

# ElectroNation

“ BE The **BEST** version  
of **YOU** ”



**ARTIFICIAL  
INTELLIGENCE**

*Hype Or Reality?*



**SPECIAL  
PROJECTS**

Alumni Interview



**New** research in  
**Electronics**

**SNJB'S KBJ, COE. DEPARTMENT OF ELECTRONICS  
AND TELECOMM. ENGINEERING , CHANDWAD.**

**Editor**  
**Prof. Memane S.B**

**Co-Editor**  
**Mr.Mrunal Dilip Wagh**  
**Miss.Shubhangi Suresh Bafna**

# Electronics & Telecommunication

## Vision of the Department:

To prepare Electronics & Telecommunication engineers for the benefit of the society.

## Mission of the Department:

- M1. To provide quality education to students.
- M2. To enrich the skill in collaboration with industry for better career opportunity.
- M3. To inculcate ethics, values and environment awareness

## Program Specific Outcomes

- PSO1. Apply their skills in designing, implementing and testing electronic systems.
- PSO2. Demonstrate proficiency in use of modern electronic design automation (EDA) tools.
- PSO3. Communicate and work effectively as individuals and as team members.

## Wipro 3D

Bengaluru: Wipro 3D, the additive manufacturing (AM) business of Wipro [NSE -1.64 %](#) Infrastructure Engineering (WIN), have jointly with the Indian Institution of Science (IISc) have developed the country's first industry grade metal additive 3D printing machine.

This 3D printing machine works on selective electron beam melting technology and offers higher build rate, better thermal management, higher part density as well as superior mechanical properties, said the company .

The machine's benchmarking is underway and likely to be completed in the near future, said the company.

"The country's first Electron Beam melting powder bed fusion 3D printer, symbolizes Wipro 3D's constant effort to indigenise, expand and industrialize additive technology," said Ajay Parikh, vice president and Business Head, Wipro 3D.

Even though metal 3D printing is still evolving both in India and global markets; the country is emerging as a player in application engineering for 3D-printed components and systems. For instance, Wipro 3D is engaged in building certain aerospace components for India, including a thruster for a satellite engine.

Aerospace and defence sectors have seen use plastic 3D printing in the country. Apart from Wipro 3D, Gas Turbine Research Establishment (GTRE) 3D printed a plastic replica of the Kaveri engine, engine model and is exploring making components using additive technology.

"We are impressed with the speed that IISc has achieved working with Wipro 3D, to execute the project, for such a cutting edge technology development programme. We commend Wipro 3D and IISc for participating actively in nation building exercise. We expect IISc and Wipro 3D to keep maturing the platform as we go forward so that it can compete globally," said A R Sihag, secretary, Department of Heavy Industry (DHI).

Anurag Kumar, Director, IISc, said he was "happy to see its collaboration with Wipro 3D culminating in this product development".

**By- Dr.Agrawal.R.K (HOD  
Depart OF E&TC)**



One day we can expect to see brain implants for perfect memory, superior vision, hyper-normal focus and more (Credit: www.wsj.com)

## Microchip Implants

Defense Advanced Research Projects Agency (DARPA), an agency of the United States Department of Defense, has developed cyborg insects that can transmit information from sensors implanted into the insect during the pupal stage.

The insect's motion is controlled from a micro-electro-mechanical system (MEMS), and it can be used to survey an environment or, say, detect explosives and poisonous gases.

Recently, microchip implants were embedded inside the human body, acting as unique lifetime identifiers.

A human microchip implant is an integrated circuit (IC) device or radio frequency identification (RFID) transponder encased in a silicate glass and implanted in the human body.

The RFID microchip is basically a tiny, two-way radio, roughly the size of a grain of rice, capable of storing digital information.

The sub-dermal implant typically contains a unique 16-digit identification number that can be linked to the information contained in an external database, such as personal identification, law enforcement, medical history, medications, allergies and contact information.

This technology makes it possible, among other things, to instantly verify and confirm the identity of a person.

An RFID implant is capable of holding all the information usually carried on visiting cards. It can transmit this information as one walks through a security checkpoint.

### Benefits of using microchip implants

The microchip implant can become a very useful tool, especially in emergency situations where instant access to the right medical information can mean the difference between life and death.

Here are the various advantages of using implants:-

Easy accessibility to medical history - Implanted microchips are useful for patients, particularly those suffering from diabetes, cardiovascular disease or Alzheimer's disease.

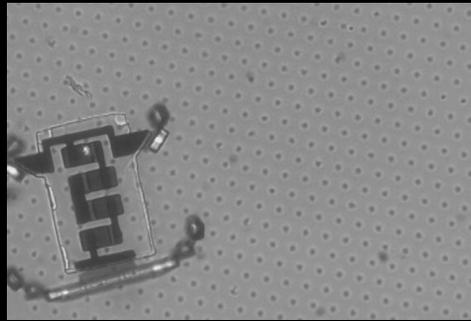
Easy identification - Passports, driver's licences and so on, which are often used for identification purposes, are increasingly containing microchips. For example, passengers can be identified at an airport by scanning the microchip in their passports.

Institutional memberships and access control - Implanted microchips are convenient and practical to use in workplaces, hotels, gyms and anywhere else where identification is needed to grant access and make payments.

Easy tracking of persons - This is useful for keeping tabs on persons such as patients, children and criminals.

Ability to automatically control many devices - An implanted microchip brings a digital identity into the real world by providing the ability to automatically control a large number of devices and equipment.

By-Mrunal.D.Wagh (TE E&TC)



## Silicon Nanobot Swarms will be coming soon

Swarms of nanorobots, usually referred to as nanobots are the stuff of science-fiction movies.

They're getting closer to reality as tiny, insect-like electromechanical "creatures", being created and evaluated.

Wirelessly powered and controlled using silicon photovoltaics, a research team employed a voltage-controllable electrochemical actuator to create their "walking" nanorobots.

Taking advantage of IC-production techniques, they can create over one million functional units in a single production pass on a single 4-in wafer..

These silicon nanorobots move as their bilayer legs are actuated by a few hundredmillivolts, which are generated from a laser shining on their integral solar cells.

These walking nanobots are both wireless powered and controlled using embedded silicon photovoltaics.

The robots "walk" using a new type of voltage-controllable electrochemical actuator fabricated from nanometer-thick membranes on a platinum base.

Their bodies are rectangular skeletons of glass about 10  $\mu\text{m}$  by 70  $\mu\text{m}$  and topped with a layer of silicon.

The legs, about 100 atoms thick, are built as two layers, comprising platinum applied via atomic layer deposition topped with titanium.

The researchers also etched electronic-control components and either two or four silicon solar cells into the body.

## Google Launches Its First-ever AI Chatbot

Chatbots are being adopted rapidly by many organizations to help personalize better user-experience. It provides an optimal solution using which multiple people can be connected at a time in a single domain, via textual interaction. But still, these AI Chatbots aren't so well mastered to answer each question of the users. And, these flaws might even set back the software towards its rubble.

At this crucial point, Google's first-ever chatbot "Meena", plays a major role. However, the search-giant isn't hurrying to foray the tool into the market, until it completely gets satisfied with the software's test proceedings.

Meena, First AI Chatbot By Google

According to Google, the new chatbot has been tutored over 341GB innumerable social media conversations. So, users won't have to wait longer, as Meena will answer your different queries in seconds, via texts. The AI software features 2.6 billion of the parameter, responsible for an end-to-end instructed neural conversational model. Unlike other chatbots, Meena can ably process realistic and major conversations with the users.

But a few researchers claimed that Meena has flaws after being subjected to the-- Turing Test (a process by AI to find out whether a computer can think like a human or not). However, Google addressed the issue immediately, by testing Meena with its own-developed metric, SSA (Sensibleness and Specificity Average).

After testing, surprisingly Meena bagged 79% score, which is way too much, during the testing scenario. Once, the software is completely tested, the score is likely to touch even 100%.

Meena could be released as a demo to the general public domain, only after Google is completely ensured that the chatbot is devoid of any limitation. Google also understands very well, how billions of users trust its secure services. So, at any cost, the search engine wouldn't want to land into trouble with its first-ever AI chatbot's security flaws.

#### What Is A Chatbot

A chatbot is a machine learning language or software that uses AI, letting textual conversation with humans, via a live chat interface. It is being used in apps like Facebook Messenger, WhatsApp, Slack, WeChat, and more, and since then textual interactions with users have become a lot smoother.

With this AI software, many firms remain connected with their customer base 24/7 hours.

**By-**  
**Prof Memane.S.B**  
**(Depart.Of E&Tc)**

## Learning Styles with Technology can Help in Improve Learning and Students Engagement”

**The days of the “one-size-fits-all” educational model are receding into the past. Today’s teachers have more tools than ever before to meet the diverse learning-style needs of their students and engage them both inside and outside the classroom. Integrate technology and learning styles.**

I think I’m part of the last generation that remembers what it was like to live without computers.

### **Leaving the past in the past**

We’ve come a long way from the days of once-a-week, forty-minute computer exposure. Today’s school kids are born with automatic digital intuition. They eat, sleep, and breathe technology in all shapes, sizes, and colors, which has led schools to revolutionize their teaching methods and embrace digital applications as their budgets will allow.

### **Learning inside and outside of the classroom**

According to researchers, one current teaching and learning trend is the technique of “**Blended learning**,” which is the practice of combining traditional teaching with computers. “**Flipped classrooms**,” a more specific sub-category of blended learning, provide the opportunity for the classroom to focus on assimilating learning rather than the delivery of information, which can be accomplished by:

- 1] Assigning interactive quizzes and online collaborative projects at home
- 2] Assigning videos and lectures to watch at home and using class time for hands-on projects
- 3] Putting the majority of curriculum online and working in class with students one-on-one

Whatever method teachers choose, “the best example of blended learning programs is to, “involve teachers who use home-time online discussions and collaborative projects as fuel for content and discussion in the classroom.”

### **Having tools for every style**

One major benefit of using technology both inside and outside the classroom is being able to meet the needs of students’ individual learning styles, particularly for those students with unique needs, such as non-English speaking students and those with physical/learning disabilities.

A document from Little Wound School, “Learning Styles and Technology,” states that teachers who provide for diverse needs and learning styles vary the subject matter, tools, and materials their students use; this method increases opportunities for learning by using various media to teach ideas and information.

**“Learning Styles and Technology” lists four ways technology improves individualized learning:**

- 1] Students can interact with the technology at their own pace and review material when necessary to aid understanding or memory.
- 2] Computer-based tools help students develop their visual, kinesthetic, aural, and oral skills.
- 3] Students with physical disabilities can use computers with adaptive devices so that they can participate fully with their classmates.
- 4] Computers help students transform data from numbers to graphs or translate words from one language to another.

**Meeting the diverse needs of our students**

The days of the “one-size-fits-all” educational model when the main use of computer technology was just to entertain elementary school kids are receding into the past. Today’s teachers have more tools than ever before to meet the diverse learning-style needs of their students and engage them both inside and outside the classroom. As blended-learning continues to grow and more schools are provided with technological equipment and capabilities, the more opportunities teachers have to develop their students’ knowledge and skills and improve learning outcomes.

But never forget that every coin has

**By,**  
**Prof. Bamb K.K**  
(Dept. Of E&Tc)



## Reducing Power-Supply Voltage Drop on PCBs

Today's printed circuit boards (PCBs) can draw a significant amount of current, in the range of 50 -100 A. This result in large IR based voltage drop. The layout designers must consider this loss when laying out the circuit tracks and placing the supply with respect to the load. For reliable working, it is necessary to ensure that such drop should not lower the supply at load end below the minimum required value. This drop depends only on the current and resistance of the track. That means, a 12-V supply sees the same loss as a 5-V supply, but the loss is greater at the lower supply voltage. As an illustration, 1-oz. copper track which is a 10-cm long, 1-mm-wide can have a resistance of around 50 m $\Omega$  (the resistivity of copper is  $1.74 \times 10^{-8} \Omega \cdot \text{m}$  at 20°C). Standard "1-oz." copper means it weighs is 1 oz. per square foot on a PCB laminate such as FR-4. In case, 15 A current is flowing on such track then, the IR drop is about 0.75 V, which is large amount. This results in lowering the dc rail at the load by 0.75 volt than it is at the supply, and also causes the I<sup>2</sup>R power loss with accompanying heat dissipation.

Technique to reduce IR Drop

- Use a higher-voltage dc supply (48 V), and then use multiple local, dc-dc converters placed near the loads. This solves the IR drop problem and greatly reduces noise pickup as well, but costs more ( dc-dc converters and PCB real estate}. It's a widely used and effective solution.
- Doubling the thickness or doubling the width of track halves the resistance, but adds to the cost & weight.

Use a stand-up busbar, to provide the power. The thick bus bar provides a low-resistance dc path. Busbars can make IR negligible while requiring almost no board area. They stiffen the PCB against flexing, which is a consideration with larger boards or for those in vibration environments.

By-Dr Agrawal.R.K  
(HOD Depart. Of E&Tc)



## Electric Vehicles: Scope/ Future in India

Review: In 2001, a Bangalore-based automobile firm called Reva Electric Car Company launched the first electric car in India called Revai. The company acquired by Mahindra and Mahindra and renamed Mahindra Electric. Still, now, the third-largest automobile company in the country hasn't made a significant impact in the EV space. The other top manufacturers, like Maruti Suzuki, Hyundai, etc. are planning to debut their EVs soon. But it's too early to judge whether Indian consumers would adapt to this new change. Pricing always plays a significant role in any industry, and the EVs are not an exception. But the companies manufacturing the electric vehicles face two major issues – Battery and Charging stations.

All the electric vehicles launched now costs a lot compared to petrol/diesel vehicles, and the primary reason is the battery cost. Till 2012, the Li-Ion batteries cost around \$600 per unit, and it has been reduced to \$250 now. Though it's projected to reach as low as \$100 by 2024, when we see in a broader view, the cost to manufacture an EV would still be high. The reason is pretty apparent as there are no sizeable Li-Ion battery plants in India. However, there's a new project undertaken by Bharat Heavy Electricals to invest a massive amount on the Li-Ion plant. Still, it might take a while actually to see the Indian-made battery for EVs. As of now, China has been the pioneer in manufacturing Li-Ion batteries, and it would be a great push if India starts making the batteries.

For an average Indian consumer, all they care about are two main things – The cost and vehicle quality. Afterward, they want the maintenance cost to be a little cheaper as the maintenance of the existing car costs quite a lot. The technology is growing at a faster rate, and at the same time, it's getting adopted at even faster speeds. So, driving an Electric Vehicle by an average Indian wouldn't be a big problem. As of now, the autopilot modes might not fit for Indian roads, but if the revolution happens and people start using it, it'd be easy for algorithms to adapt. Again, it's just my hypothesis as a working autopilot model for Indian roads is still uncertain. As mentioned already, the recent Auto-Expo in India has proved that Indian consumers are quite ready for adoption.

But again, all the EVs exist in the Indian market now can only top the speed at around 85Km/hr, and for a full charge, the cars would go around 120Kms. These numbers would derive yet another contradiction as the money spent on the EVs costs more, but their mileage is relatively lower compared to conventional cars. So, unless the existing hybrid car manufacturers create a new mark in terms of mileage, it'd be quite hard to see Electric Vehicles drove by Indians.

If India manages to transform its entire fleet to fully electric vehicles, it would be one of the largest markets for EVs in the world. In the grand scheme of events, **India needs to involve private players and also needs to develop a suitable charging infrastructure.** However, the economic aspect can make things difficult for the electric vehicle industry to bloom in India. Going by the average cost of a car, people in the US and UK do not mind spending around \$35,000 on a new one. The number is \$15,000 for China, whereas, people in India spend less than \$10,000 on a car on an average. So people would opt to buy an electric vehicle only when the prices fall in that range. India is the world's third largest market for automobiles, and it sold about 25 million internal combustion engines in 2017. Of these, more than 80 per cent (about 20 million) were two-wheelers. The two-wheeler segment is expected to lead the EV market in India, not cars or buses. "We will see electric two-wheelers as a way to adapt proclivity of electric mobility in India, instead of forced adoption through four-wheelers," Rebecca Lindland, senior director and executive analyst at Kelley Blue Book, a California-based vehicle valuation and auto research firm, told Mint in February 2018. Therefore, India needs to implement significant subsidy schemes and put up mandates which will encourage car buyers to pick an electric vehicle instead of internal combustion, which would come in the form of 'Faster Adoption and Manufacturing of Hybrid and Electric vehicles' (FAME-II).

Well, the future of the automobile industry is quite unpredictable, and anything happens in a year or more. So, let's hope for the best.(Data is collected from various sources of internet like [igadgets.com](http://igadgets.com), [indiatoday.in](http://indiatoday.in))

**By- Prof. G S Pawar  
(Depart. Of E&Tc)**



## Smart farming

Smart farming focuses towards smart treatments like deciding the amount of fertiliser that should be applied, or using plant protection resources for optimal crop development in a particular area in the field.

Data- and information-driven agriculture is a general trend in smart farming.

Earth observation (EO) and navigation satellites use data collected from ground sensors to help farmers decide how, when and where to allocate resources for best results.

Satellites are mounted with multiple sensors. Information on current growth status and development of crops at each location in the field is obtained from the satellite(s) through various plant conditions and parameters such as biomass and chlorophyll content during growing season.

### Agriculture 4.0

Agriculture 4.0 is a new approach towards farm management and precision agriculture using technology, including sensors, smart tools, satellites, the IoT, remote sensing and proximal data gathering.

Sensors empower farmers to react quickly and dynamically maximise crop performance.

Sensors for agriculture include optical devices, sensors for crop health status determination, seed monitoring, detection of microorganisms and pest management, yield estimation and prediction, detection of crops, weeds and fruits, and airborne, soil, wearable, weather and Internet of Things (IoT) sensors, electronic noses and tongues, sensor networks and so on.

With connectivity gaining ground, we have GPS precision-guided tractors, sensor-based water irrigation systems, pest surveillance from air, smart live-stock monitoring along with farmers hooked up to Big Data.

By-Shankar.G.Kawade (TE&TC)

## Li-Fi: The Brighter Way to Communicate

Globally, Wi-Fi has been used for years to access and transmit data. But more often than not, Wi-Fi and their modems have elicited unsavoury remarks when more users have logged on.

Li-Fi is now poised to transform for the better the scenario of data transfer and access.

What is Li-Fi???

Li-Fi is a bidirectional, high-speed, fully-networked wireless communications technology.

In simple words, it can be considered a light-based Wi-Fi.

Where radio waves are deployed to transmit data and information in Wi-Fi, Li-Fi uses light waves, which is faster and acts as a better tool for communication.

In Li-Fi, LED lamps fitted with transceivers can light a room and receive information too.

Unlike Wi-Fi, which can hold limited access points only, Li-Fi can have multiple.

Considered a Visible Light Communications (VLC) system that runs wireless communications at extremely high speeds, Li-Fi uses common household LED (light-emitting diode) bulbs to transfer data, ensuring speeds of up to 224 gigabits per second.

How Li-Fi is generated??

1. A LED bulb is a semiconductor light source.
2. Consequently, the constant current of electricity supplied to a LED bulb can be dimmed and dipped up and down at very high speeds without being detected by the human eye.
3. For instance, data can be fed into a LED light bulb via signal-processing technology.
4. Thereafter, this data is embedded in its beam and sent back at rapid speeds to the photo-detector or photodiode.
5. Miniscule changes in the LED bulb's swift dimming are converted by the receiver into electrical signals.
6. Finally, the signal is reconverted into a binary data stream recognisable as web, video or audio applications running on Internet-enabled devices. for the limited range of radio waves.



Mini Projects From –Electronics and  
Telecommunication(TE)

# Project Name - Smart Speed Breakers

## ➤ Abstract:

Speed bumps or breakers are an effective way to reduce frequency and severity of collisions, improve pedestrian safety, and passively reduce the number of vehicles exceeding the recommended speed limits.

Although speed bumps have been proven to reduce speed and make neighborhoods safer, some critics claim that they can cause damage to vehicles, increase emergency response time, and increase traffic noise. Fortunately, many of these issues can be mitigated through proper speed cushion planning.

Our project idea for that is whenever the speed of vehicles increases above the speed limit then a beep sound produced and red LEDs get on and a speed breaker will come upward after some distance, because of that speed of vehicle reduces. Also if speed is less than speed breakers doesn't move upward, at that time green LEDs are on.

For special vehicles we used the RFID tag technique that is used to detect the special vehicles like ambulance, police car, fire brigade, etc. When the RFID module detects that special vehicle then no speed breakers will move upward. Because of this the number of accidents will be reduced.

## ➤ Description:

### **IR sensor:**

IR sensors are used to detect the speed of vehicles.

### **LED:**

When speed of vehicle is more than the limit of road speed then red LEDs are turned on and when the speed of vehicle is less than the limit of road speed then green LEDs are turned on.

### **Buzzer:**

When the vehicle's speed is more than the speed of the road limit the buzzer is on and produces a beep sound.

### **Display:**

Used to display the speed of vehicle. 328

### **RFID tag:**

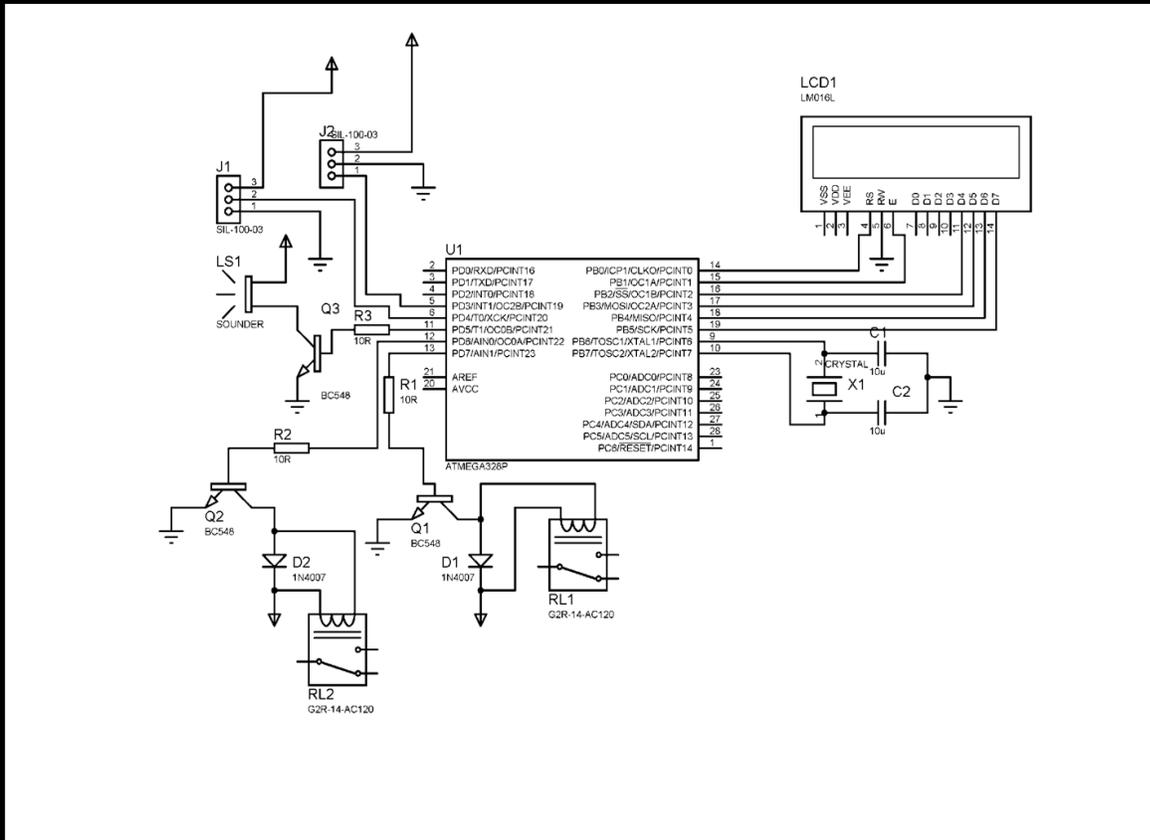
It stands for radio frequency identification tag. This tag is located on the front side of vehicle. In this project it is used to detect the special vehicles like ambulance, fire brigade,

Police car, etc. controller.

### **ATMEGA 328:**

It is an 8-bit and 28-pin microcontroller. It follows RISC architecture and has flash memory of 32kb. In Arduino UNO, UNO is based on ATmega 328 microcontroller.

# CIRCUIT DIAGRAM



## Name Of Student

- 1) Jadhav Apurva .H
- 2) Shaikh Sharmin .A
- 3) Borade Dipali .S

# Project Name - Smart Gas Regulator

## ➤ Abstract:

PG leak detector model is a compact electronic device which detects the presence of LPG in the air. Gas leak detection is the detection of gas leaks with a sensor specially designed to identify the leaks. In order to detect gas leaks with traditional methods, the gas itself must either be in close proximity to the detector or within a pre-defined area. Outdoor environmental conditions such as changing wind directions and quick dispersion of a potential gas cloud, which can be found e.g. on an offshore platform, can result in undetected gas leaks, leading to extremely dangerous situations.

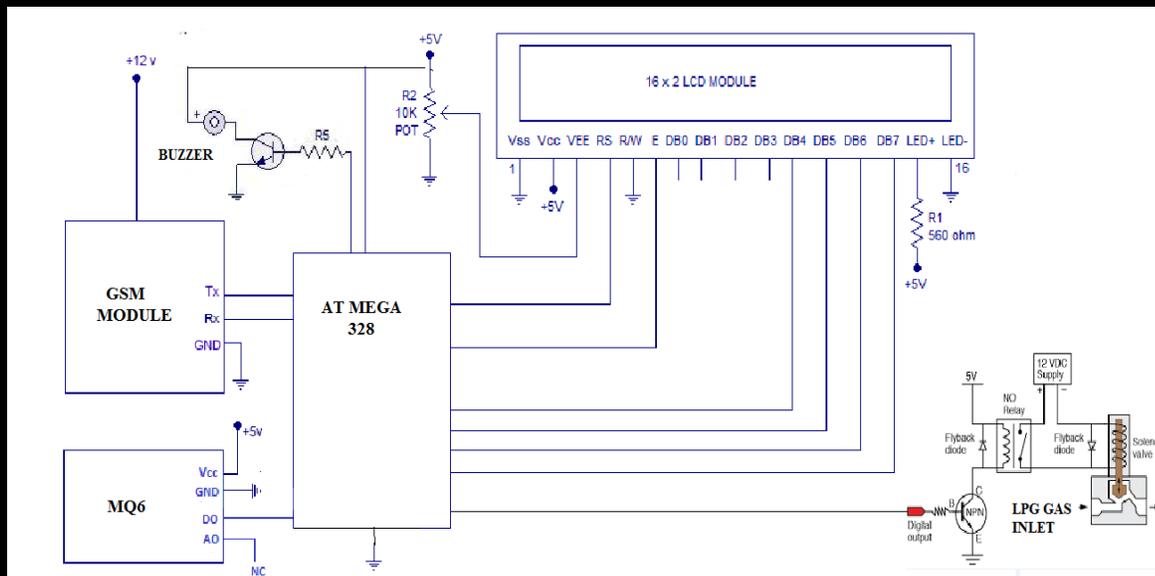
Gas is intentionally odorized so that the average person can perceive it at a concentration well below the explosive range. That odorant concentration is generally between 0.5 to 1.0 percent by volume or as local applicable codes dictate. Gas odor is a common and effective indication of a leak. A report of gas odor should be investigated immediately. If a leak is found, the migration pattern of the gas should be determined. If an immediate hazard is determined to exist, the hazard potential should be eliminated and the leak repaired immediately. Odor is not always totally reliable as an indicator of the presence or absence of gas leaks. For this reason all gas leak reports should be investigated using a leak detection instrument. Gas personnel should remember that the primary purpose of the gas odor is to provide a warning to the public, who do not have gas detection instruments.

LPG gas detection projects main idea is to implement security system for detecting leakage of gas in closed environment. In this project gas leakage is identified by using sensors which works only in closed environment. In present situation there are many cases related to gas leakage which cause innocent people lives and property damage. Implementing this application can be useful for companies, houses, which can save lives of people.

We use AT-MEGA 328 to perform the desired task by interfacing Gas sensor, Buzzer and LCD to display. The output of the Gas sensor is in analog form which can be converted into digital form using MCP3201 which is an ADC (Analog to Digital Converter). Initially when there is a leak the Gas sensor detects it and gives voltage related to the amount of gas that is getting escaped from the apparatus. We create a set-point to the AT-MEGA 328 so as if the Gas sensor gives the output above the set-point the controller drives the buzzer ON as an indication to the user.

This can be used as an application in chemical and hazardous industries where there is a continuous need of monitoring the gas leaks. By using different kinds of sensors for every gas we can almost identify leaks for every kind of gases.

# CIRCUIT DIAGRAM



## Name Of Students

- 1) Wagh Mrunal .D
- 2) Deore Pallavi .U
- 3) Gatkal Ankita .K

## Bill Of Materials (ESTIMATE)

Sr. No	LIST OF COMPONENTS	QTY.	RATE	AMOUNT
1	AT MEGA328 IC	1	150	150
2	MQ6 (GAS SENSOR)	1	130	130
3	DIODE	8	1	8
4	RESISTOR	10	1	10
5	RELAY	1	60	60
6	CRYSTAL 16 MHZ	1	20	20
7	IC 7805	1	16	16
8	IC 7812	1	16	16
9	LED	4	1	4
10	WIRE (1 Mtr)	1 Mtr	30	30
11	AT MEGA SOCKET	1	7	7
12	CAPACITOR	5	2	10
13	BUZZER	1	60	60
14	PCB BOARD	1 Sqft	200	200
15	TRANSFORMER (12-0-12)	1	159	159
16	SOLENOID COIL	1	260	260
17	EXOST FAN	1	50	50
18	TRANSISTOR	3	5	15
19	DISPLAY 16*2	1	125	125

**TOTAL= 1357**