robot and Breathe Clean. The Projects were a huge success and launched in the presence of veteran actor Boman Irani, who appreciated the students for their hard work.

Team Fire Fighting Robot: Aatif Dakhway, Payal Acharekar, Sameer Raut and Shrikant Fulwade

Team Breathe Clean: Mitesh Mehta, Mayur Nikharge, Nihar Patil and Viraj Saiya


Team Fire Fighting Robot

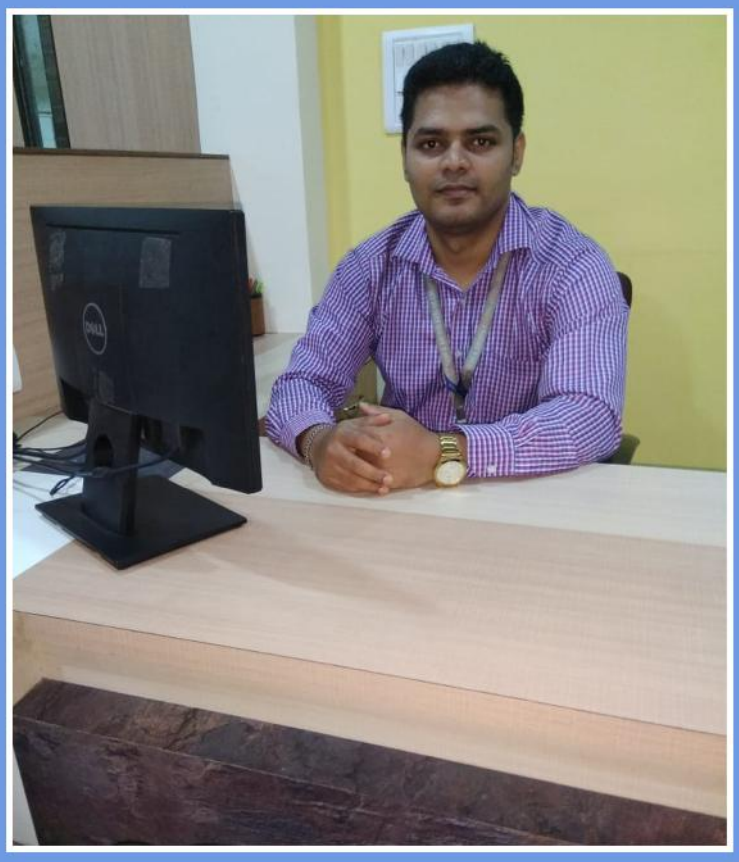
Team Breathe Clean

## 2. NPTEL Certification

| Staff / Student | Course | Certification |
|---|---|---|
| Prof. Rohan Borgalli | Digital Circuits | Top 1% |
| | Switching Circuits & Logic Design | Elite |
| | Machine Learning for Engineering and Science Applications | Elite |
| Prof. Sridhar Sahu | Introduction to Research | Elite |
| | Op-Amp Practical Applications: Design, Simulation and Implementation | Elite |
| Shubham Pawar | CMOS VLSI Digital Design | Elite |

**3. Prof. Rohan A Borgalli was sanctioned a Minor Research Grant by the University of Mumbai Ref. No APD/237/601 of 2019 Research Project No: 134 entitled, "IoT based Smart Pothole Detection and Mapping System".**

**The department wishes him and the team all the very best !**



4. We congratulate the team of students who were selected for the BIG IDEA SUMMIT 2018 EXPO held at Ghatkopar, Mumbai. They showcased the set up 'SMART MIRROR', guided by Prof. Rohan Borgalli and the members were Mr. Vinit Veera, Mr. Karan Shah and Mr. Harsh Shah.


5. Prof. Jagdish Sarode and Prof. Gauri Chavan underwent a TBT training organised by e-Yantra Lab Setup Initiative (eLSI) – IIT Bombay. e-Yantra Lab Setup Initiative (eLSI), funded by MHRD under National Mission on Education through ICT (NMEICT), is a program under which colleges are encouraged to setup robotics laboratory. It is designed as a scalable and sustainable approach that addresses infrastructure creation and teacher training – to create an eco-system at the colleges to impart effective engineering education.

6. Vidyesh Bondre, a third year EXTC student, won the Inter College Chess Competition at the SAKEC Cultural Festival, Pratishtha 2019.

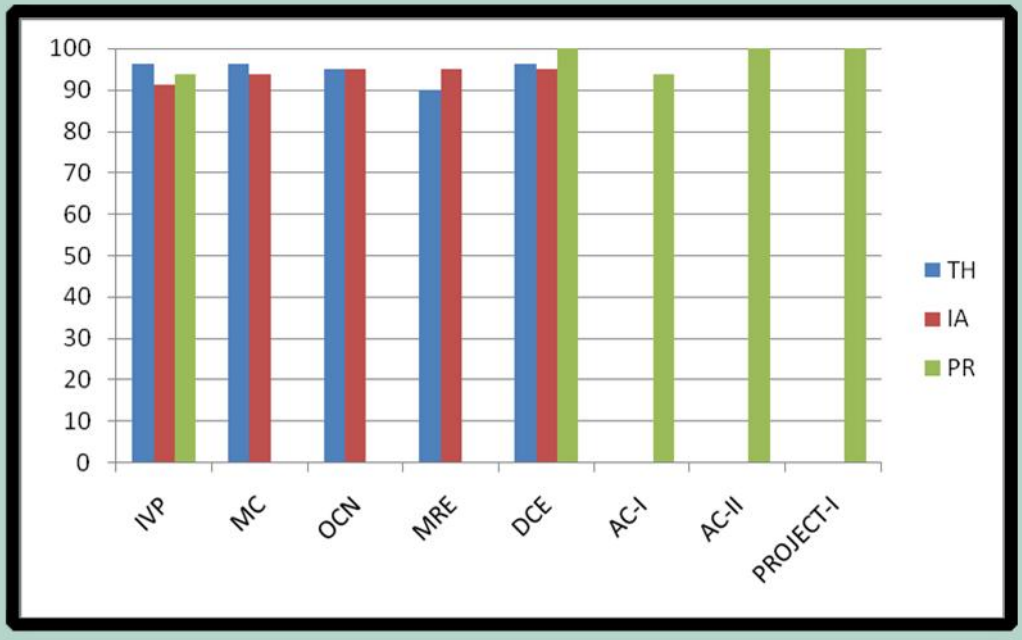

7. Prof. Seema Kawale is now promoted as Chair, WIE AG, IEEE Bombay Section from Vice-chair Position. She is also currently the IEEE Day 2018 Ambassador for IEEE Bombay Section.

# RESULT ANALYSIS

## ACADEMIC YEAR: 2018-19

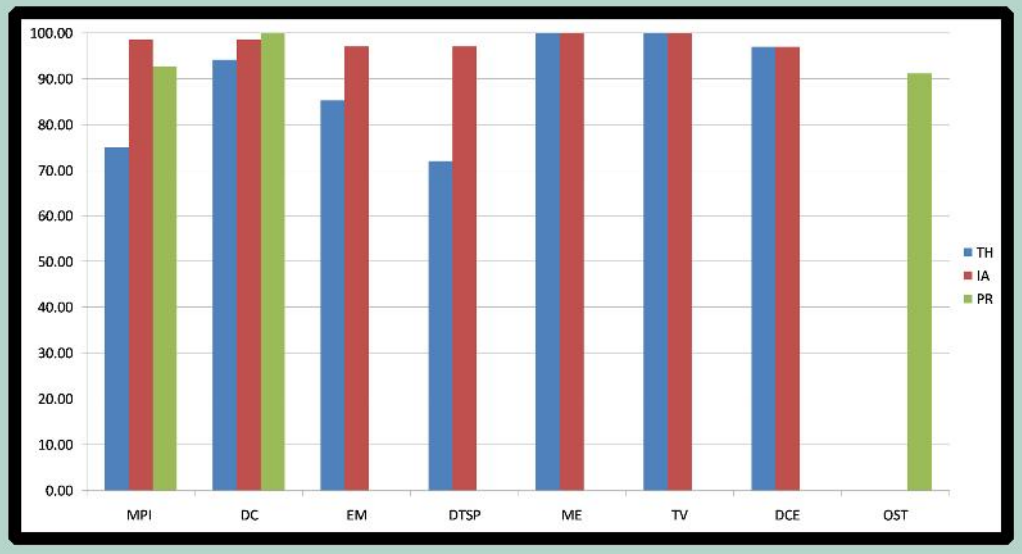
# RESULT ANALYSIS OF FINAL YEAR SEMESTER VII

| | IVP | | | MC | | OCN | | MRE | | DCE | | | ACI | AC-II | PROJECT-II |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TH | IA | PR | TH | IA | TH | IA | TH | IA | TH | IN | PR | PR | PR | PR |
| Total Appeared | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Total passed | 76 | 72 | 74 | 76 | 74 | 75 | 75 | 71 | 75 | 76 | 75 | 79 | 74 | 79 | 79 |
| Pass Percentage | 96.20 | 91.14 | 93.67 | 96.20 | 93.67 | 94.94 | 94.94 | 89.87 | 94.94 | 96.20 | 94.94 | 100.00 | 93.67 | 100.00 | 100.00 |



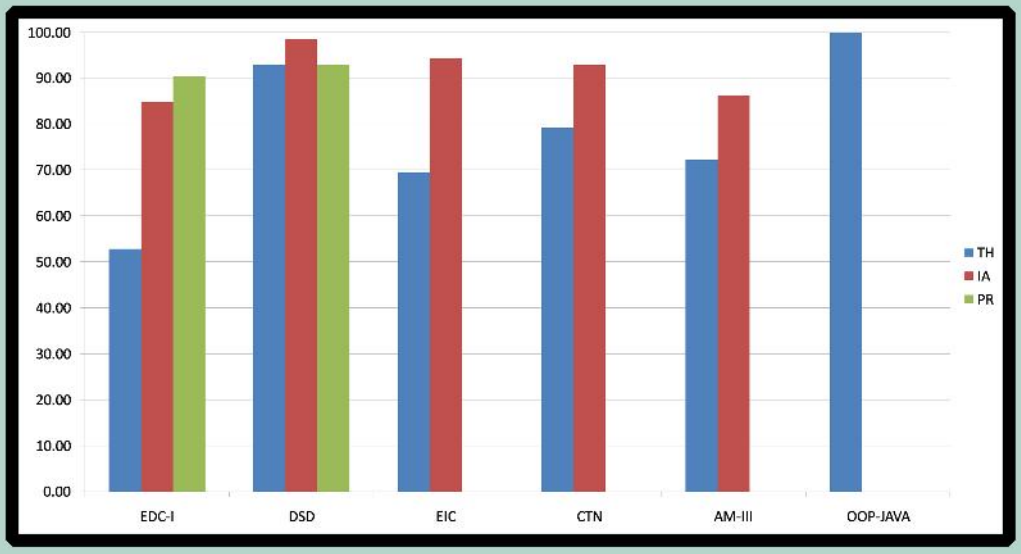

# RESULT ANALYSIS OF THIRD YEAR SEMESTER V

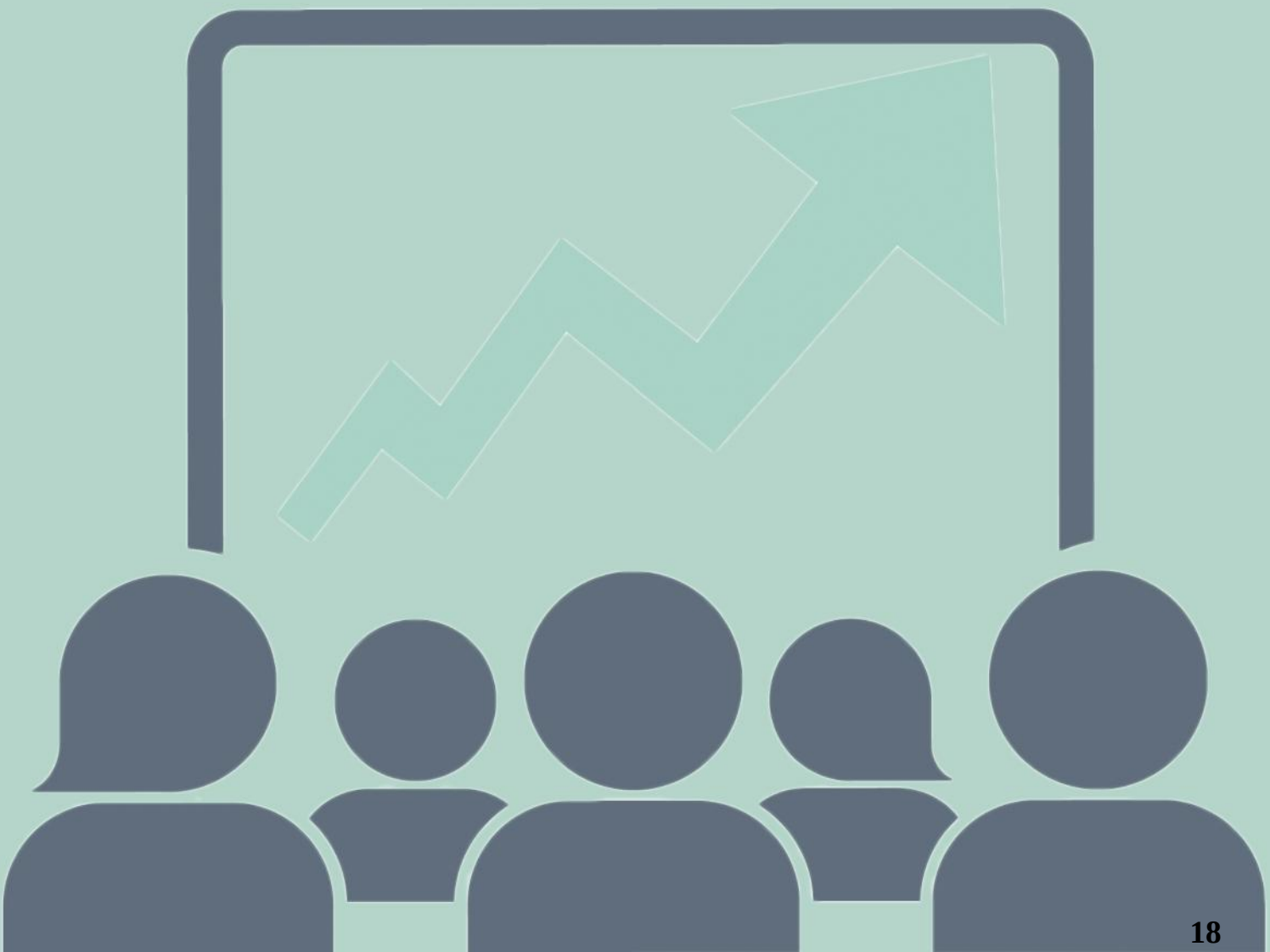
| | MPI | | | DC | | | EM | | DTSP | | ME | | TV | | DCE | | OST |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TH | IA | PR | TH | IA | PR | TH | IA | TH | IA | TH | IN | PR | IA | TH | IN | PR |
| Total Appeared | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 12 | 12 | 23 | 23 | 33 | 33 | 68 |
| Total passed | 51 | 67 | 63 | 64 | 67 | 68 | 58 | 66 | 49 | 66 | 12 | 12 | 23 | 23 | 32 | 32 | 62 |
| Pass Percentage | 75.00 | 98.53 | 92.65 | 94.12 | 98.53 | 100.00 | 85.29 | 97.06 | 72.06 | 97.06 | 100.00 | 100.00 | 100.00 | 100.00 | 96.97 | 96.97 | 91.18 |



# RESULT ANALYSIS OF SECOND YEAR SEMESTER III

| | EDC-I | | | DSD | | | EIC | | AM-III | | CTN | | OOPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TH | IA | PR | TH | IA | PR | TH | IA | TH | IA | TH | IN | PR |
| Total Appeared | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| Total passed | 38 | 61 | 65 | 67 | 71 | 67 | 50 | 68 | 57 | 67 | 52 | 62 | 72 |
| Pass Percentage | 52.78 | 84.72 | 90.28 | 93.06 | 98.61 | 93.06 | 69.44 | 94.44 | 79.17 | 93.06 | 72.22 | 86.11 | 100.00 |




# CONVOCATIO
# BATCH C

# N CEREMONY
# OF 2018

# MERITORIOUS STUDENTS

**Final Year (BE):**

1st Topper: Anuj Jain (CGPA: 9.41)

2nd Topper: Monika Trivedi (CGPA: 8.87)

**Third Year (TE):**

1st Topper: Ramashish Gupta (CGPA: 9.21)

2nd Topper: Himanshu Rasal (CGPA: 9.2)

2nd Topper: Siddhi Salvi (CGPA: 9.2)


**Second Year (SE):**

1st Topper: Dhruvi Shah (CGPA: 9.83)

2nd Topper: Shubham Pawar (CGPA: 9.69)

# STØP NOISE POLLUTION FROM HONKING

This article constitutes of a solution that was submitted by Team Neutron as a part of Smart India Hackathon 2019, Hardware Edition.

Organization Name: Maruti Suzuki India Ltd.

Problem Statement: Stop noise pollution from honking

Team Name: Neutron

Team Leader: Akhil Chheda

Team members: Ananya Gore, Siddharth Soni, Dhanraj Mhatre, Dhruv Satra, Monika Gautam

Description:
'Indian Roads are very noisy due to various road users and congestion factors. It's a custom in India to paint truck rear with message "BLOW HORN". Honking is a habit and people like to install various types of horn to generate discrete audible noise. Horn blowing leads to noise pollution and creates a chaotic environment. Horn is a device to be used in emergency and if it is used repeatedly in very short succession then there should be system having the following features: recording the no. of times a horn is pressed by the driver & this should be further linked with driving capability which in turn should be used to calculate insurance premium / permit charges for taxi, etc..

Solution:
1. In India honking is a habit and people like to install various types of horn to generate discrete audible noise. Hence , we make a device which record the no. of times a horn is pressed by the driver.

2. A device have 20*4 character led display which shows number of times horn is pressed, limit of pressing horn, last date of payment of charge, pending charges.

3. We make another device which is to be fixed near “NO NOISE ZONE” which can communicate with device which is fixed in car and display message “DO NOT BLOW HORN” when vehicle come in this zone.

4. A device which is made to fixed near "NO NOISE ZONE" can also fitted near traffic signal which is also communicate with device which is fixed in car and display message "DO NOT BLOW HORN" when vehicle come in this traffic signal region.

5. We also make a handhold wireless device which is for traffic police to collect charge from motorists. This device also can be fitted near toll plaza to collect charge. Hence the charge collection done in easy way.

Explanation Of Idea:

In this project we use Arduino Uno, Arduino Nano and NRF24L01 transceiver. A device which is fitted in car is made with Arduino Uno and NRF24L01 Modules (NRF24L01 transceiver send the data wirelessly without using Wi-Fi and Bluetooth. It works on radio waves.). This device calculate a number of times a horn is pressed by the driver. We use 20*4 character led display which is attached in the car which shows the limit up to which you can pressed the horn, number of times a horn is pressed , last date of clearing charges, pending charges.

The government declared several areas around hospitals and schools as the no-noise zones, the norms are not being implemented in the city. While the motorists are not aware about the norms for silence zones, there are no visible no honking signboards in the city, rendering the government directive redundant. The Traffic Department said it was difficult to enforce the direction in the past month as people were not aware that honking was banned around schools and hospitals. Hence we make a another device using Arduino Nano and NRF24L01 transceiver which is fitted in that region were government declared no noise zone. The use of this device is that, when our vehicle is comes in no-noise zone, then there is display of message "DO NOT BLOW HORN" on led display which is fitted in the car and small bip which sounds for one time only for attention.

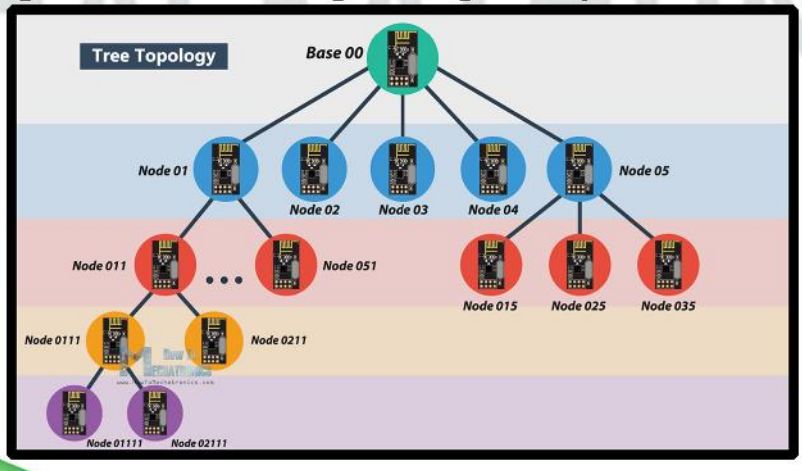
There is also one major problem in India that when a red traffic signal glow, there is long row of vehicles stands. But the motorists press the horn again and again without any reason. Hence, if we fitted a device which is made up of Arduino Nano and NRF24L01 transceiver in a traffic signal area, it can communicate with NRF24L01 Modules which is fitted in the car and display a message "DO NOT BLOW HORN" and small bip sounds, only for attention of motorists.

Now, the problem arises how system will be handled? The system will be handled easily and noise pollution due to the honking will stop slowly. The main question arises where the motorist pay the charges. The solution is that, there are many toll plaza in India , we make a device which can read the vehicle number and charges which is assign for blowing of horn. If government has decided that we have to pay the toll with this charges compulsory which is assign for blowing of horn, the noise pollution definitely within control and may be reduced. Now, another question arises that toll plaza exists only on national highway, hence if motorist drive their car only on common road there is problem arises for the collection of charges. Hence we make a portable handhold device which is for traffic police. This wireless device display the vehicle number and respective charge when the vehicle come near this device . The traffic police collect the charge from this motorists. In this way we collect the charge from motorists. In this project we do not use the GSM module because, if we make the project with GSM module there is chances of vehicle tracking, which is illegal. Hence, we make a device with NRF24L01 module and Arduino Uno which is cost effective and can be handled easily.

Advantages:

1. The device is easy to implement in car.
2. The overall cost of making device is Rs. 1900 only ,hence it is affordable to buy.
3. The size of device is 10*12cm ,hence it take less space.
4. A device can be fitted easily in car ,two wheeler and in auto rickshaw etc.
5. Collection of charges is made easy due to a single NRF24L01 module can actively listen up to 6 other module at same time with different addresses. Hence it is easy to collect charges from device which is given to traffic police.

The figure below shows that each NRF24L01 module communicates with six other modules. This logic is used to display a message "Do not blow horn" near no-noise region and traffic signal region.a portable wireless device.



Team Neutron

# SODA DISPENSER

Nemeen Shah and Anisha Dhakate of third year designed a Soda Dispenser using the 8051 microcontroller. Shown below is their technical paper titled 'Soda Dispenser using 8051' on the same.

## Soda Dispenser Using 8051

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Nemeen.Shah@Sakec.ac.in

***Abstract*—The main purpose of designing this project was to make a Soda Dispenser which could provide soft-drink like coke and water to the people. All the details will be on screen which should be followed. This machine will also give an option to the user select the amount needed.**

***Index Terms*—Dispenser,Soda,8051,Atmel**

### I. Introduction

Soda Dispensers are fundamental for any food service foundation that's seeking out for a straight forward way to dispense drinks. You can utilize these machines which are perfect for self-service station. A few soda machines can be set on your counter tops, whereas others drop into spaces between other gear.

### II. The Concept of Model


Fig. 1. Block Diagram of Soda Dispenser

Above block diagram illustrates the working flow of Soda dispenser. First LCD will display the drinks which are available to be selected. After selecting the drink user can enter the amount which can be increased by 20 or decreased by 10. Once the amount is finalized user can hit confirm button and Enjoy the drinks. Accordingly, humankind who likes to drink coffee or tea can buy a cup of coffee or tea anywhere and anytime from them.

### III. Parts Required

#### A. Atmel AT89S52

The AT89S52 is a high-performance CMOS 8-bit microcontroller which devours low-power with 8K bytes of programmable Flash.

It is made utilizing Atmels nonvolatile memory technology and is compatible with 8051 instruction set and pin-out. The on-chip Flash permits the client to program memory to be reprogrammed by a programmer.

#### B. IRLZ44N MOSFET

We can use any MOSFET but always try to use IRLZ44N because it is a logic level MOSFET so it will respond for low voltages too that means current will conduct even on 2.5v or 3..3v or 5v. Which are the voltage levels our micocontrollers work with.

#### C. 16*2 LCD

LCD (Liquid Crystal Display) is a display module. It finds a wide range of uses in projects. A 16x2 LCD display is basic module which is commonly used in various circuits. LCDs are economical easily programmable have no limitation of displaying custom characters, animations etc.

A 16x2 LCD can show 16 characters per row and there are 2 such rows. In such LCD each character has 5x7 pixel lattice. These LCD have two registers, to be specific, Command and Data registers.

The command register stores the command instructions given to the LCD. This instruction given to LCD may be a predefined task like initializing it, controlling display etc. The data register stores the information to be shown on the LCD. The data is converted to ASCII value of the character.

#### D. Submersible DC Pump

A submersible pump is a device which has sealed motor. The total assembly is submerged within the liquid to be pumped. Submersible pumps thrust liquid to the surface whereas jet pumps having to drag liquids. Submersibles are more proficient for such application.

#### E. Food Grade Vinyl Tube

Vinyl tubing is adaptable and gives an prudent means of liquid transfer. PVC tubing shows fabulous resistance to microbes for nourishment safety.

### F. Push Buttons

Push-Buttons are normally-open switches. Push buttons permits us to form any specific connection only when required by squeezing the button. Basically, it makes the circuit connected when closed and breaks when open. They are commonly in our everyday life of electronic equipments.

### G. Wooden Case

Wood is an insulator due to air pockets inside its cellular structure, which implies that its superior than masonry. In insulation, lightweight wood surrounding strategies permit simple establishment of extra fiber which results in extra insulation. As a result of this improved thermal performance, wood was chosen for the construction of fame.

## IV. Algorithm

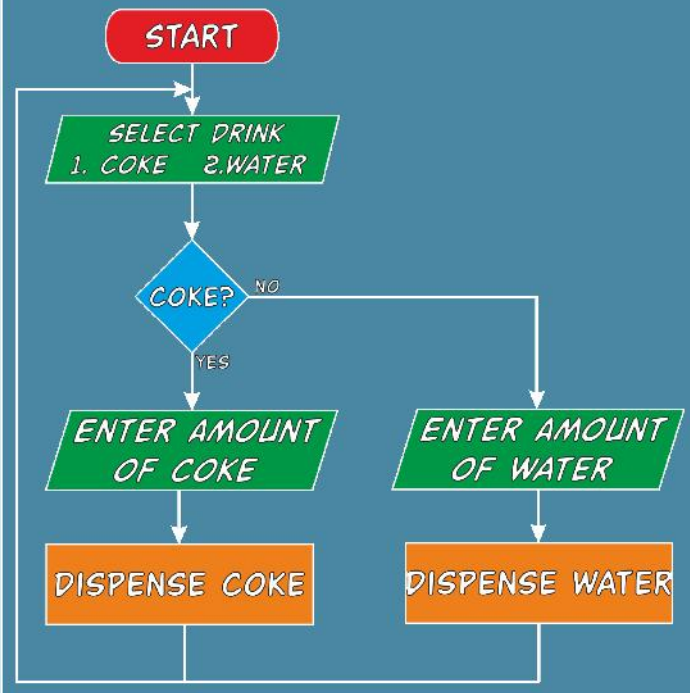



Fig. 2. Algorithm of Soda Dispenser

## V. Construction

Entire frame was construed using wood as discussed earlier because of its good insulation properties to keep drinks cool. First all the necessary measurements were taken and final design was made in CAD Software. Once the plans were ready we chose to use 5mm thick wood to keep the weight down. All the joints were made using L brackets which held the wooden pieces together using nuts and bolts.

Once frame was ready all parts like AT89S52 board, MOSFETS, LCD, etc were added to the built as shown in the schematic, And some of the components like LCD were glued to the case using Hot Glue.


Fig. 3. Soda Dispenser

## VI. Code and Circuit

Refer the additional Sheet attached.

## Conclusion

Hence from the above project we get to learn about 8051 Micro controller, How its I/O ports works as well as how to interface such Micro Controller with external peripherals like an LCD, MOSFETs, Motors, etc.

## Acknowledgement

We would like to express our special thanks of appreciation to our professors, who gave us this brilliant opportunity to do this wonderful project, which also made a difference in us doing a part of Research and we learned about so many new things we are truly grateful to them.

Secondly we would also like to thank our parents and companions who helped us a lot in finalizing this project within the constrained time outline.

## References

[1] Muhammad Ali Mazidi,Janice Gillispie Mazidi and Rolin D. Mckinlay "The 8051 Microcontroller and Embedded Systems: Using Assembly and C" Second Edition,Pearson Education India, 2013.

[2] Lyla B. Das, "Embedded System and Integrated Approach", Pearson Education India, 2012.

# The coming age of 5G

Imagine playing a co-op shooter like PUBG on a VR headset – in real-time, with zero lag – all through your phone, while traveling in a fleet of self-driving cars going 200 miles an hour. Sit tight, because the future of gaming, and everything else, is about to change forever.

If you look at the corner of your phone, you're probably used to seeing a little indicator that says 4G LTE, 3G, or, god forbid, 2G, and you've come to recognize that it probably has something to do with your phone's connection to your mobile network. The higher the "G," the faster the connection.


It's pretty easy to follow: The G stands for generation, and each subsequent generation refers to a specific minimum speed, connectivity, and reliability necessary to classify the network as that particular generation. 1G let us talk to each other, 2G let us send messages, 3G gave us data and internet, and 4G/LTE made it a whole lot faster.

But all those networks will be things of the past, because on the horizon is 5G. And while you may be thinking that 5G is just a little faster, a little more reliable, and a little new, it's actually more than that. It's a massive breakthrough that's going to change the way devices connect to the internet, and more importantly, to each other. Being able to send and receive information that quickly means that we can use 5G to replace real-time interactions. What that means is, you'll be able to interact with people, objects, or characters controlled by someone else, with no lag on either side. Play a real time first-person shooter on your phone. Control virtual objects with other people simultaneosly. Put on a headset and fly a drone or drive a car that's somewhere else, in real life. Or, better yet let it drive itself. It all sounds implausible right now, but that is what's capable with 5G in the future.

5G will revolutionize the future, and companies have already spent billions to set up their networks and to fund new technologies that can use it. But, that's not to say 5G is perfect. One major drawback has to do with why it's so fast. See, 5G uses a mix of frequencies, with most of the attention on millimeter waves compared to the 15-40 centimeter-long waves used by 4G. And shorter waves and higher frequenci-

-es have one big drawback: They don't go very far. Whereas on 4G networks, you can go ten kilometers and barely lose signal. 5G maxes out at about 300 meters, and it can't even go through walls or rain.

While the world waits for 5G, 4G will continue to improve and offer a pathway to 5G. Current applications will be enhanced, ready for the next generation in wireless connectivity. The two generations are not so different and will work in harmony to manage the world's evolving connectivity demands more efficiently. The complete transition will take time, but we will soon see wireless speeds far exceeding those we currently enjoy. 5G will be a game changer, but both operators and providers need to stay ahead of the revolution. We need to ensure the correct support is in place to manage the changes before we can realize its potential.

- Sujitha Kurup


A depiction of 5G. (Courtesy: PCMag)

# Robot Operating Systems

BY ALI ASGAR TASHRIFWALA

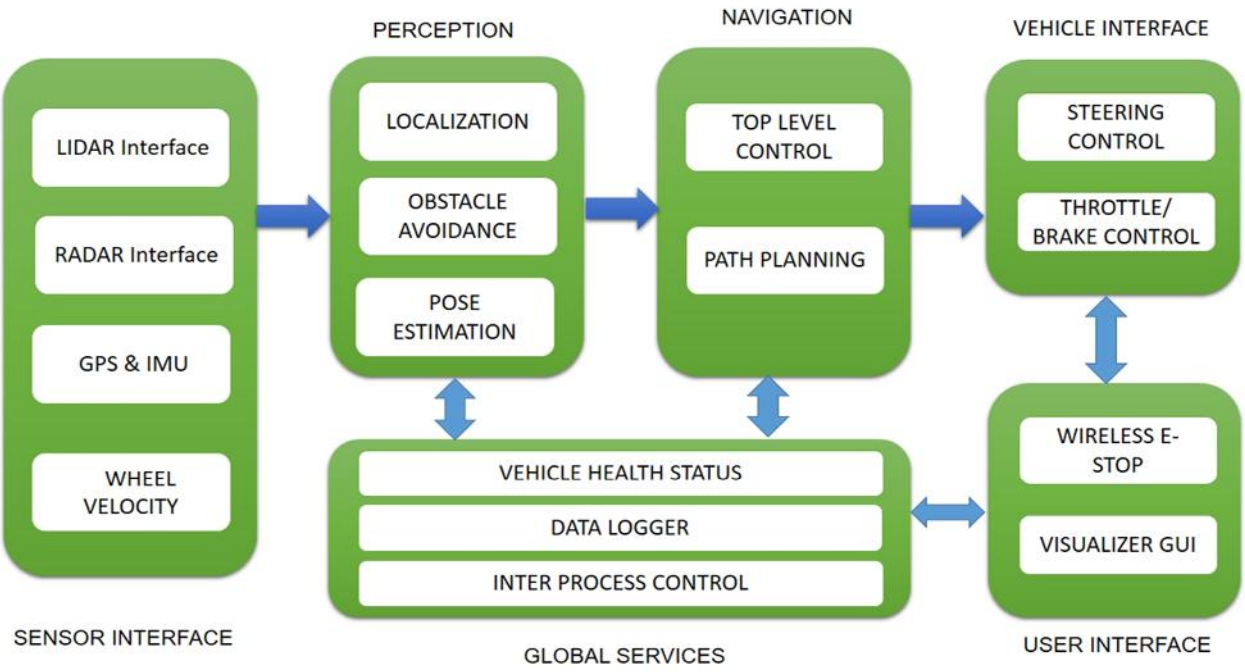
Robot Operating System (ROS) is an open source meta-operating system, a.k.a., robotics middleware (i.e. a collection of software frameworks for robot software development). Although ROS is not an operating system, it provides OS like services inside the host OS.

Software in the ROS Ecosystem can be separated into three groups:

- language-and platform-independent tools used for building and distributing ROS-based software.
- ROS client library implementations such as roscpp, rospy and roslisp (C++, Python and Lisp).
- Packages containing application-related code which uses one or more ROS client libraries.

Sometime before 2007, while working on robots to do manipulation tasks in human environments, two Stanford University PhD students, Eric Berger and Keenan Wyrobek, noticed that their colleagues were held back by the diverse nature of robotics: an excellent software developer might not have the hardware knowledge required, someone developing state of the art path planning might not know how to do the computer vision required.

# A Game Changer in Robotics




To remedy this situation, the two students build the PR1 as a hardware prototype with Morgan Quigley, another Stanford PhD student worked on the software for it. ROS project started under the name switchyardby Stanford AI Lab in support of STAIR (STanford AI Robot).

From 2008 - 2013, Eric Berger and Keenan Wyrobek met Scott Hassan, the founder of Willow Garage. Hassan shared Berger and Wyrobek's vision of a "Linux for robotics".Willow Garage developed PR2 and achieved one of its longest held goals: giving away 11 PR2 robots to worthy academic institutions. This, combined with Willow Garage's highly successful internship program, helped to spread the word about ROS throughout the robotics world. Willow Garage created the Open Source Robotics Foundation (OSRF) in April 2012 and in November, ROS began running on every continent.

An image depicting the ROS equation:

Plumbing + Tools + Capabilities + Ecosystem = ROS!

Plumbing:
ROS provides publish-subscribe messaging infrastructure designed to support the quick and easy construction of distributed computing systems.

Tools:
ROS provides an extensive set of tools for configuring, starting, introspecting, debugging, visualizing, logging, testing, and stopping distributed computing systems. The most common tools are:

- Rviz - it is a three-dimensional visualizer used to visualize robots.
- Rosbag - it is a command line tool used to record and playback ROS message data.
- Catkin - it is the ROS build system. catkin is based on CMake.

• Rosbash -The rosbash package provides a suite of tools which augments bash shellfunctionalities.
• Roslaunch - it is a tool used to launch multiple ROS nodes as well as setting parameters on the ROS parameter server.

Capabilities:
ROS provides a broad collection of libraries that implement useful robot functionality, with a focus on mobility, manipulation, and perception. The most common capabilities are:
• Mapping and localization - gmapping, cartographer and amcl.
• Navigation - nav2d provides the capability of navigating a mobile robot in a planar environment.
• Perception - vision_opencv is a meta-package which provides packages for integrating ROS with OpenCV.
• Simulation - gazebo_ros_pkgs is a meta-package which provides packages for integrating ROS with the Gazebo simulator.

Ecosystem:
ROS is supported and improved by a large community, with a strong focus on integration and documentation. ros.org is a one-stop-shop for finding and learning about the thousands of ROS packages that are available from developers around the world. The most common ecosystems are:
• Melodic Morenia– 2018
• Kinetic Kame– 2016


Before ROS, we faced a lot of issues such as
• Robotics software development time is high because all code should be written from scratch.
• High cost for robotic simulators.
• Less open source simulators.
• Difficult to collaborate with robotic projects.

After ROS, we had solutions such as:
• A common software platform to develop robotics applications.
• The main goal of ROS is code re-use.
• Open source simulators like gazebo community become very active after ROS.
• Collaboration in robotics development with universities and companies.

Operating SystemsSupporting ROS:
• Full Support: Ubuntu and Ubuntu (armhf)
• Experimental OS: OSX, Android(NDK), Debian
• Single Board Computers: Raspberry Pi, NVDIA Jetson TX1, TK1, and more.


Popular Robot supporting ROS: robots.ros.org
• PR2 (Personal Robot)
• Turtlebot 2
• Baxter
• Pepper
• Robonaut 2
• REEM
• Husky

Who all are using ROS:
- Google
- Apple
- Amazon
- Microsoft
- Intel
- Qualcomm
- ARM
- Nvidia
- DJI
- LG
- SONY
- Mathworks
- BMW
- Toyota
- Bosch
- Ubuntu

Popular Sensors supporting ROS: wiki.ros.org/Sensors
- Velodyne
- Laser Scanner: UTM – 30LX
- Kinect
- IMU-XSense


Library Support for ROS:
- Gazebo
- OpenCV
- ROS Industrial
- Pointcloudibrary
- MoveIt

GAZEBO

OpenCV


Ali obtained MS in Computer Engineering from NJIT. Currently, he is a research assistant at RADLab.

# PASSION FOR PUBLIC SPEAKING

**Recently, one of our alumni, Aniruddh Menon, won the district-level Toastmaster's extempore competition. Below are a few words from his end.**

**"I have always been passionate about public speaking and SAKEC helped hone this skill by giving me ample opportunities to anchor various events.**

**Post college, I was looking for a forum to keep this flame burning and I joined the Toastmasters Club at my office (Reliance Jio).**

**While as a Toastmasters member, I participated in the EXTEMPORE SPEECH COMPETITION which saw 220 clubs participating with the overall member strength crossing 13,500. This competition was structured in 4 levels- Club, Area, Division and District, with the winners of each level proceeding to the next.**

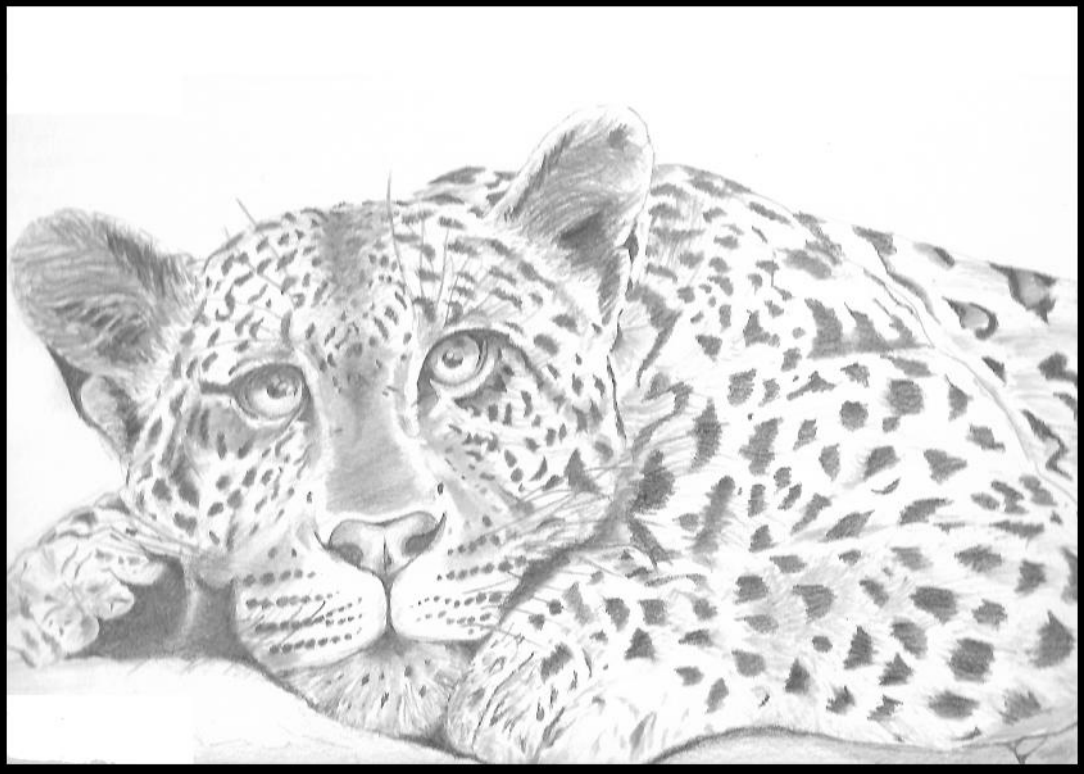
**The Division Level contest was held at Pune on May 18th, 2019 and was attended by over 2000 people and to my total disbelief, I went on to win the competition to be crowned as the District Champion.**

**These memories and moments remind me of a quote that has guided me ever since I read it, 'Have fun even if it is not the same kind of fun other people are having.'**

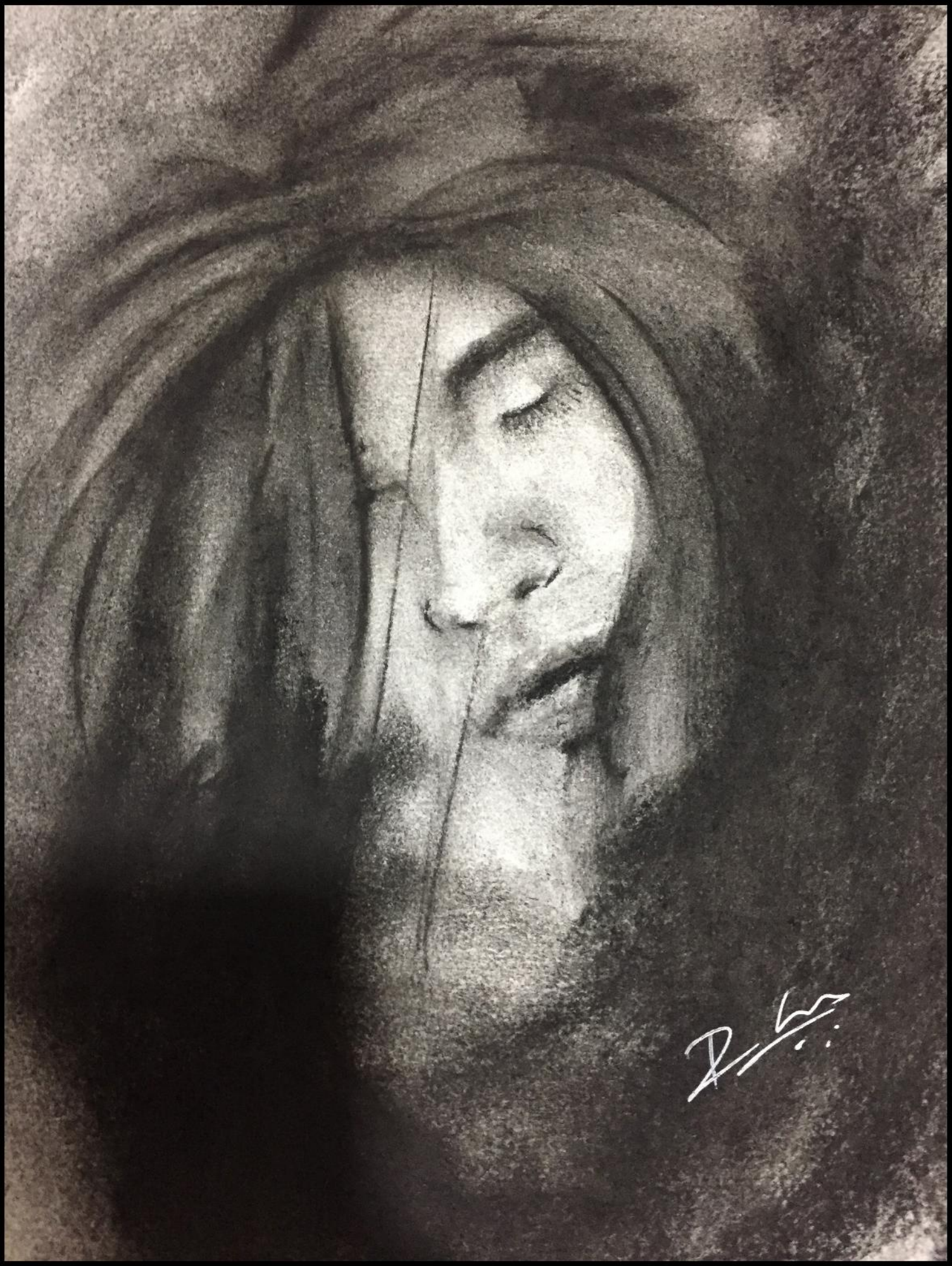
# Creative Corner

From paintings to sketches, poems to prose, the creative works of students and teachers from the department find their place here.

- Riddhi Panchal, Final Year



- Adarsh Shetty
Final Year



Darshan Bhatt, a final year student, has a flair for sketching. Below he answers some questions that he faces quite often :

1. How did you fisrt start sketching?

It started when I was in school. All the students were asked to draw a bird and get it the next day. I made one and submitted it to the teacher but she couldn't believe that such a young boy could draw so well and so she doubted me. But I drew it again in front of her and she asked all my classmates to clap for me. It was a motivation for me. And I've been sketching since then.

2. What connects you to sketching?

Every piece that I've made so far has feelings and emotions filled in it.
Those feelings look different from each and everyone's perspective.

3. Despite being a student of engineering, how do you devote time to it?

Sketching is not only my hobby, it's my passion. Engineering is a time consuming field but I have to practice sketching the same way. It also helps me calm my mind amidst all the stress.

4. Do you plan to take up sketching professionally, say as a carrer option ?

Yes, I've always wanted to take this further professionally and I have been working hard for it. I recently started up a company named Design Booth. We take up projects for graphic design, industrial design, animation, etc. I hope to expand the company soon.

The previous sketch and the sketches on the right are a few of Darshan's works .

# Dastaan-e-Doston

Alright guys so listen
Here's an atrangi kahani
Kahani of my friends in this college
As for myself,
I'm a bina Sins ka Johnny

Ye chaar saal iss college mein
They're like a lachha paratha
Masalke bata du achhese
Kin logo ke bharose inhe kata

Order really doesn't matter
Sab khaas no kam no zyada
Now why am I speaking in Hinglish?
Desi hu, Khali English se feel nahi ata

Feel se yaad ata Harsh Shah
Pyaar se use bulate Cutting
Chota packet bada dhamaka
Alag hi swag me rehta vo strutting
Paalta vo ek sunhera sapna
Banunga dashing director
Anurag Kashyap ka bhakt
Sab ki achche se lunga
Film mein Koi bhi ho actress ya actor

Actor se yaad ata Gaurav
Typical Sharmaji's son
Marks, sports, sab me stud
Harkate uski legend
Big fan of the Indian Army
Dimaag silver aur dil gold
Baat karke dekho use
Your khushi will become six fold

Six fold se yaad ata Ameya
Kukdu kamaal ka advisor
Gossip and kahaniyo ka khazana
Talking to him will only make you wiser
Iski bohot cool hai karni
Speech craft iska fine art
Let me tell you, ladies
He doesn't even need to steal,
You yourself will offer him your heart

Heart se yaad ati Masumi
Everyone butchers her name
Maushumi, Mosambi, Basundi...
Good Lord it's such a shame
Dance ki bohot badi shaukeen
You better be making some noise
Always bhand but charm akhand
Humesha cheerful uska voice

Voice se yaad ata KK
He's the ultimate show-stopper
Baat karke dekho use
His tehzeeb is jaw-dropper
Woman or man barely matters
He plays the guitar and can really well dance
Try not to get fazed by his charisma
I doubt you'd stand a chance

Chance se yaad aati Devichan
Meri pyaari Kouhai
By chance I got her and by chance I lost her
I didn't even get to say goodbye
They all lament the loss
The loss of her golden voice
I lost my kindred spirit
Once a melody of euphoria
Is now a mind-numbing noise

Voice-noise rhymed really nice
Let's get the mood back up
Let's talk about some vatt
Cuz when Veera talks
You instinctively stay shut
This dude commands respect
His smarts is a sharp sword
He won't break a sweat to diss back dissers
They're bound to get owned

Own se yaad ata Himanshu
Lagta mera bichda hua bhai
Pasand use lambi neend aur
Vadapav, whatta-powerful mind
Natak to karta bohot
One of the class ka toppers
Bro tu rehna na kabhi udaas
You are a star real proper

Baara verses already hogaye
I guess rukne ka hai time aya
But abhi bhi bohot naam baaki hai
Umair, Karan, Pratik, Yogya
Sab hai Akshay Momaya
Chawda, Monika, Adi, Vismaya
Sabne dosti se bhi zyada nibhaya
By the way I'm Aniket
Open Mic 1.0
We're gonna set this place on FAYAA!!!

- Aniket N Prabhu

Aniket is a budding engineer, an amateur pianist and a great artist. As of today, he's persuing his MS in Robotics from Arizona State University.

# The Soulful classical Dance

## "पिया तोसे नैना लागे रे, नैना लागे रे....."

a song from 1965 movie "Guide" starring Vaheeda Rehmaan opposite Dev Anand, like all the other songs from this movie, this song was enchanting me not only with its music but Vaheeda Rehmaan's graceful dance which is choreographed on one of the Indian Classical dance form i.e Bharatnatyam.

India is blessed with 7 different types of beautiful classical dance forms, Kathak, Bharatnatyam, Odissi, Kuchipudi, Mohiniattam, Manipuri, Kathakali. Being trained in "Kathak", these classical dance forms have always mesmerized me with their uniqueness, every dance form is different from others and more importantly, the dance moves are designed not just for the entertainment purpose but for the physical and mental well being of a dancer! Indian dance is used for healing and consciousness. The fascinating movements can strengthen your muscles, also inherently incorporates breathing exercise, because every movement requires rules of the game and a rhythm. An active movement can prove to dilate your blood circulation which leads to a healthy heart. These were the physical benefits of classical dance, now let's see what are the mental benefits?!

Stress is an integral part of our day to day life. These dance forms will make you handle your stress efficiently. According to the study conducted by The New England Journal of Medicine, dancing can improve memory and prevent dementia, because during the dance you have to recall every movement you have learned before. Also with improved physical health your mental health automatically gets improved.

One more important aspect of Indian Classical dance that I would like to address here is its age old connection with the "Spirituality"! These dance forms make the spiritual journey easy for us. Classical dance is a most important thread of the colourful fabric of the Indian Culture. Since olden times, classical dances have been counted as a sacred art, one which was mostly performed in the temples. If we take a closer look, all the classical dances are basically a Prayer or a Pooja of the Paramatma. Like for example, Bharatnatyam mainly comprises of "Shiva Stuti" i.e a prayer offered to Lord Shiva and Kathak comprises of "Krishna stuti" i.e prayer offered to Lord Krishna.

It is said that, there are many ways to reach the Divine, but none can be compared to the music and dance. That is why Indian Classical dance will always inspire us by its universal benefits. So, keep getting inspired and keep dancing!!

- Gauri Deshpande Ingle

# Ode to the Batch of '19

This is to the achievers, the go-getters, the sportsmen, the last benchers, the reticent ones, the loud ones.... finally it's to all the students who made up the Batch of 2019.











SODA LEMONGINGER POP
TE-T ON THE TOP !!

# THE EDITORIAL TEAM

**Prof. Sujitha Kurup, Vinit Veera, Aniket Prabhu, Harsh Shah, Karan Shah, Masumi Seth, Yogesh Prabhu**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