

# ABHIVARG 5.2



# THE CIRCUIT MAKER

**VOLUME 5.2**



**TODAYS CIRCUIT MAKERS,  
TOMORROWS LEADERS**

## DEAN'S MESSAGE

Dear students,

“Man proposes God disposes”. We have heard of this saying meaning human beings do lot of planning in their life specially about future, based on past experiences, sacrificing their present, but finally what happens in life is as per the will of Almighty.

The present pandemic situation, I am sure nobody must have ever thought of even in their dreams. Today we all are locked in our houses not because of war or natural calamity but because of an invisible microorganism known as coronavirus, also called as Chinese virus by many.

This condition of uncertainty taught me one very important thing that never forget to thank even for the smallest thing you get on life. This is because when you realise it is important, we have lost many opportunities to be happy to express our gratitude especially to nature and our loved ones who have always supported us unconditionally. We take them for granted and forget to say thank them when they are there for us and a sorry when we hurt them unknowingly.

This is the best time to be connected with our self and our family because no one in this world will be there to help you other than you yourself and your family. So I request all of you do first thing today is go and say thank you to your family. Believe me you will feel very good and it will give you strength to face any uncertainty with positivity that will help you to convert any problem in your life into an opportunity for growth.

All the best.

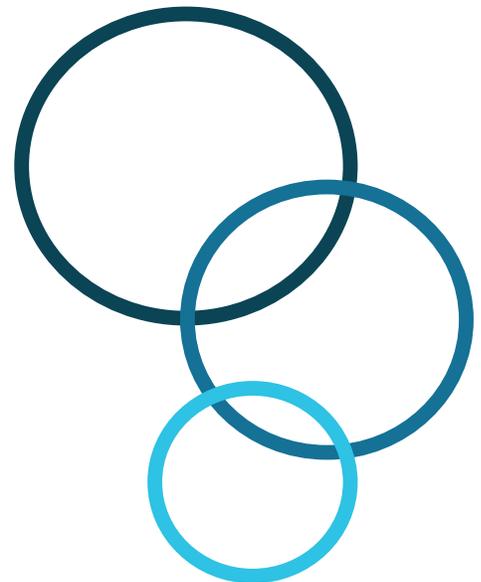
God bless you all.

Dr. Lochan Jolly

Professor (E&TC) and Dean (Student and Staff Welfare)



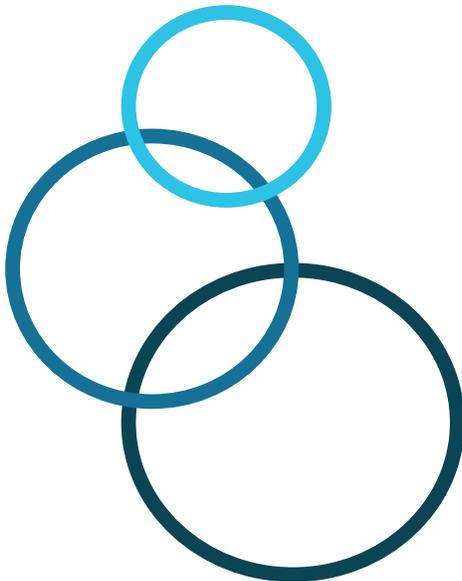
**Dr. Lochan Jolly**  
**Dean (SSW)**



## HOD'S MESSAGE



**Dr. Payal Saha**  
**HOD, E&TC**



College life promises years of fun and excitement, especially in the last year of on-line education where we enjoy the freedom and the convenience that is not afforded to brick-and-mortar college students. The way to achieve success is to remain focused on your work. List down everything that you need to do on a daily basis before dealing with it, prioritize your tasks, be organised and realistic, and stick to schedule. Don't procrastinate or give in to distractions. Be optimistic always. And most importantly, stay healthy and stay connected.

## FACULTY INCHARGE'S MESSAGE

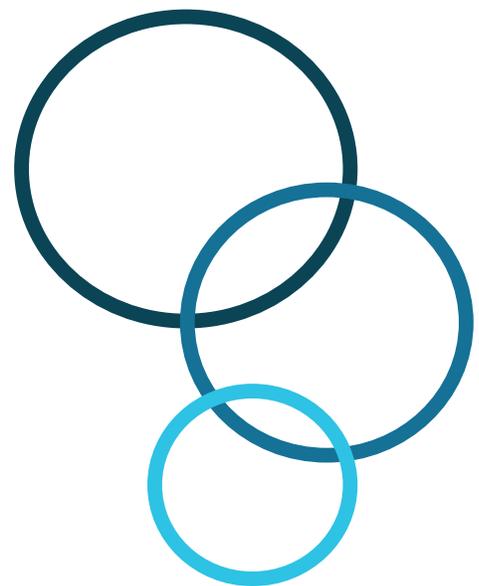
Hello,  
Welcome to all of you for the new edition of Abhivarg. It's the time when everyone is talking about COVID-19. We are living in the era when the time has taken a new leap. A leap towards a different world. Living has changed. Work culture has changed. Lifestyle has changed. Dictionary has got some new words; but kids have understood their meanings without searching the dictionary. We all are familiar with "The New Normal". Stay home, stay safe are the new words of best wishes. This pandemic has feared everyone for the lives of their near and dear ones. Students have their own fear of different world of teaching, placements and post COVID job opportunities. Definitely things will change with time, but this new normal will survive for few years. This difficult time has taught us to be self-reliant.

Our nation is getting newer and difficult situations to fight with. Pandemic, border issues and internal affairs and many more. "Aatmanirbhar" this is what our prime minister wants us to be as an individual and as a nation too. We can see a wave in Indians to boycott Chinese products. But with this comes the responsibility and duty of every Indian to contribute to this noble cause of serving the coming generation in some or the other way. As an engineer our responsibility is towards research and development. Innovative ideas and designs can help entrepreneurs to convert them into products, where in we need not pay any import duty while buying such products. Budding engineers mostly think of foreign universities. But after getting degrees they never feel like coming back and serving their own nation. This brain drain should be choked now.

With this I would like to wish you all a health and safe year ahead.



**Ms. Megha Gupta**  
**Faculty In-Charge**





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# STUDENT ARTICLES

## IoT based Remote Patient Health Monitoring System



Riya Gupta  
TE E&TC A



Krishnakant Dubey  
TE E&TC A



Neha Jaiswar  
TE E&TC A

Remote patient health monitoring system is an IOT device which could be used with patients or elderly at our homes whose real time health readings such as temperature, blood pressure and electro-cardiogram could be monitored remotely on a hand held device. Internet of Medical Things (IOTM) is providing new facilities for the doctors and their patients to access and use health information. This provides the health care workers to store collect and convey information electronically. It will help the patients to recognize their own symptoms and communicate to the doctors wirelessly outside the clinical setting i.e. from home or office. The main objective for this project is to design the health tracking system which uses sensors and Internet to inform the condition of the patient to their loved ones and doctor in case of any emergencies. Majorly it will help for particular patient who lives in an area where the reach of doctors is impossible on time. Also it is possible to overcome the difficulties faced by physically unstable patients in consulting a doctor physically on a regular basis.

Health is always a major concern for humans, like the recent corona virus attack has ruined the economy and the health to a great extent. The biggest lesson that we got during pandemic is Health is Wealth which means health should be the most important part of one's living. Nowadays, social distancing is the biggest formula that everyone is using, to maintain social distancing between patients and the doctors; it is always a better idea to monitor the patients using some technology which will not allow human interventions. In hospitals, where patient's status needs to be regularly monitored that is 24/7, is usually done by a doctor or any staff by constantly observing some important parameters, such as body temperature, heartbeat, and blood pressure thus, this task becomes very tedious after some point. Hence it can cause problems. However, there are many researchers have attempted before to solve it in many different ways, but the earlier methods in several cases either

SMS will be sent using GSM or RF module will be used to send patient's data from sender device to receiver device. Moreover, in the earlier cases the history of the patient cannot be displayed, only current data is displayed. This was a major drawback of using GSM based tracking system therefore IOT based health monitoring system is a good solution for such problem.

#### Proposed Methodology:

The core objective of our project is to implement a health monitoring system which can be used in remote places. Remote health monitoring system will be consisting of:

- 1)Monitoring of health & Data Collection Monitoring health sensors will be present within our proposed system to collect the data i.e. the health parameter such as body temperature, blood pressure etc. sensors send signals to the Arduino Uno. Programming of the system will be done according to our systems requirement and also with the help of LED display the health parameters will also be visible to the patients. More than this, because of internet this system can be accessed from any part of the world as the health data will be stored in the cloud.
- 2)Segregation of attention and appliance control

The segregation of the patients can be done in two form 1. Major ailment & Semi-major ailment. Whenever the set threshold conditions rise and it ranges

in the major health issue symptom, the patient will be attended quickly as the doctor will be immediately notified through an emergency alarm and without any delay an ambulance will be sent at the registered address and all this happens without involvement of third party. For semi-major the response will not be severe in this case doctors can go through the symptoms and prescribe the medication and precautions to be provided for the same.

- 3)Preparing a Database from the acquired data

For doctors the most important thing while treating a patient is to know about its medical history. So for future use it is essential for one to keep the medical data of the patient. Quicker the doctor is able to diagnose, the easier ways he can find to cure the patient's illness in case of major health issues.

#### Expected Output:

The pulse rate sensor, body temperature sensor etc. values might be calibrated using Arduino Uno. We will be able to make a complete prototype of our proposed system with the sensors and a led display where all the output values of the sensors might be displayed.

These data will be sent to database server and data can be accessed from cloud using the IoT application platform. Based on the data received, the disease of the patient will be diagnosed by applying predefined set of rules and accordingly medications can be prescribed or appropriate action can be suggested by doctor.

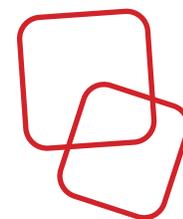
#### Conclusion:

The Internet of Things is considered now as one of the feasible solutions for any remote value tracking especially in the field of health monitoring. It facilitates that the individual prosperity parameter data is secured inside the cloud, stays in the hospital are reduced for conventional routine examinations and most important that the health can be monitored and disease diagnosed by any doctor at any distance. In this research, we will be developing an IOT based health monitoring system, the system will be designed to monitor body temperature, pulse rate and room humidity and temperature using sensors. These sensor values will be then sent to a medical server using wireless communication. This leads to the conclusion that user can remotely monitor the live status of the patient from anyplace with the only constraint that there should be internet connectivity as to receive the live updates about the patient. The proposed model is extremely useful for the society and would supplement the existing solutions for health

monitoring.

#### References:

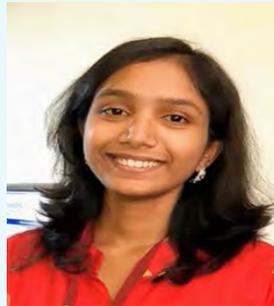
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# LOW COST HEARTBEAT RATE MEASUREMENT



Kirti Moily  
TE E&TC A

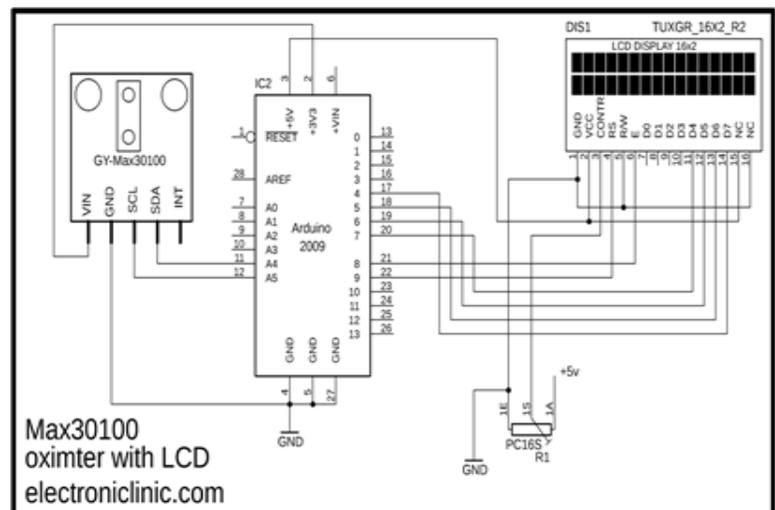
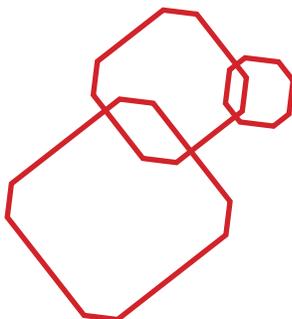


Nivedita Mishra  
TE E&TC A



Vedashree Naik  
TE E&TC A

There is a need of technology in healthcare as in death due to cardiac arrest at home is increasing day by day. Heart rate and blood oxygen saturation is monitored in this project to provide information regarding the health of the body. It can be used whenever you fell sick and instant medical test is not possible. The Max30100 sensor is playing a major role in this project as it measures both heartbeat rate as well as blood oxygen percentage. By measuring the intensity change of light transmitted through tissue due to arterial blood, heart rate is measured. Furthermore, oxygenated blood has different light absorption characteristics than deoxygenated blood under red and infrared wavelengths. The design is small, easy to use, real time method to provide information regarding health. The advantage over here is that this product can be used by any non-professional.



### Introduction:

Heart rate measurement is one of the very important parameters of the human cardiovascular system. World Health Organization (WHO) research shows that most people were dying due to heart illness. Therefore, this disease cannot be taken lightly and need constant monitoring of cardiac parameters. The heart rate of a healthy adult at rest is around 72 beats per minute (bpm). The average heart rate is between 60 to 100 bpm. Consequently, heart rates outside this range could lead to an indication of medical conditions. Oxygen saturation depends on the concentration of haemoglobin in red blood cells, where the average value is 95 to 100%. Here Arduino is used which is a programmable device that can sense and interact with its environment and the MAX30100 sensor is used to calculate %oxygen in blood and heart rate in bpm and both the readings are displayed in LCD. The purpose of this study is to create a low-cost device that can calculate %oxygen in blood and heart rate in bpm.

### Problem definition:

In the current lockdown situation, oximeters are been used widely, but they are very expensive.

Low cost device is needed that can find out oxygen content in blood and which can also calculate heartbeat rate.

### Proposed Methodology:

In this project the heart rate (BPM) along with blood oxygen is displayed on the LCD display.

Put your finger on the sensor and you can successfully read the bpm and blood oxygen value.

When you connect 16 x 2 LCD display with Arduino along with 10k potentiometer, the bpm and blood oxygen value will be displayed.

So basically 30100 sensor is the pulse oximetry and heartrate monitor which is used to check the health of a person with any condition that affect blood. Max30100 sensor combined 2 led of photo detector, optimized optics and low noise analog signal program.

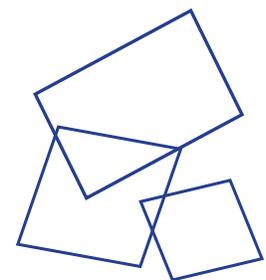
To reduce the cost instead of using 2 different sensors max30100 sensor is used which can calculate percentage oxygen along with heartbeat rate.

While using the Max30100 sensor make sure that the figure is placed properly and is stable for getting accurate reading.

### SWOC Analysis

#### Advantages:

- Easy to use
- Low cost
- Portable
- Immediate results



### Drawbacks:

- Require physical contact with the device.
- Accuracy

### Opportunities:

- Current pandemic situation
- High market rates of oximeter

### Challenges:

- Oximeter might be a jargon
- Connect device with android
- Save the data of a patient as a record

### Novelty in the project:

Most of the measurement devices either measures bpm or oxygen percentage in blood, but here is a device which measures both at same time. Its is observed that the individual device is way more costly than our device which has dual features in same rate or may be less.

### Expected output:

By Placing the finger on the sensor the heart rate in bpm and SPO2 reading will be displayed on the Lcd screen display. For accurate reading place your finger properly without moving on the max30100 sensor.

<b>SPO<sub>2</sub> Reading</b>	<b>Interpretation</b>
95-100	Normal
91-94	Mild hypoxemia
86-90	Moderate hypoxemia
<85	Severe hypoxemia

Table 2: Present values of SPO<sub>2</sub>

<b>Age</b>	<b>Heart Rate (BPM)</b>
15 years-adult	<60
1-2 days	>159
3-6 days	>166
1-3 weeks	>182
1-2 months	>179
3-5 months	>186
6-11 months	>169
1-2 year	>151
3-4 year	>137
5-7 years	>133
8-11 years	>130
12-15 years	>119
>15- adult	>100

Table 1: Preset values of heart rate

### Conclusion:

The purpose of this paper is to develop a low-cost device that can calculate %oxygen in blood and heart rate in bpm. It can monitor SPO<sub>2</sub>, heart rate and based on the monitor values it can analyze the health status. The device has an advantage that it can be used by non-professional people at home easily and it is a wireless device.

### References:

- [1] Esrat Jahan, Tilottoma Barua, Umme Salma. "An Overview On Heart Rate Monitoring And Pulse Oximeter System" pp 148-152, October 2014.
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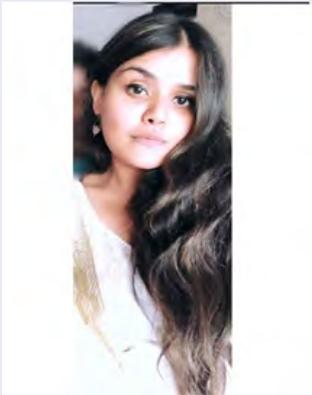
## DRIVERLESS METRO TRAIN

### INTRODUCTION

This project is developed to understand the technology used in the driverless metro train system which is mostly used by some other developed countries like Germany, Japan and France. It solves the problem of mass transportation as well as the high transportation cost in the metro train system. It also reduces the energy consumption by 30% of the metro train as it also uses the solar panels on the top for running the accessories of the train. The train is programmed to run on a predefined path and it is controlled by the motor driver IC. The stoppage of the train on the stations is also predefined. The RFID sensors and tags are used for stopping of the train. This project uses Arduino UNO as the main controller of the whole system. The different operation or functions of the train is carried out by fetching the programs in the Arduino by using the Arduino IDE software. Some other additional features like LCD display to give messages to the passengers, GSM-based SMS facility to know the position or location of the train and give that information to the control centre by SMS service, alarms to give indication to the passengers for LCD messages as well as for indication of door operation, automatic door controlling, passenger counting section by using IR modules, MQ2 smoke sensor, vibration sensor, emergency brake button are also included in this project.



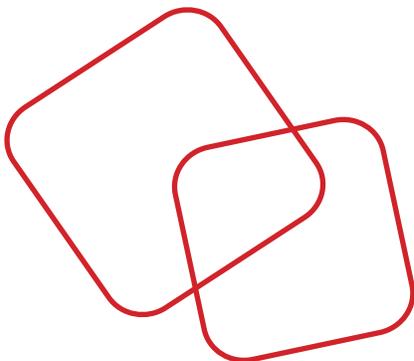
Kalpit Joshi  
TE E&TC A



Neha Mishra  
TE E&TC A



Harshad Kolhe  
TE E&TC A



## RESEARCH GAPS

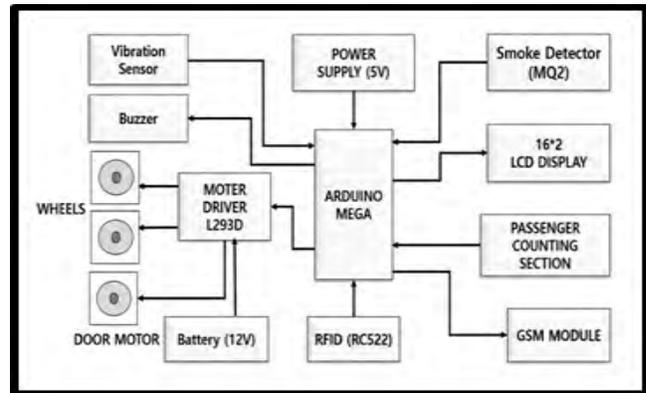
The system can be hacked, destination can be changed causing a danger to passenger's lives. PIC Microcontrollers were used to implement this automation but now we have Raspberry Pi and Arduino.

## PROBLEM DEFINITION

By observing the all the different areas of the metro transport system maximum number of accidents are happening due to various errors which might be due to electricity failure or human error and some of the service of the driverless metro train need to be improved. The methods and technologies used for counting passengers and monitoring service are old.

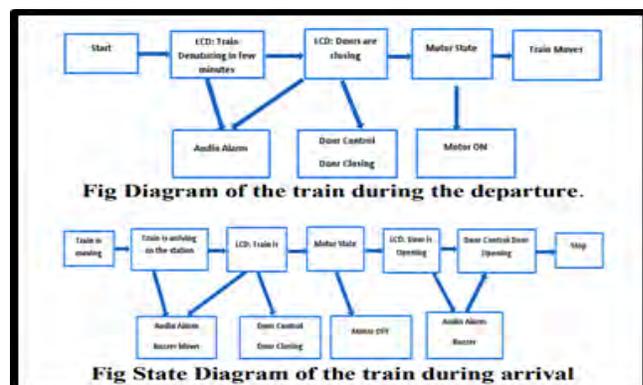
Disadvantages of the existing system are manual service monitoring, manual passenger counting, more manpower is required, installation and integration is time consuming.

The proposed merits of the automated system are requiring less manpower, automated passenger counting helps in identifying significant passenger load points where service is excessive or deficient, assisting service planning and schedule adjustment, service monitoring technology helps to identify the system operations and tracking vehicle location and quality and adequacy of service, automatic train supervision (ATS), and automatic vehicle location (AVL) help in monitoring these trains.



## PROPOSED METHODOLOGY

All the components which are used for the different operation of the train are connected to the Arduino. At first, the train will get supply from a source and gets ready to move. Here we have used the 12V battery for giving supply to the motor driver IC and door motor. But before that, the LCD will display the message that "The train will depart from the station in few minutes". The buzzer operates for every LCD message and for door operation. The passenger counting section came into action and count the passenger by use of IR modules and display it on the LCD. Then the LCD will display the message that "Doors are closing" with buzzer operation. The state of the motor is changed from off state to on state and the train starts moving and departs from the station.



When the train is arriving on the station, the LCD will display the message that “Train is arriving on the station in few minutes” with buzzer operation. The state of the motor changes from on state to off state by use of RFID sensor and RFID tags. RFID sensor is fixed on the train and RFID tags are fixed near the station. By detection of RFID tags by RFID sensor, the train changes its state of motors from on state to off state. Then the LCD will display the message that “The doors are opening” and the door control will open the door. The whole operation of departure and arrival is repeated on every station during the train operation.

This project also contains some additional features like GSM based SMS service. We can track the position of the train by using this system and send the information to the control centre by using this service. This project also includes smoke detection via the MQ2 smoke sensor for the protection purpose. When there is some problem in the train due to system failure or electric shocks, smoke is produced which is detected by the smoke sensor and give the signal to the Arduino for protection of the train. It protects the train against fire as well as short circuits in the train.



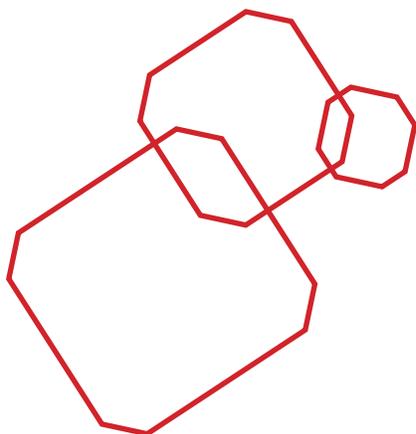
## EXPECTED OUTPUT



Whenever the train arrives at a station, the IR line is interrupted and the train stops automatically. After the train is stopped the doors of the train will be opened and a buzzer will be blown indicating the passengers that the station is arrived. Meanwhile the passenger counting section will count the no. of passengers present inside the train and displays it on a LCD screen. After a prescribed time set in the controller, a buzzer will be blown and the doors will be closed automatically. After a prescribed time set in the controller, a buzzer will be blown and the doors will be closed automatically. The principal service issues that passenger counting technology has identified are the need to provide more service, to track changes in passenger demand, and to track on time performance issues. AVL in Auto Metro increases traffic control efficiency and improves customer service Information. In Metro monitoring equipment for preventive maintenance, together with service monitoring, improves service reliability. The accuracy and abundance of data provided by service monitoring technology - especially ATS and AVL - help to determine what issues need to be addressed. Reinforced by manual staff monitoring, monitoring technologies are enabling transit providers to provide more efficient and effective service.

## CONCLUSION

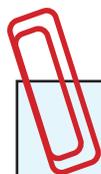
Our driverless metro train project provides the unique features like it provide fully automatic driverless operation with less traveling time, less consumption of electricity, smoke detection etc. Driverless metro system provides better quality services as well as exact timings of the train for arrival and departure. It reduces the overall running cost of the system and by use of solar panels, it also reduces the power consumption of the train. One advantage of this system is to transport more people than the normal metro train services. This system makes a better way to build smart cities as well as to provide better metro rail services to the society.



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# Designing Devices To Ease The Communication Channels Between Various Communication Devices



As the population is growing rapidly especially in the metropolitan city of Mumbai, public transport is playing an important role in the transport of people. The major problem with public transport (bus) is overcrowding and uncertainty with the time of arrival of the vehicle. For counting the number of passengers, various techniques can be used as the use of sensors at doorstep, IoT, Webcam. Here, the use of a web camera for Image processing is done to get the count of passengers. The received data is then sent to the NodeMCU module which updates the data at the cloud. The real-time data of buses would be stored in the cloud, which can be further used for the analysis of bus routes and the number of average passengers on a particular route. The Global Positioning System (GPS) receiver is used for real-time tracking of the buses, thereby notifying the passengers about the arrival time of the bus. The crowd information and location of the bus is displayed on the user's web application with the help of Google Maps.

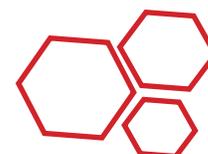
## INTRODUCTION

The population of metropolitan cities is increasing day by day, as people from rural areas move to the city for better jobs, salary, and a good lifestyle. Due to this migration of people, cities have started to become overcrowded.

Ashutosh Tiwari - TE E&TC B  
Shivshant Singh - TE E&TC B  
Akash Singh - TE E&TC B

Because of this overcrowding in the past few years, there has been an increase in the number of deaths and other health issues. Overcrowding of buses and trains has been a problem in the last few years due to the increase in population. In a city like Mumbai, some people prefer rickshaw, taxi, or drive their own vehicle due to overcrowding and unpunctuality of buses. But this increases the traffic and the level of pollution in the region. People are generally not aware of how crowded the bus or train is and how far it is from their location. This increases the risk of them boarding an overcrowded train or bus and they eventually risk their lives.

The application solves both these problems by providing passengers the location of the bus as well as how crowded the bus is. Webcam in the bus is used to get real-time images of the crowd on the bus with the help of Image Processing which is connected to NodeMCU module that helps to count the number of passengers on the bus and updates the data on cloud. The location of the bus would be



tracked by getting the conductor/driver's location using the GPS on their phone. The received real-time data would be stored in the cloud for further analysis. Only the relevant data that the user needs to look at would be shown to the user on their phone.

#### I. LITERATURE SURVEY

##### [1] CROWD ESTIMATION USING SENSORS FOR PUBLIC TRANSPORT

To solve the issue of overcrowding and to get the count of passengers on the bus, IR sensors were used. The IR Obstacle Detecting Sensors were used at both the doorsteps of the bus and the data is sent further with IoTcloud using raspberry Pi. Further, the location of the bus is tracked using GPS. The Global Positioning System (GPS) receiver built into the ETM is used for real-time tracking of the buses and thereby notifying the passengers about the arrival time of the bus.

##### [2] ESTIMATION OF THE NUMBER OF PASSENGERS IN A BUS

The project is implemented to count the number of passengers on a bus using image processing. Here, two cameras are used, one at the front and the other at the back at a certain angle. Yolov3 is used to count the number of passengers using object detection. Also, CAE architecture can be used to get the count of the number of passengers and to also get an approximate idea of the crowd on each bus.

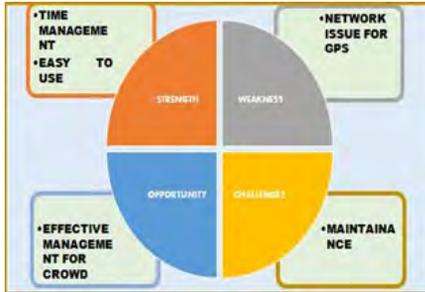
##### [3] INTEGRATION OF CLOUD COMPUTING AND INTERNET OF THINGS

Cloud computing and the Internet of Things (IoT) are two very different technologies that are both already an important part of our life. A novel IT paradigm in which Cloud and IoT are two complementary technologies merged together is expected to disrupt both current and future internet.

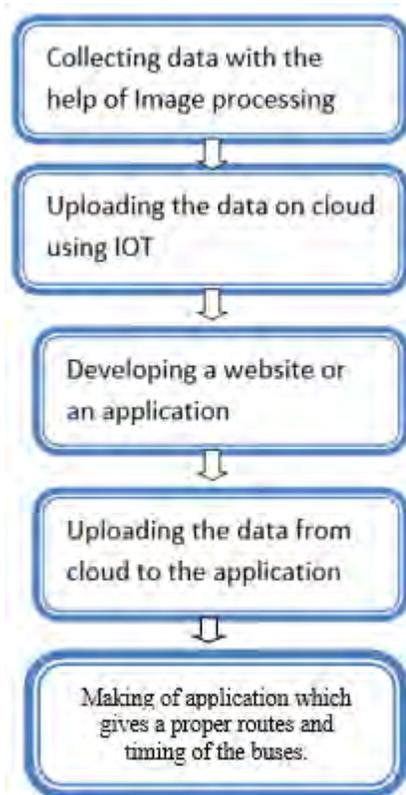
##### [4] SMART BUS: AN AUTOMATED PASSENGER COUNTING SYSTEM

It counts how many passengers are sitting on which seat and shows the result on the display screen in real-time. The authority can see the total number of passengers. This system is made with Arduino Uno, Bluetooth HC-05 module, pressure pad, potentiometer, and data collection software module. If there are no passengers sitting on a particular seat, it will show a blank seat. But as soon as a passenger is seated on the bus, it will show occupied on the display screen. The display will change the color for each seat that is occupied. The display database updates every 30 seconds.

### III. SWOC ANALYSIS



### IV. FLOW CHART / DESIGN



### V. Methodology

To get the estimation of the crowd on a bus, various ways are available as the use of sensors at the doorstep or at every seat of the vehicle. The IoT or RFID sensors are used to scan tickets and bus passes. But it has many disadvantages, and it requires monthly servicing which

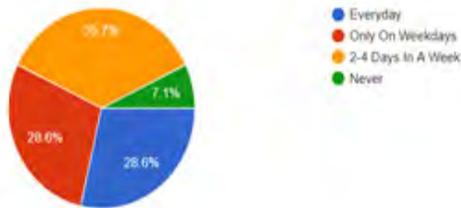
may be very expensive. The other way of crowd estimation is through Image Processing with the help of Webcam. This process of counting the number of passengers using image processing can be done by using different software like anaconda, NumPy, or MATLAB. Here, the software named Jupiter notebook is used which gives a line by line execution easily, whereas in anaconda it will done by using a hardcapture.xml algorithm file which will be mainly used for the detection of objects. After taking the image of the object, it will convert the image from grey to binary which means it will turn colorful pictures into black and white so that it will be helpful at night or dark background. There is a tool given by anaconda named bilateral which is used to remove ages from the picture i.e.it removes the noise and makes the picture look clear and clean. Also, the Gaussian filter is used to blur the images or reduce the noise according to the picture.

The data collected by Image Processing is further sent to a NodeMCU module which is connected to the bus, which will be WIFI enabled. Here, the data that is sent is uploaded to Cloud for further use. The NodeMCU module is an open source IoT platform that is based on the ESP-12 module. It is used as a Wi-Fi module to send data over the Internet. The count generated by the program based on the algorithm would be sent to the Cloud where it would be stored.

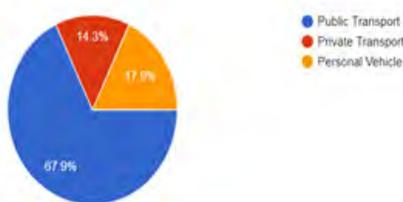
## VI. RESULT & STATISTICS

For more understanding of project and users need a basic survey was conducted and its result was analyzed with the help of some basic questions.

1) How many times do you travel in a week?



2) What type of vehicle do you prefer for travelling?



3) How much crowded buses you find on daily basis?



4) What do you do when you don't know the specific routes of the buses?

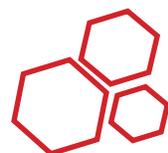


## CONCLUSION

The system is cost-effective and can be used to manage the crowd in various other transport systems. People can see how crowded the bus is or if seats are available on the bus. Also, they would be able to locate the position of the bus through their app which would help them plan their travel. A system wherein people get to know the location and the crowd on a bus is the need of the hour, as the death of people falling from overcrowded buses and also getting suffocated due to overcrowding have been on the rise. If the features and infrastructure of buses are improved, it would also help decrease pollution. Effective management of crowds and buses can be done with the help of this system.

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# Density Based Traffic Control System And Emergency Vehicle Detection



Apurva Tejani - Dept. of E&TC  
Shefali Singh - Dept. of E&TC  
Rahul Gupta - Dept. of E&TC

**Abstract**—Today is the new era of technology and advanced systems. Almost everything that is used is controlled automatically, however there are a few fields in which work is still done manually. Traffic is one of the fields which still uses manual controlling. Traffic is a major problem in megacities. The major issue with Indian traffic is that it is non-lane based. It is one of the reasons of congestion which further leads to an increase in the number of road accidents. A system is developing to optimize traffic control and ensure a smooth flow of traffic. A system is proposed for the detection of emergency vehicles. The aim is to develop a system which manages traffic based on the density of vehicles (-Vehicle count). The processor calculates on which side the density is high and accordingly assigns signal priorities based on it. Raspberry pi is used as a micro-controller which provides signal timing based on this. A camera is rotated 360 degree with the help of a dc motor. This camera captures images and then the images are analysed further. The conventional system is based on timer

which poses different kind of issues such as traffic jam and wastage of time even when there are no vehicles on the other side. Emergency vehicles also get stuck due to this. All these limitations and the problems posed by them have led to many ideas as solutions. These includedigital image processing using raspberry pi.

## INTRODUCTION

The daily life is affected frequently due to the traffic congestion and it poses all kinds of challenges and problems. Major disadvantage of Indian traffic is that it is non-lane based and chaotic. So, for Indian traffic we need to design a solution system which is different from developed countries.

The conventional system is based on timer which causes limitations such as heavy traffic jam, wastage of time even though there are no vehicles on other side. Stuck in of emergency vehicles like ambulance takes place.

Becauseof these limitations many ideas are developed. These include digital image processing using raspberry pi, IR transmitters and receivers. For achieving more effective Traffic control system, a system is designed based on Raspberry Pi module.

Camera is rotated through 360 degrees

by using a dc motor. Using this it can differentiate the presence and absence of vehicles in road and signal the traffic light to go red if the road is empty and green when the density is more.

If the maximum time for the green light has elapsed then Signal the traffic light to go red even if there are still vehicles present on the road.

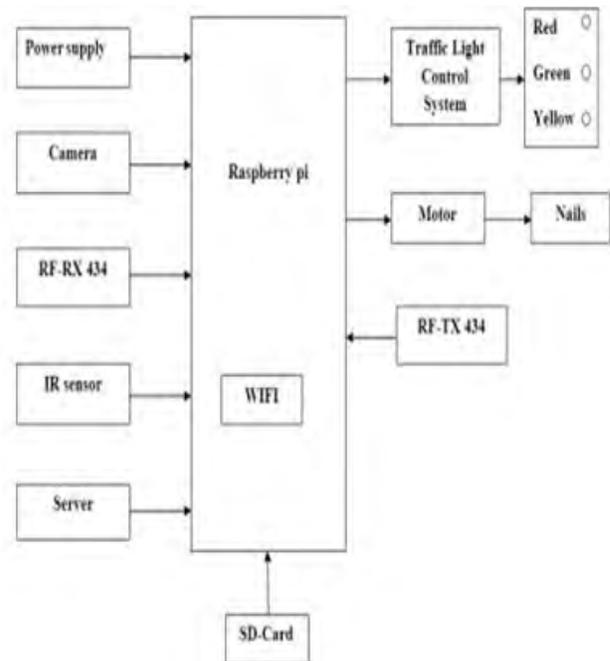
Traffic congestion is a relentless problem in many cities around the world. Congestion means a lost worker productivity, trade opportunities, delivery delays. Traffic lights which are of current technology use manual operating system for the time allocation and also require high maintenance during the operation. This makes more time lapsing and vehicular traffic is increased. This proposed system results in making the traffic less and allow the vehicles based upon the density on the road. The aim of the project is to reduce the traffic in areas where there is a heavy density of vehicles by implementing Raspberry pi operation along with image processing.

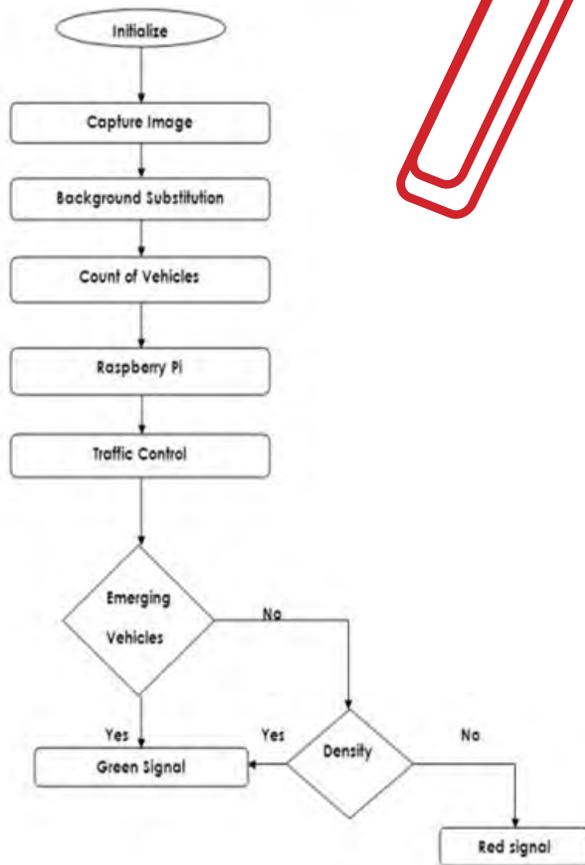
### EASE OF USE

This project aims at reducing traffic by monitoring the vehicles and evaluating the density. It applies various processes and signals the traffic by providing priority to heavy density regions. It also reduces the human effort of the traffic police who manually manages the traffic at times of congestion on the roads.

### METHODOLOGY

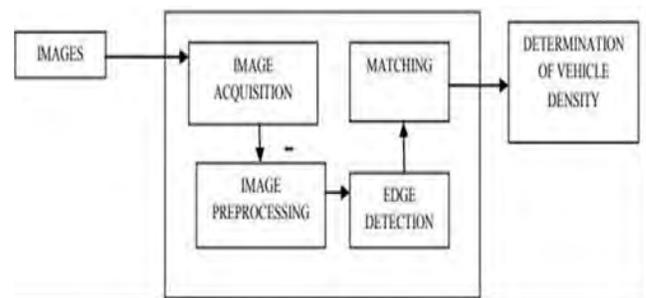
This traffic controller is designed with Raspberry Pi, Image processing using python, Pi-Camera, IR sensor, motor and RF transmitter and receiver. Image processing is performed to convert the raw images into more accessible form. The main component is Raspberry Pi which is used to control all, it acts like a controller. Traffic is captured by the camera and this information is sent to pc. The Raspberry pi is connected to the PC to do the hardware implementation in which it controls the signal using traffic control system. To activate the motor IR sensor is used. The motor with nails is placed below the traffic light to control the traffic when the red light is on. Emergency vehicles like ambulance or any VIP vehicles are also allowed by using the RF transmitter and receiver.



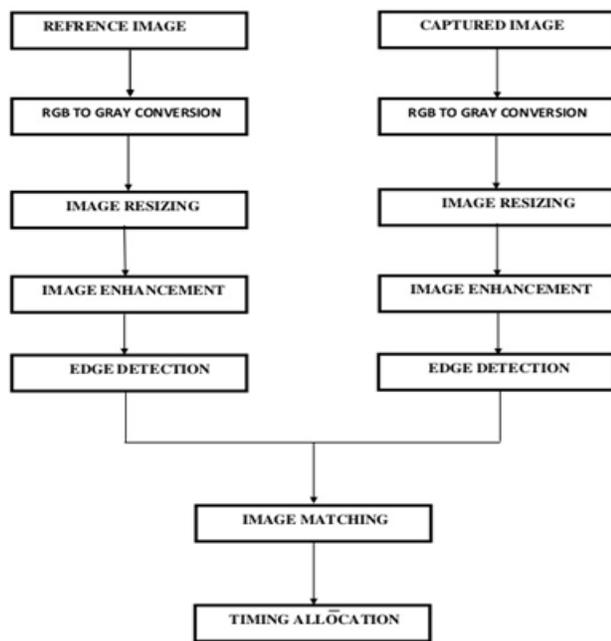


The complete working and flow of the project can be compiled in short as this flowchart. The Functional block of the Density based traffic light control system is shown in the flowchart Here the Raspberry pi 3B+ is interfaced with IR Sensor to detect the vehicles, Camera to capture the vehicles on the road and the Motor which is connected to IR sensor is used to avoid the vehicles crossing the road during red light. Initially SD card is inserted in the Raspberry pi. WIFI module interfaced with in the raspberry pi which is used to connect the PC and the hardware kit. This system proposes a new system for controlling the traffic light by image processing using raspber

ry pi module. A camera will be installed alongside the traffic light. The camera is rotated through 360 by using a dc motor. It will capture image sequences. Using digital image processing The image sequence will then be analyzed for vehicle detection, and according to traffic conditions on the road, traffic light can be controlled. It can be also used for emergency vehicle detection. A tool like VNC viewer is used to connect the Raspberry pi to the system. Server is the system which is named as PC. Nails are connected to motor to tilt when IR sensor detects the vehicle.



In image acquisition, external USB camera is required and Modifications are to be made in raspberry pi camera set up according to the changing Linux environment. The functions for image preprocessing are imported from open cv libraries and is included in final python program. In Edge Detection there is a change in the gray level. The following are the criteria for Edge Detection –There should be minimum number of false edges, noise sensitivity, good localization, orientation sensitivity.



## EXPECTED OUTCOME

This project is expected to reduce the stagnant traffic on the roads and junction. The project will also save time of the people. This project is also designed to replace the old conventional system of timing-based traffic light to density-based traffic light using advanced methodologies. With the help of image processing and Raspberry Pi, a real time analysis of the traffic will be achieved and accordingly the timing for the traffic signals will be controlled and priority for the emergency vehicle will be provided.

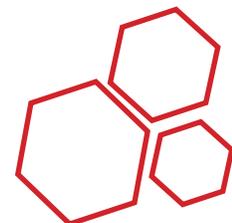
## CONCLUSIONS

Density based traffic control system and emergency vehicle detection shows that there are many ways to implement this task but using image processing gives

traffic congestion in cities, Using Raspberry pi, IR sensor, Camera module, image processing we will design a density based traffic control system . The camera module is installed at the junction of the roads. This gives the count of vehicles on the road, with the help of that count we can control the traffic by allowing the vehicles where the density is more. Emergency vehicle detection is done using radio frequency transmitter and receiver module.

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**INDUSTRY**

# IMPACT OF CORONA

Rahul Rajbhar

Aircraft Engineer, Pawan Hans Helicopter Training Institute,  
Mumbai.

Bachelor of Chemistry, Thakur College, Mumbai.

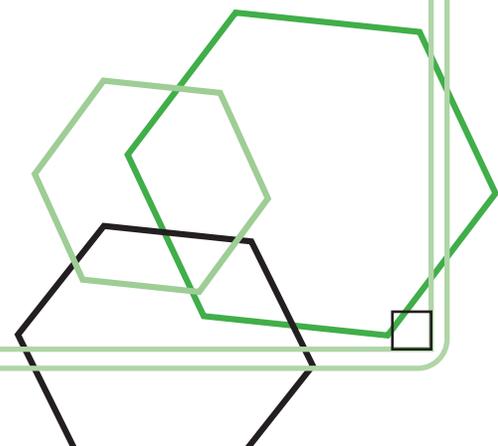
“Impact of Corona”

the papers title, it represents the changes in lifestyle adaptation of new thing, learning the proper use of technology, reviving the economy after crisis and conditions of the hospital.

In India, the lifestyle was happier people can perform any activity without any hesitation or any barrier but after the COVID-19 pandemic, people started to follow social distance among themselves because that is only the way to get rid out of this COVID 19. The government has announced curfew and lockdown on 23 March, it was necessary also for survival and health purpose. The major impact was on psychology because people were not habitual to stay at home .the domestic violence has increased. The alcoholic person cannot stay without alcohol. they started violence toward wife and children in their house. The rumors are also played a major role in the spreading of Covid19.eg gettinging at Bandra station. Even people are afraid to visit mohalla clinic (the residential clinic) because people are not aware symptoms of Corona, but even a clinical doctor cannot differentiate between COVID 19 and common cold .in some cases, the person who is not infected or just infected with a common cold the residential clinic doctor suggested him to visit covid19

center for a test while visiting towards coronavirus center. The person got infected due to the protected atmosphere around the hospital. This is a major problem of this spreading out COVID 19. People also started to immune themselves with the help of Ayurveda and homemade recipes. In the hospital, there are different sections and specialized doctors for different problems. Covid19 is a major disease, so it affected other sections also Doctors of different sections delaying in the appointment because the beds and rooms are not available.

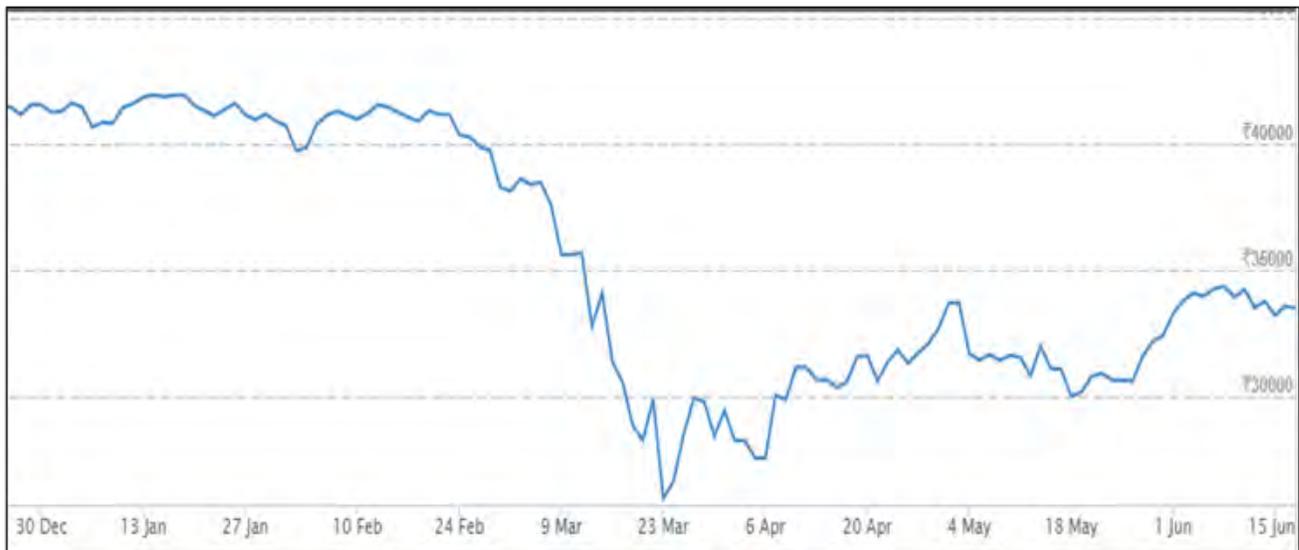
As people are not buying and saving their money during the pandemic period and it is normal behavior of human being toward survival and management of life.



Therefore, it shows an impact on Sensex. the Sensex has touched the bottom line because of the economic crisis. it creates many laws but the other side it the best time to invest in a Sensex. because anyhow Sensex will going to regain itself after sometime .the same economic crisis happened in August 1929 to March 1933 that was known as Great depression. This crisis harmed the GDP and employment at that time same scenario India facing now.

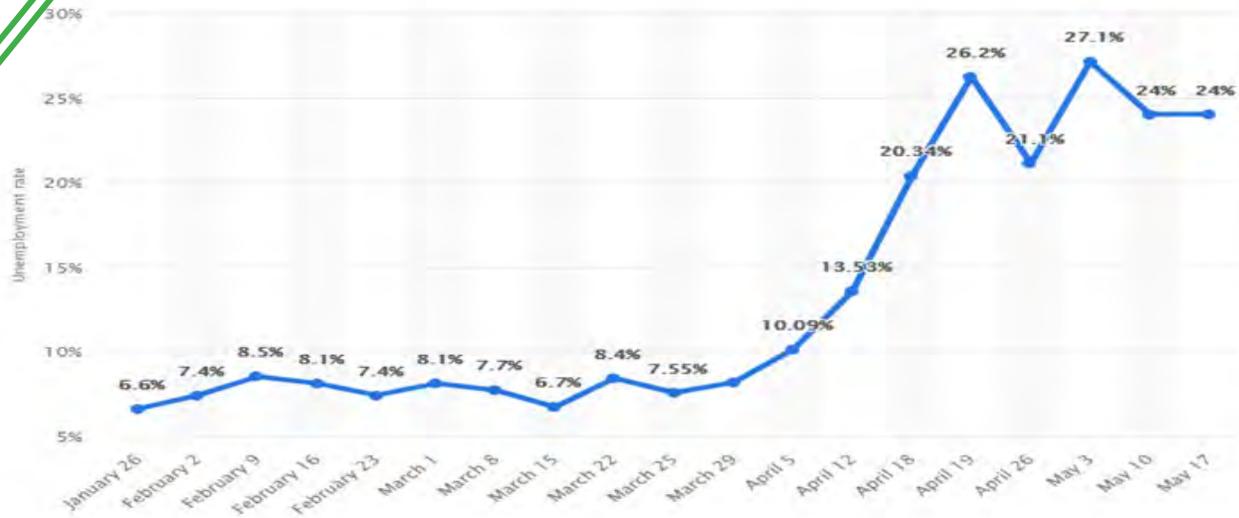
ter sometime .the same economic crisis happened in August 1929 to March 1933 that was known as Great depression. This crisis harmed the GDP and employment at that time same scenario India facing now.

The education system has also developed. The teachers have not to stop there work .they started an online lecture, but teachers are facing problems in that because from the decade they were using chalk and duster to teach. But immedi-



Therefore, it shows an impact on Sensex. the Sensex has touched the bottom line because of the economic crisis. it creates many laws but the other side it the best time to invest in a Sensex. because anyhow Sensex will going to regain itself af

ately they have to adopt a new technology which is a difficult part for them. Industries that are majorly affected are tourism, transportation, daily wage labor, and the farmer. The Indian farmer has a lot of vegetables, grain, and other products to sell .but due to transportation company is not working that's there facing problem and that's the reason why middle class and farmers are facing problems.



Construction has been significantly impacted by COVID-19 such as with sites shutting down, labor shortages, and procurement delays.

With construction workers returning to work in larger numbers as the economy opens back up, companies need to focus on certain areas to ensure a smooth transition back to work such as:

#### Safety:

Companies need to keep the safety momentum that was established during the pandemic going such as:

Maintain some degree of physical distancing.

Keep wearing PPE.

Set-up hand washing/sanitizing stations.

Administrative/design staff could stay working remotely with companies providing them adequate remote work support such as software tools/training.

#### Re-allocation:

Revisit the planning of projects to determine which work is not essential and

re-allocate it to be completed at a later time. This will prevent tasks from being jam-packed together which could help workers keep safe (such as mitigating pressure on workers to maintain distancing) and could also ensure there will be consistent work/cashflow maintained.

Trade-offs will have to be made and risks of completing/delaying certain projects will need to be evaluated.

#### Communication:

As always, having communication is very important to the success of projects. It would be helpful to increase engagement with key stakeholders if contact was affected during the pandemic such as by:

Re-establishing communication with suppliers and manage risks if there are still delay impacts. Look for ways to improve processes or source alternative contacts to mitigate risks of future delays.

Communicating expectations to clients so they are aware of potential decreased levels of productivity. A discussion on any revisions to schedules or cost implications for current or planned projects should occur.

While a quick return to the previous normal still seems to be far off, construction is now on the path to recovery. The new ways of working and the lessons learned can help the construction industry become stronger than it was before.

Here are some steps and actions that companies can look into to emerge stronger:

#### Digital Transformation Adoption:

As more companies look for increased ways to collaborate and work remotely, more tools will be created to increase construction work efficiency and companies should make use of these. Examples of digital tools developed for construction include Procore, BIM, OpenSpace, Disperse, etc.

It is not only important to use digital technologies, but it is just as necessary to properly train staff on how to use the new tools.

#### Focus On Resiliency:

Through lessons learned from the pandemic, contractors and owners will know they have to create better risk management plans to handle unforeseen such as identifying potential supplier delays, forecasting labor usage to help allocate

resources, etc.

#### Cultivate Talent:

With the pandemic forcing workers to stop working, it was evident that construction cannot occur without the skills that tradespeople bring. With talent being one of the greatest assets companies have, they should invest more time and money to grow the skills of its tradespeople.

A growing trend in construction is the aging of the labor force, so by cultivating talent, companies can better prepare for this and mitigate its risks

#### Utilize Off-Site Construction:

Some level of social distancing is expected to continue on job sites, which will make off-site prefabrication practices more appealing. Not only will this help with safety, but it can have increased cost and schedule benefits as well.

#### Increased Investments in infrastructure:

According to a study from Autodesk, every \$1 billion in extra overall construction spending generates an average of at least 6,500 construction jobs, so the government

will want to get planned projects started asap to create more work for people who were laid off during COVID-19. This will benefit the industry as a whole as more projects will be available.

Getting the construction industry back on track is crucial for economic recovery along with undertaking steps to help it come out stronger. The construction industry of the future will transform through this experience and become far more efficient and resilient!

There are many good things happen during this COVID-19 make then he started to revive himself. now due to less air pollution, the Punjabis of some reason can see the Himalayas with the naked eyes the beaches of Mumbai get clean the construction work of Mumbai BMC has completed due to less disturbance of people the family is spending more time together. We can see many true faces of celebrities, great industries, businessmen toward donation, and helping people. The current Pandemic has generated better awareness among the citizens about the need for acquiring and maintaining immunity against infections, through regulated food,

exercise, and simple seasonal preventive medication. The general willingness to follow hygiene rules has also increased. People will also learn the value of saving some cash for any emergency, even if they are daily wage earners.

Though there are many and is all-pervasive, some of the points are given where there will be an impact. According to my thoughts

1. First and foremost is cleanliness. Swatch Bharat. Chewing pan and spitting would get reduced. schools / Roads / Colleges / Offices, etc will maintain cleanliness.
2. Alternate methods of studying and new methodology can be developed. Education can be imparted through Mass media / social media
3. WFH. Companies are designing their offices to enable employees to Work From Home. If the nature of the job does not impact on the scheduled deliverables, companies are now looking for WFG. Companies do save in terms of office space and also reduced traveling for the employees.
4. New Business Development: Alternate methods of businesses and new skills required would be useful in the long term.

5. **Basic Research / Science:** We are too much engrossed in Engineering and hence basic science and research have taken a back step. This would make governments start investing in basic / research in science.

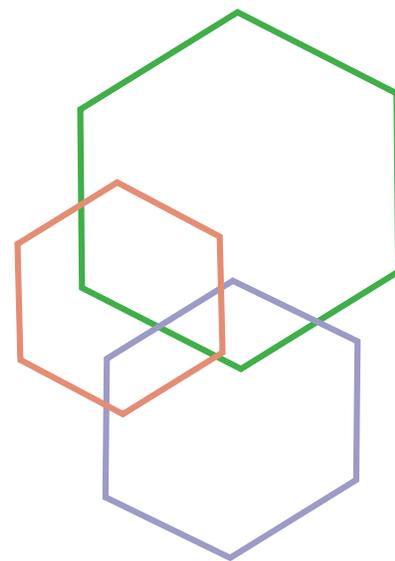
6. **Self-reliance:** Due to globalization, we are depending upon the whole world for supplies. Economies of scale are important. Due to the short supply of medical supplies, now the country is looking for self-reliance in many of the sectors.

7. **Investments:** As a democratic nation and learning from the COVID 19 experience, India would devise a policy of FDI / Industrialization.

8. **Environmental friendly industrialization policy and reduced pollution.**

9. **Opportunity to Promote our culture / methods / Ayurveda / Yoga, etc.** Namaste is now recognized across the world as the best method to greet. This

There are many new announcements done by the Pharma Company. The company claim that the got medicine which cures the corona. But its high-level flu audience. by these thing their company stocks got high and perform bullish in market. The Glenmark Company brought Flairvier which is Flu medicine. Even Patanjali Company sells medicine in name of corona but it is just common cold basic treatment.





# ALUMNI ARTICLES

## *Femtocells in Smart Cities*

Meeting citizens requirements economical-ly and efficiently is the most vital objective of Smart Cities. As a matter of fact, they're considered as key concept for the future of communication technology. It is expected that in future a large range of services are going to be made available for residential users (e.g. intelligent transportation systems, e-government, e-banking, e-commerce and smart management of energy demand), public administration entities, public safety and civil protection agencies so on with increased quality, lower costs and reduced environmental impact. So in order to attain these ambitious objectives, new technologies should be developed like non-invasive sensing, highly data processing, smart grids and mobile broadband communications. Therefore the purpose of this article is to know about the communication aspects of Smart City applications, specifically, the role of the newest developments of Long-Term Evolution-Advanced standard, which is femtocells in a smart city.

### What are Femtocells?

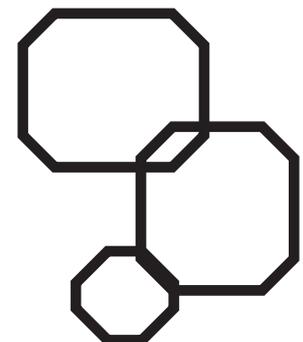
Femto cells are small cellular telecommunications base stations that may be installed in residential or business surroundings either as single stand-alone items or in clusters to supply improved cellular



Rajeshwari Singh  
Alumni, TCET



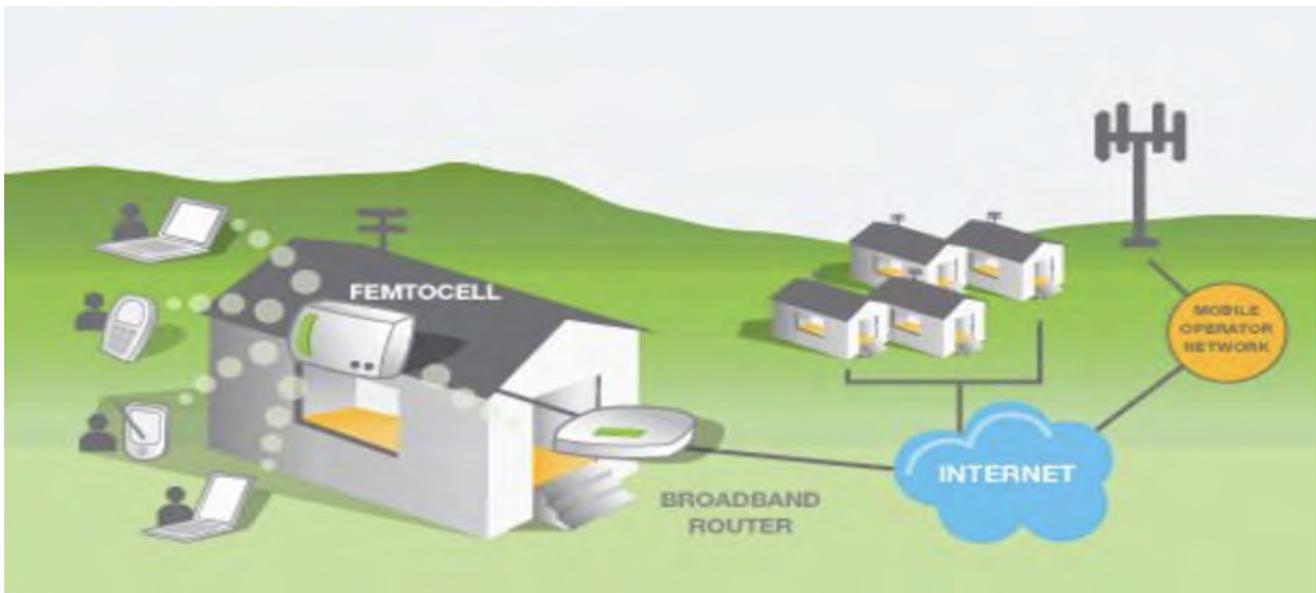
Nokia Femtocell



coverage within a building. It's widely known that cellular coverage, especially for data transmission where good signal strengths are needed isn't pretty much as good within buildings. By employing a small internal base station – femtocell the cellular performance may be improved together with the possible provision of additional services. In recent years, with the rapid increase within the number of mobile connected devices and data traffic, mobile operators are trying to seek out solutions to supply better coverage and capacity for mobile users. In this respect, deployment of femtocells could be a promising solution.

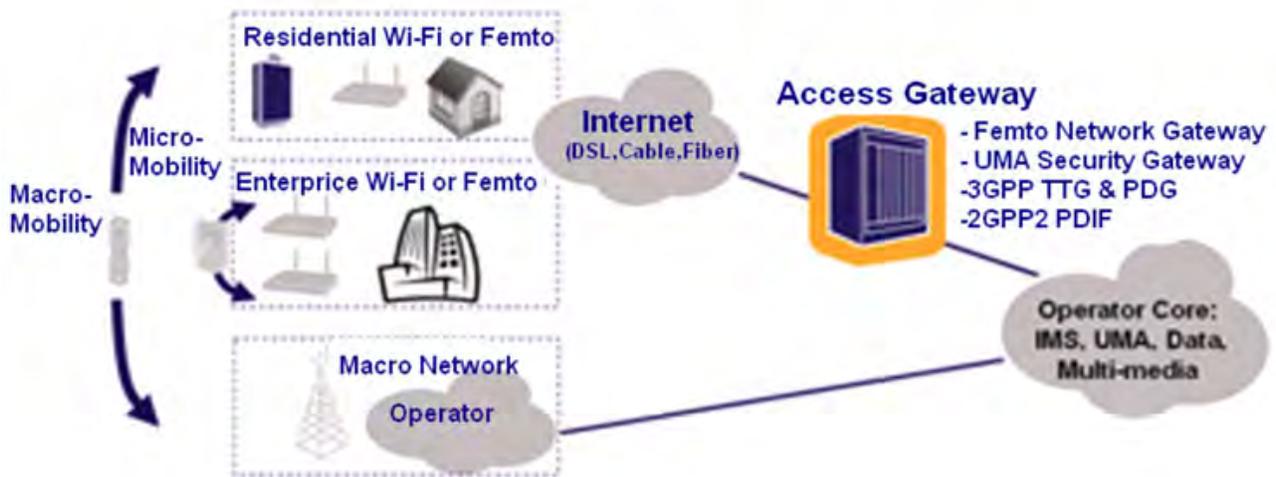
portfolio of residential and small-medium enterprise small cells that caters to the complete range of consumer requirements. Their portfolio offers 4G/5G and multi-standard solutions together with a support of IoT connectivity. The plug and play deployment ensure instant coverage boost with easy LAN cabling.

Small cells are considered as a valuable solution to the matter of ecological sustainability for future broadband wireless access. The concept of a dense deployment of self-organised, low-cost, low-power base stations has been shown to possess the potential of



One example of femtocell is Nokia Femtocell (Smart Node). Nokia femtocell solution enables you to productively densify the networks and achieve greater customer experience in small indoor domain. Nokia has the most prime

significantly increasing the capacity of cellular networks while reducing their energy consumption. In fact, the radio coverage using small cells deployment shall allow a stronger control of the territory and a discount of the

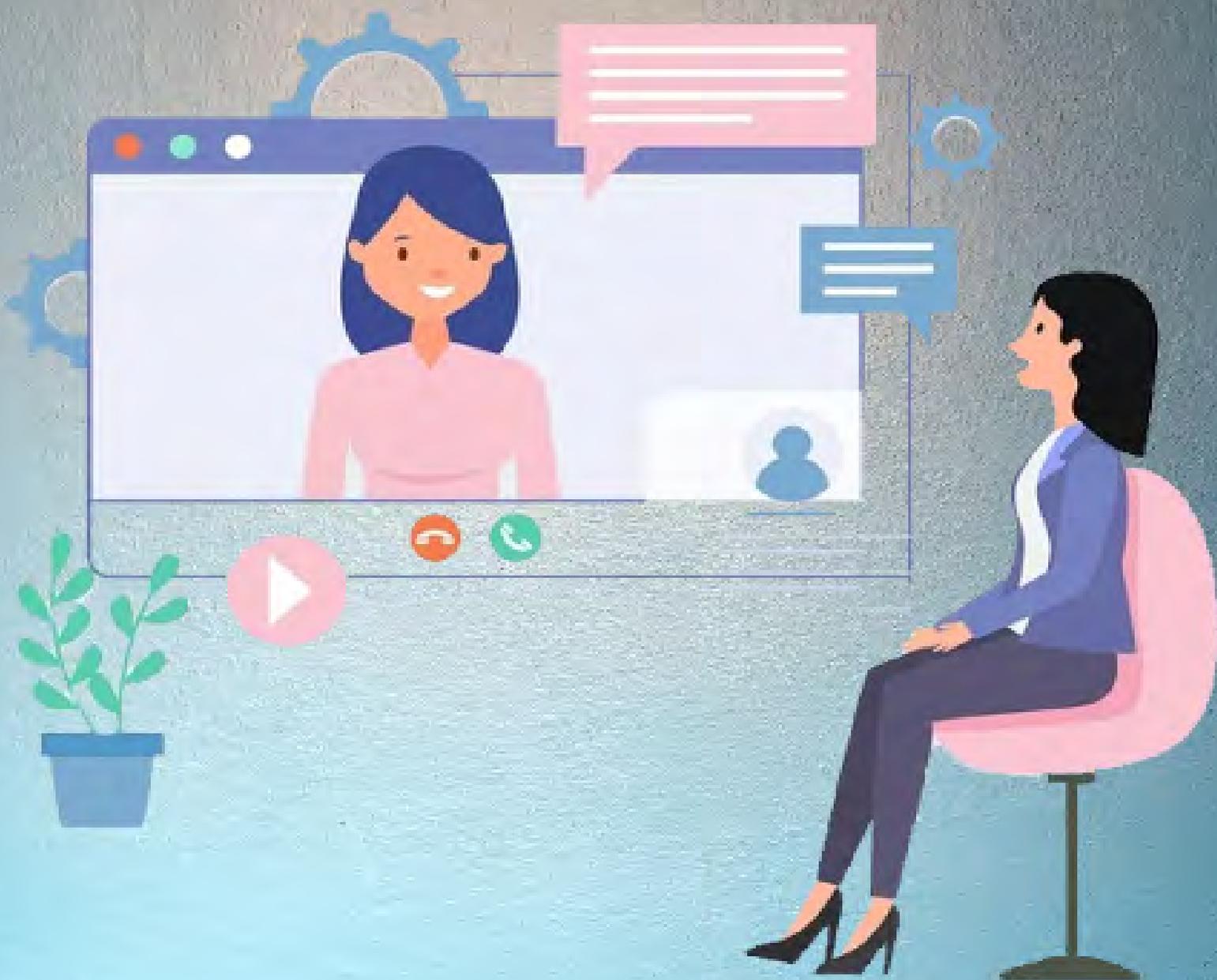


electromagnetic emission in urban areas. The result of this dense grid of cellular coverage shall enable greener services (i.e. cell broadcasting alerts and news) to pick specific urban districts of the Smart City.

#### Why Choose A Femtocell Network?

Even with having limited capacity, Femtocells have certain advantages over other small cell devices that benefit both the house user and businesses alike. Because of their low powered nature, Femtocell implementation is a less costing than its counterparts, and in some situations, can provide mobile users with better cellular connectivity. For smaller locations, or locations that feature many signal obstructing obstacles, Femtocell technology will still be a preferred network solution. Their low cost, low powered nature makes them a wonderful alternative to other larger, costlier small cell solutions, especially of offering Wi-Fi calling, which directly

competes with Femtocell capabilities. Also, as popular messaging applications move more users off from traditional SMS text messaging, the requirement for a reliable cellular connection within the house is likely to still decrease in priority.



# INTERVIEWS

## INTERVIEW 1

Snehal 0:01

Good afternoon to one and all present here and my heartiest welcome to our guest for this afternoon, Dr Priyanka Desai. Welcome ma'am. We have gathered here for an interview session for the Department of Electronics and Telecommunication Engineering of Thakur College of Engineering and Technology

Dr. Priyanka 0:21

I'll introduce myself. Yeah, I have completed my B.E. and M.Tech from Karnataka in Computer Science and Engineering. And later I completed my PhD in Computer Science and Engineering in Information Retrieval, which you can say Machine Learning and; in the process for around 11 to 12 years I was working in colleges and in between I was working as a trainee in iFlex Solutions which is Oracle now, and after my PhD, I was doing online training and I was an Adjunct faculty as an Associate Professor. And after that, and in the process, I was working on content development and for Brain Works infravision market research. And in the process, I was working in India's enforcer from January 2020 to February wherein I was training the data scientists, trainee data scientist and Python machine learning and Robotic Process Automation UiPath and also in automation anyway. So currently I am with arrow cracks, which is also known as IPROSONIC, okay, as a data scientist and consultant. Basically, I'm into consultancy right now, wherein I check what are the requirements.

is also need to be told. So that is what I am doing. Apart from that I have my own kids coding for 10 to 17 years right now, though I also train others. But right now it's going on strong. And I have two levels, level one and level two, level one is basic Python and level two from Python they are taught intermediate and machine learning. These are kids. So for kids, you have to teach in a way that they understand. So that is about me as of now.

Snehal 2:35

Thank you, ma'am, for this introduction, this wonderful introduction. And also thank you for sharing your precious time with us. So we'll get started. Neha.

Neha 2:50

The very first question I had was about your job profile, but you already answered it in your self introduction. So the next question that I wanted to ask you about how has your academic training prepared you for a career in this industry?

Dr. Priyanka 3:05

See academy training, generally you feel you're more towards your Coursera or whatever courses are offered online. But when you go into academics, the basics that are taught to you is incomparable, you know, you might go in for online trainings or others, but you have some amount of understanding because of which you're able to go ahead with whatever is being taught because you know, the basics or fundamentals clear. And apart from that,

whatever seminars are given to you, I would like you to concentrate on the seminars, so that you're asked to give, you know, the topic, select a topic on which you're going to present or going in for your final year project, because that will help you in understanding what you would like to do. And as I said, it's as a consultant, it's not about what you can do, it's about what you cannot do. That is what is mainly required. The research aspect is what will be done in your academics. Okay, though you take it a little lightly, I would suggest you go ahead with that, you know, get into a research mode of whatever you're doing, try to get into depth of the advantages and disadvantages. It's already taught to you but you kind of neglect. That is your focus point when you start. So that's what I would say. I mean, how is academics good in that way.

Aashvi 4:50

First of all, Good afternoon, ma'am. My first question is, do you suggest doing higher studies immediately after graduation or having work experience before doing it?

Dr. Priyanka 5:02

It's always better to have work experience. I went into industry after my master's, okay. So soon after your B.E. if you can get any internship or any kind of work it will help you understand what you understood. Right soon after, if you go ahead with Masters, it will be a little difficult. Yes, sometimes you feel I will be wasting my time. So you want to go ahead, but mostly in the US or anywhere,

if you have your U.G. and an experience, that will definitely count. Because they will know what you have done and in your masters it will help you what you're good at, okay, and where your focus points are and what you will have to focus on and what are your weak points, basically, your strengths and weaknesses are known if you start working. That is what I would say. I mean, that's how it has happened, based on the examples that my brothers and all who have completed their masters, you know, they have had work experience in IBM or other companies. So it's helpful in that way to get a job later or to start something later.

Aashvi 6:24

Yeah, okay. Yeah.

Neha 6:28

So the next thing is what made you develop interest in the field you are actually working in?

Dr. Priyanka 6:35

Oh, yeah, as I said, I told you, right, you know, when you're giving seminars, you try to focus on it. I just liked doing things, you know, having a question of whatever I'm doing. So, I just started writing a research paper on the basic of machine learning. Before that, I was into virtual machines and all that, but it was a very deep topic, and machine learning was catching up. So that is how I started. I started writing papers, and I enrolled

for PhD because I felt, that I will not work on it, unless I have something to complete. So that's the reason you come to colleges, right? Because you have tests. Okay, so you have tests, and you complete it on time. So I thought, let me start my PhD, because that would give me a push to actually work on my research aspect, though right now, I am doing my presentations and all that without that, but initially, that is required. So that is what I would suggest. Do you want anything else? I mean, this is what I would I thought fit in. So were you expecting something else? Okay.

Aashvi 7:58

Yeah. So according to you, what kind of internships should we opt for a better experience of a core subject? And where should we apply for it?

Dr. Priyanka 8:09

Okay, so let's go ahead with how you should apply and then come to the internship part. So first and foremost, is you have to get a good LinkedIn profile of yourself. And in the LinkedIn profile, you can, actually, LinkedIn is catching up a lot nowadays. So and I would also suggest, you know, that would be a later part of the question, but I would add in early here now, in the profile, you can actually work on GitHub. Okay, and Kaggle for machine learning, okay, GitHub, you have Kubernetes and all that for you know, it's cloud based right now, every-

thing is going online, even the network part. So as electronics engineers, I would suggest that so you try to work on that so that you show that yes, this is the real life problem and this is our solution. Okay. So this is one part. Okay. So based on that, try applying to internship. There are some of them there's internship.com which is you know, for India and all over other countries, okay. So since right now everything is software based, okay. So sitting in India, if you're able to get somewhere outside also will be fine. There is one more I think, internmatch and youtern these are not for India, but you can just try out in those also.

Neha 10:35

Next is, what courses do you suggest us to improve our skillset and profile?

Dr. Priyanka 10:43

Your profile? Yeah, since you are into electronics engineering, but right now, everything is software based, it will not be just like we had when we were doing. I have done in computer science and engineering. So, we have studied both computers and electronics, where in we had motherboards and all that we were doing it from basics, we have C Programming only in some part of database. That's not the case right now. Okay. So, I've also taught Digital Communication and since you're really into it, I would suggest you go ahead with that, digital communication.

So, apart from that, you can go ahead with 4G and 5G that is there because you have a lot of call drops happening. So why do they happen you know, how it can be improved. And then you have antennas. Megha Ma'am is there, I think she's working on antennas. So you can be behind it and check out what is good you know, in antennas you know, for software related how it can be done. Apart from that you also have wireless networking, okay. So, apart from this, you're already studying Internet of Things embedded right. So, you can work a little more on it and see how the data that is there can be used for machine learning and AIML, okay. So, whatever Internet of Things data is there, how you can take that data and how can how you can get relevant information from that data, okay. So AIML is also required for you. And I said there is one more, which is since everything is virtual now. So what realization networks are virtual, so you have something known as OpenStack for electronics engineers, so you can note this down OpenStack. So, which is virtualization of network. OpenStack. And the other one, as I said, it's all cloud based. So I told you about Kubernetes. So you can work on Kubernetes in GitHub. Okay, so these are some that I could come up but there will be many, but since you're in third year right now? Or fourth year?

Snehal 13:19

Ma'am, I'm in fact, I'm in my final year and Neha is in third year and Aashvi is in second year. So we are a mix.

Dr. Priyanka 13:25

Okay, so second and third year, it will be really and for y'all because you're still getting into it. So in the third year, you'll have seminar. So second year, if you're in second year, you can also, you know, form groups right now and start working on that since you already have Snehal, she can probably be of some guidance to you as to how to, you know, because as a third year you do not know how to and where to start off for the seminars, okay, you just pick up some random seminars and you just want to get it done and get the marks. Okay, so don't do that. So you can take some guidance from your seniors to actually work on that is where seniors help, okay, if they don't help then, try to figure out how they can help you. So where in which to select if you really want to work on and then you can go. Anyway you have GitHub and Kaggle wherein you can start working on. That is already available, you just need to log in, create your data and lots of data is available, a lot of solutions are available and a lot of data is available for which you can get solutions. So how to go about, that is where your professors and your seniors will be of help.

Aashvi 14:47

Lastly, ma'am, can you guide us about overcoming the upcoming challenges in the industry due to pandemic situation?

Dr. Priyanka 14:55

So due to pandemic actually. Yeah, yeah. Okay, so for that, first and foremost, I had asked you to upgrade your skills, which I'm also doing. I learned only C programming and databases as a student. But right now I'm doing a lot of things. So your academics, as you said, one of the questions, will you know, push you to push you to the boundaries where you have to do things on your own. We never had seminars in our UG, we had seminars in our PG, okay. So those things are being given to you. You will have practical oriented approach in the teaching learning right now which is happening as I've got to know. It's not just theory. Theory and practicals are being taught to you together, which is not happening even in the best of the colleges. I heard about bits Misha, wherein they're still not doing their practicals they have been taught theory. So it's not about the College, where you're going in from, it's about your mindset, basically. So the pandemic is just a situation. Okay, so there will be another situation if not a pandemic, right. During our time 2000 was a slowdown, 2009 was a slow down. Okay, so it was not pandemic, but they were slow down. Okay. So one thing I would suggest is keep merging.

And apart from that, you can upload and write papers also, apart from the GitHub and the Kaggle that I just mentioned, you know, whatever you have tried to find out, okay, so the positives and the negatives is what is required. What are the advantages? And what are the disadvantages. Take help of your professors who are already writing papers. Write papers, so that it's not only about the practical approach, but you know, the theory part also of it, okay. So these are some of the things, basically keep yourself positive. Okay, be positive. So the pandemic, if not for pandemic, that is some other issue. So you will have to change, you will have to change yourself, otherwise you will become obsolete. So, 2014 is when Python in machine learning actually started gaining momentum. Okay, so you are still in 2020. So you're just six years down. So you have a lot of data until these six years where you can find which is good for you what data you're using. So that is what I would suggest if I yeah, yeah. And yeah, one more. This is basically you're just asking about the job perspectives. But not everybody will just go in for a job. You also have to be having an entrepreneurial mindset, which is basically been done in most of the IITs and the NITs. Okay, so you will have to have an entrepreneurial mindset as to where you're good at and what is the job market? Okay, what is current job market? How are you going to change it?

Snehal 20:28

They might, they might have attended your webinars, but I attended one, where you came in to, during this pandemic, the holistic development thing had happened. And it was an amazing webinar. And we are looking forward to more webinars that you will be sharing with us and a lot more information. So thank you ma'am.

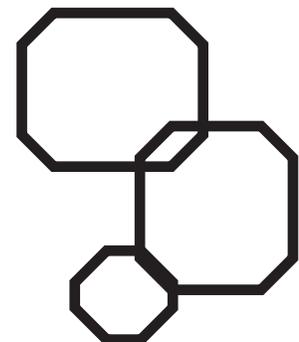
Dr. Priyanka 20:53

There is one question that you missed out. And I think that is also important. Professional ways, this is the expression you miss out. Okay, so for your whatever questions you asked, one is you have to be positive. And you have to gain more expertise to be an expert. Select one or two topics, some topics can be merged together. So first select one topic, second years, basically, and the third years, select one topic, which you're good at. And as you go ahead in the third and the fourth year, then you can see you know, how two or three topics can be merged, how you can gain expertise in those topics, and identify what you have, okay? And if you're not able to work in what you love, then love what you're working at.

Okay, so it's either as you'll have to come up with one of the solution, either love something and getting there. If you're not able to wherever you're getting, you start loving it and you will change. I never wanted to be a teacher. But yeah, so when you start doing something, you will have to love it. So that is one thing and manage time perfectly. Try to find your strengths and weaknesses. And last but not the least, there is no perfect time to reach your goal. Okay, I wanted to be in industry I started after I was 30. Yeah, I was in when I was 28 or 29 working in Oracle. But due to the timing constraints in Mumbai, I thought teaching would be better. So there is no you know, you can always hope and work for it will happen. And then if you want to go there or not, that's a different thing. You can again shift back to where you started.

Snehal 22:56

It was really great talking to you. Because, we never get this opportunity to gain so much information, and we are glad we are in this committee, magazine committee where we get to interview such people. So thank you. Thank you for coming, ma'am.



## INTERVIEW 2

Mr. Swarnim Gupta

So, hi, my name is Swarnim Gupta. I am working as a manager for additive manufacturing at Eaton. I did my bachelor's and master's from IIT Bombay in mechanical engineering and manufacturing and then joined Eaton. I have been working there for last 10 years now. Mainly worked on new product development, research and design. So that are the core areas in which I have worked on. My hometown is in Rajasthan, Kota. That's the three cities I've lived in Kota, Mumbai for education and then Pune for job.

Sonal

So we can go ahead with the questions. Sir, this is Sonal. I will be asking you a few questions. So can you tell us more about your company?

Mr. Swarnim Gupta

Okay, so, Eaton is a US based MNC. A \$22 billion industry started more than 100 years ago. Started with axle manufacturing for trucks, slowly ventured into new products, some developed internally, some developed by acquiring new companies. So, in all its right now into two main business verticals called as electrical sector and industrial sector.

Sagar

Okay, so this is Sagar here. So I would like to ask, how has your academic training prepared you for a career in this industry?

Mr. Swarnim Gupta

Okay, so only a couple of things here. One of the things is, of course, all the textbook knowledge that's there. Definitely, it helps you gain the basic fundamentals of working of things. Once you know how some something works or something fails, you can always add the same notion to something other. When it comes to designing a vehicle transmission or a fuel system, you would apply the same theory. So that theory becomes really important, really critical when you are trying to get into any industry. I'm pretty sure the same applies to any other streams also, its what my friends tell me. Second thing was also about how you take college life in general. So if you are talking about extra curricular activities or anything else that you have participated in, you, by default, learn something additional. So it's not because you had participated that there will be soft skill development, but even if you are part of it in any sense, so even in organizing or otherwise participating or anything associated with any event or activity that you do, you get to learn something.

And that helps you. You will not even realize, but you would gain some skills. And another good thing about my college specifically, some of the professors were into open book tests. I really loved that. Because there were no solutions to it. The we did not have any clue what the professor was asking in the exam. But the good part was you then suddenly start linking all the theories together, because those questions usually had all the theories associated. You would have to apply multiple fundamentals that you have learned in the classroom on the same problem. And that's when you start realizing, okay, engineering is a lot more than what you really read in books. That's my answer.

Sonal

What are the professional goals that you have set for yourself in the future?

Mr. Swarnim Gupta

Okay, tough one, because that's the clarity that everybody wants to have, but nobody has. Right out of college, I was like, okay, I want to be the head of an organization and do all the new product development and have multiple patents and stuff like every young and energetic guy, everybody has that. So I'm pretty sure all of you also have some of the other goals like those. But when you start working, you start realizing a lot of things. There are many factors. One is of course, your own hard work.

I still have the vision in mind that okay, I want to find an organization where numerous development happens. But the timelines will always be flexible, you have to move from point A to point B. It might take one year for somebody, it might take 10 years for somebody else. And there are multiple factors. There are things in your family, there are things in your office, there are things in your city, that impact how you grow and what you can do. So be ready for all the shocks and setbacks, but still have that vision in mind maybe somewhere close to that you will end up

Sagar

So what made you develop interest in the field that you are working in now?

Mr. Swarnim Gupta

Okay, so again, like I said, new product development in engineering, I used to enjoy. Even in my college when I said participate in extracurricular activities. If you ever seen any of the Tom and Jerry videos, you will see that the Jerry would just move and then one thing leads to another to another to another, and then that domino effect is seen. So that was something that I always enjoyed. . To be honest, I always thought okay, how precisely do you have to make things move so that this thing can work? That curiosity is still alive. If there is any machine or if there is any product that I've seen, I really love to see how is it working?

Sonal

Sir, can you guide us about overcoming the upcoming challenges in the industry due to pandemic situation and the current COVID scenario?

Mr. Swarnim Gupta

Okay, so, a couple of things you have to be aware of. One is what industries will be up and booming because of the pandemic and how does it fit in the overall trend in which the market is growing. The second thing you have to be aware of is how you work. So, first thing first. So, there are always multiple articles you can find easily on the web. There are companies like McKinsey, which published some of these mega trends or the industry trends. For the next 10 years, which industry is going to boom and what is the CAGR- Compound Average Growth Rate. So how fast is the industry growing? That's the growth rate of the industry, you might want to have a look at that on a periodic basis. The technology that works on additive manufacturing, 10 years down the line, everybody said it's promising, but it's not here today. So 2000 to 2010, everybody said the additive is promising, but it's not implemented everywhere. 2020 additive manufacturing has arrived, and it still has a potential growth. So similarly, there are multiple trends and technologies. People are talking about Internet of Things, Industry 4.0, these are things of today now.

But people are also talking about how everything is digitized. Everything is digitalized, even Amazon, and everyone is talking about drones and stuff like that. Cloud computing was a thing of the future earlier. Now. It's already there today. So there are many more trends, however, look, understand which one is growing, which one is not growing, specifically with regards to your interest areas. If you're interested in core mechanical manufacturing, that's a different story. If you're talking about communications, that's a different story. If you're talking about computer science, there is a different field in which is evolving slowly. So you will find those, and you should be ready and upcoming with that, like the science is at the peak right now. I mean, it's almost reaching the peak. So if we can develop some of the skills in terms of data science, or our programming, or Python, or whatever, you might find yourself relevant to the industry today. Second thing is also in the same factor is where is the industry going tomorrow?

Sagar

Okay, so the next question was, what courses will you suggest us to improve our skill set?

Mr. Swarnim Gupta

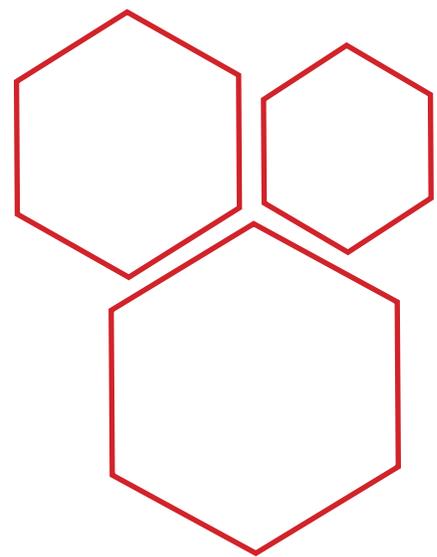
Like I said, look at the trends where the industry is going. Look at the industry in which you want to go then. So you want to get into communications industry or telecommunications, specifically

5G is something that people are talking about now. Do you really want to know what are the 5G technologies? And then think about everything? Who makes the hardware for 5G? who make the software for 5G? Or how is the signal transmission happening in 5G? Why is it different from 3g or 2g or 4g? Think about all those questions. Don't just look at one specific technology and stick to it. Always look at the adjacencies. What are the things affecting it? There is a very nice book called The Wide Lens by Ron Adner. The book actually talks about this thing only, that you can talk about any technology, but there is an ecosystem around it. So for example, even if you talk about data science, or cloud computing, do you even have the servers? That will become the first question? Well, all those servers would need uninterrupted power? Who is providing that? What is the reliability of those servers? How is the communication channel? Are those fiber optic cables or proper old broadband channels? Or how's the communication happening? If that is happening? How reliable is that? Then? Where is the data coming for cloud computing? Who really wants it? Is it automated? Is it something that somebody has to manually sit in and code? Now there are thousands of such factors for just a simple term called cloud computing. Or now, even 5G will become a part of it. Because that means faster communication channels.

That becomes crucial. And that is where you really have to work on. So just pick an industry, find out what skills are needed there. And then we're seeing what all relevant courses are. This is something that you will have to keep on doing again and again. Every 10 years, you will have to forget everything that you have learned and start doing something new.

Snehal

Thank you very much for joining us today. We were enlightened by all the stuff that you told us and we got to know a lot about the industry. We are certainly very new to this kind of conversations, because we hardly get to speak to any of the people who are working right now. And it's really been a great session.



# REVIEWS



"The articles in our department magazine are quite informative and definitely beneficial for the students."

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**Vedhadshree Naik**

"The design and theme of the magazine is worth admiring."

---

**Mukul Gupta**

"The interview section will help us to stabilize in the industry."

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**Jaihind yadav**

"I would like to congratulate the whole team of Abhivarg to make this magazine a complete and beautiful one."

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HEAD OF  
MAGAZINE  
COMMITTEE

*Ms. Neha jaiswar*

CURATOR  
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*Ms. Anupama hasurkar*

CHIEF CURATOR

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HEAD OF DESIGN



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*Mr. Shivshant Singh*

CHIEF CURATOR

*Mr. Sagar Chitre*

IN-DESIGN  
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*Ms. Harneet kaur*

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CURATOR  
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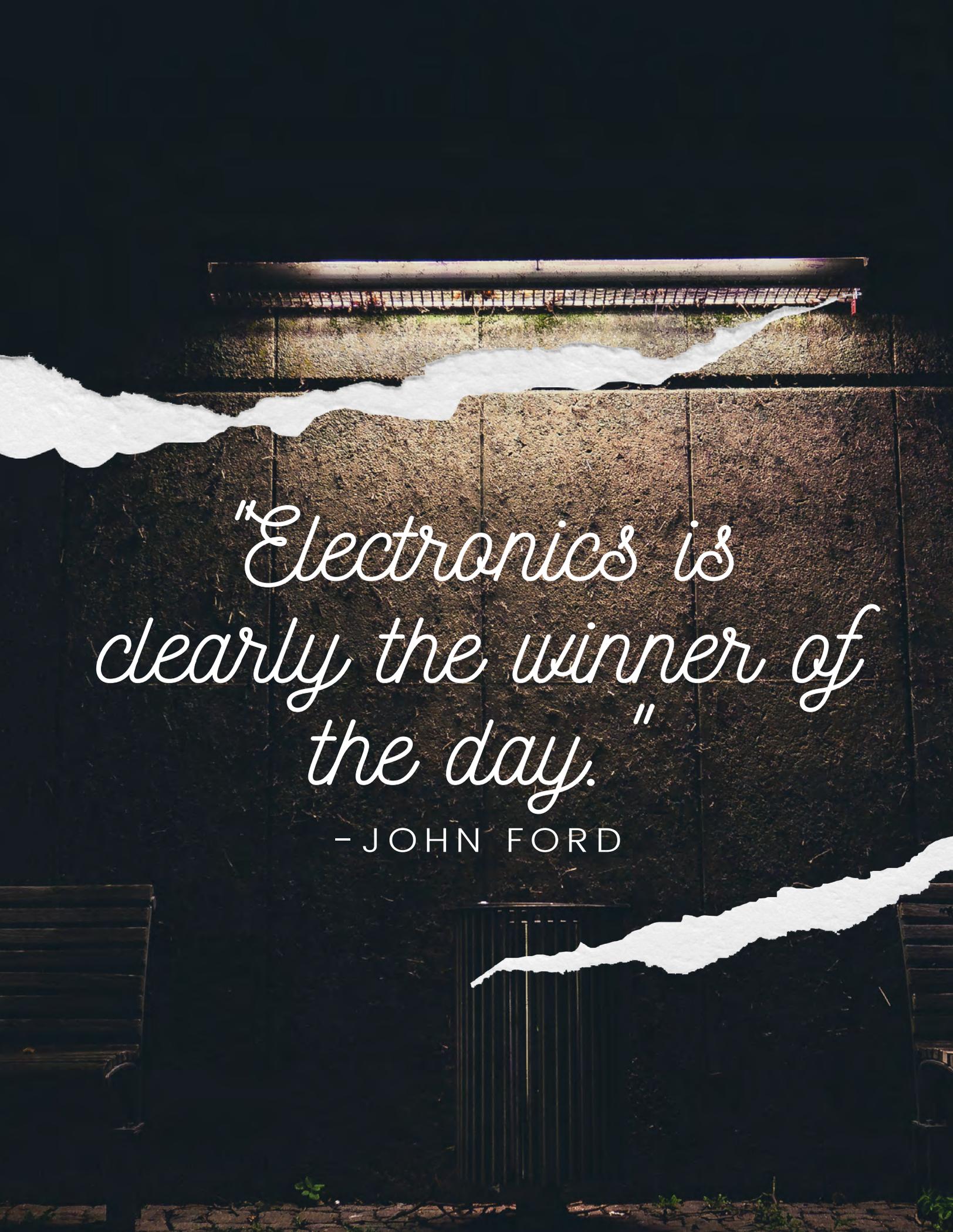
*Mr. Harsh kudtarkar*

WEB MASTER

*Mr. Vikas lodh*

IN-DESIGN  
AND  
SOCIAL MEDIA  
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A dark, textured wall, possibly made of stone or concrete, with a horizontal pipe or vent at the top. A white, torn paper effect runs across the middle of the image, creating a jagged, irregular shape. The text is overlaid on the wall.

*"Electronics is  
clearly the winner of  
the day."*

- JOHN FORD