EC-Tech Chronicle

2018-19

Department of Electronics and Communication Engineering

PRAGATI ENGINEERING COLLEGE (AUTONOMOUS)

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada & Accredited by NAAC with ' A' Grade

EC-Tech Chronicle / 2018-19

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CONTENTS

Vision of the Department

To be an acknowledged Leader in providing quality education, training and research in area of Electronics and Communication Engineering to meet the industrial and Societal needs.

Mission of the Department

M1	To facilitate students with a state-of-the-art infrastructure, learning environment and value-based education to improve technical knowledge and skills for continuous learning process.
M2	To impart high quality education with well qualified faculty and enable students to meet the challenges of the industry at global level
M3	To promote innovation and active industry institute interaction by facilitating the students to improve their leadership and entrepreneurship skills with ethical values.

Program Educational Objectives (PEOs)

PEO 1	To prepare Graduates with sound foundation in fundamentals of mathematics, science and engineering to assist them exhibit strong, independent learning, analytical &problem solving skills in Electronics and Communication Engineering domain.
PEO 2	To facilitate learning in the core field with effective use of modern equipment and programming tools to solve real life, multi-disciplinary problems with professional, ethical attitude and also to make them aware of their social responsibilities.
PEO 3	To assist and enable individuals to imbibe lifelong learning in thrust areas related to research & innovation to have Progressive Careers or Entrepreneurs.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO-1	The ability to apply concepts in electronics and communication engineering, to design and implement complex systems in the areas related to analog and digital electronics, communication, signal processing, VLSI & ES.
PSO-2	Ability to provide discerning solutions based on the their expertise in electronics and communication courses in competitive examinations for successful employment, higher studies and research.

PROGRAM OUTCOMES (POs)

1	**Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.**
2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Satellite TV

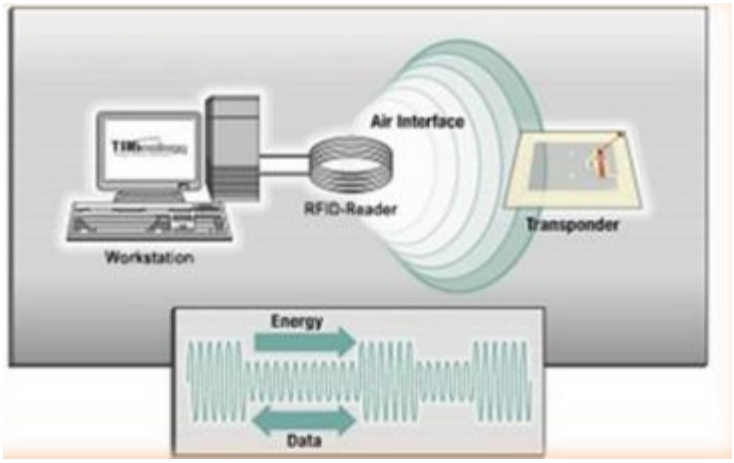
Satellite TV is a type of television programming that is wirelessly delivered to TV sets across the world via a network of radio signals, communications satellites, broadcast centers and outdoor antennas. Broadcast signals are transmitted from satellites orbiting the Earth and received by local and regional satellite TV systems. How Satellite TV service works Satellite TV technology makes use of specialized antennas known as satellite dishes. These satellite dishes transmit signals to a satellite receiver such as a set-top box or satellite tuner module within a TV set. The programming source transmits signals to a satellite provider broadcast center and these waves are then picked up by a compact satellite dish and broadcast onto television sets. Overview of Satellite TV Video Content Delivery Satellite TV service can also be referred to as direct broadcast satellite (DBS or DBSTV) service. A DBS provider will select programming—often a wide range of channels and services—and will then broadcast this content to satellite TV subscribers as part of a larger TV package. DBS programming can either be sent to a digital satellite receiver or an analog satellite receiver. Analog satellite television is slowly being replaced by digital satellite programming. Digital satellite television has become increasingly available in better quality known as HD TV (high-definition television). Digitally-broadcast content is characterized by greater picture and sound quality. Satellite stations and broadcast television stations both transmit TV programming through radio signals. Years ago, the first satellite television TV technologies were broadcast in the C-band radio frequency range. Today, digital satellite TV content is transmitted in the Ku frequency range. To further understand the technology behind direct-broadcast satellite systems, it is important to review the top features and elements involved in direct-broadcast satellite TV video content delivery: programming sources, satellite provider broadcast centers, satellites, satellite dishes and the satellite receivers. Programming sources refer to networks or channels that offer TV shows and movies for the enjoyment of subscribers. A broadcast center plays an integral role in video content delivery. At broadcast centers, TV providers receive and send broadcast signals to satellites orbiting the Earth.

Mr. V PRASANTH

Associate Professor-ECE

Electronic Toll Collection

Electronic Toll Collection is a generally mature technology that allows for electronic payment of highway tolls. It takes advantage of vehicle-to-roadside communication technologies to perform an electronic monetary transaction between a vehicle passing through a toll station and the toll agency. This project is implemented using the innovative technology of Radio Frequency Identification (RFID). Radio-frequency identification (RFID) is a technology that uses communication via electromagnetic waves to exchange data between a terminal and an electronic tag attached to an object, for the purpose of identification and tracking. An RFID system consists of a reader and transponders. Transponders (derived from the words "transmitter" and "responder") are attached to the items to be identified. They are often called "tags". Radio Frequency Identification (RFID) involves contact less reading and writing of data into an RFID tag's non-volatile memory through an RF signal. The reader emits an RF signal and data is exchanged when the tag comes in proximity to the reader signal. The RFID tag derives its power from the RF reader signal and does not require a battery or external power source. Each vehicle will be provided with an RFID tag. This transponder (tag) stores the unique ID of the vehicle and related information. When interrogated by a reader, it responds with that data over a radio frequency link. The readers are fixed in the toll gates. So when the vehicle comes near the reader, the data from the tags can be easily read by the readers. This data is passed to the computer and thus the cash can be deducted from the user's account.



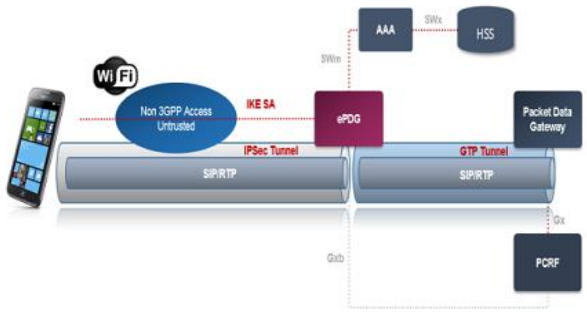
Mr. D NATARAJ
Associate Professor-ECE

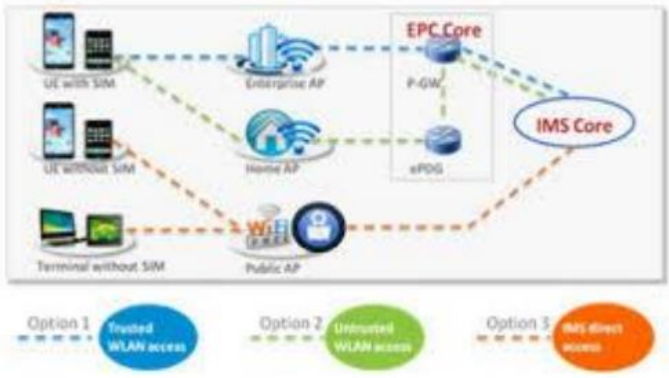
Voice over Wi-Fi (VoWi-Fi)

Introduction

VoWi-Fi stands for Voice over Wi-Fi, which uses IEEE 802.11 wireless local area networks to transmit VoIP traffic. This is an additional service that can be used with voltage. Wi-Fi technology allows users to make outgoing calls even where there is poor cellular connectivity. It is designed to plug the gaps of the indoor network as Telecom operators find it increasingly difficult to obtain approvals for site approvals and path (row) rights in residential areas.

- The most widely known deployment method is to use the IMS core (IP Multimedia Subsystem) to integrate with a WiFi radio network through an ePDG access gateway, according to a newnet white paper study. This method is also described in GSM AIR.51 profile
- Another less commonly used method, according to the same whitepaper, is to use IR.92 best VoIP technology efforts from RCS specifications.





Benefits to Consumers

- Can make calls without the need for a mobile signal (such as in a remote location or in a building with thick walls).
- Benefit from security based on SIM card based authentication like for VoLTE
- Experience better indoor coverage.

VoWi-Fi challenges

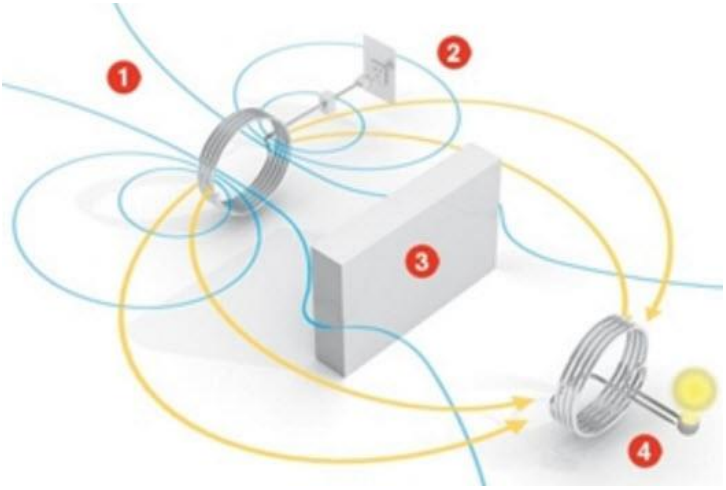
Service providers have no control over the quality of the Wi-Fi network, so they may encounter problems to troubleshoot Wi-Fi. Experts believe that this problem can be solved by using an app that can monitor the quality of the Wi-Fi network and cancel service when it is below thresholds.

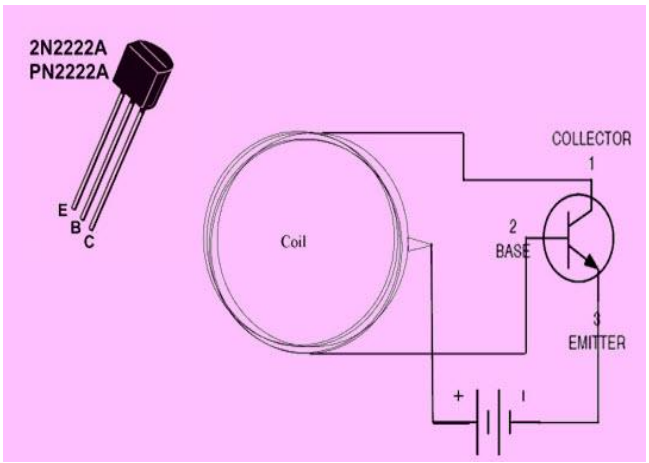
VSSV Prasad

16A31B0458

Wireless Power Transfer Technology

WPT technology is old technology and it was demonstrated by "Nikola Telsa" in the year 1980. Wireless power transmission mainly uses three main systems such as microwaves, solar cells, and resonance. Microwaves are used in an electrical device to transmit electromagnetic radiation from a source to a receiver. Accurately the name WPT states that the electrical power can be transferred from a source to a device without using wires. Basically, it includes two coils they are a transmitter coil & a receiver coil. Where the transmitter coil is powered by AC current to create a magnetic field, which in turn induces a voltage in the receiver coil.





In the TX (transmitter) section, the AC current increases a copper wire, which creates a magnetic field. Once an RX (Receiver) coil is located near to the magnetic field, then the magnetic field can induce an AC current in the receiving coil. Electrons in the receiving device convert the AC current back into DC current, which becomes working power.

To accomplish this, power source (DC current) is changed into high-frequency AC (Alternating Current) by particularly designed electronics erected into the transmitter. The AC boosts a copper wire coil in the transmitter, which produces a magnetic field. When the receiver coil is placed in proximity of the magnetic field, the magnetic field can make an AC (alternating current) in the receiving coil. Electronics in the receiving coil then alter the AC back into DC which becomes operating power.

The main intention of this technology is to design a WPT system in 3D space (transfer power within a small range) and the block diagram of this project is shown below. The block diagram of the wireless power transfer mainly builds with HF transformer, capacitors, diode, rectifier, inductor coil filled with air and lamp.

Mr.K.PasipalanaRao

Asst.Prof-ECE

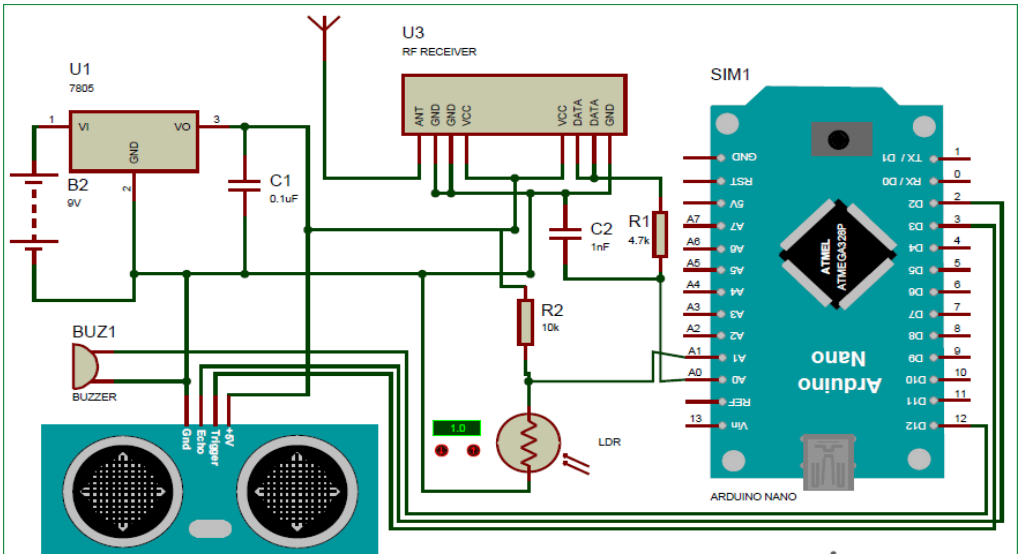
Smart Blind Stick Using Ardunio

Objective

This Smart stick will have an Ultrasonic sensor to sense distance from any obstacle, LDR to sense lighting conditions and a RF remote using which the blind man could remotely locate his stick**.** All the feedbacks will be given to the blind man through a Buzzer. Of course you can use a vibrator motor in place of Buzzer and advance a lot more using your creativity.

Working

This Arduino Smart Blind Stick Project requires two separate circuits. One is the main circuit which will be mounted on the blind man's stick. The other is a small remote RF transmitter circuit which will be used to locate the main circuit. The main board's circuit diagram is shown below:



I have used a small hack to make this RF remote control circuit to work. Normally while using this 433 MHz module requires an Encoder and Decoder or two MCU to work. But, in our application we just need the receiver to detect if the transmitter is sending some signals. So the Data pin of the transmitter is connected to Ground or Vcc of the supply.

The data pin of the receiver is passed through an RC filter and then given to the Arduino as shown below. Now, whenever the button is pressed the Receiver output some constant ADC value repeatedly. This repetition cannot be observed when the button is not pressed. So we write the Arduino program to check for repeated values to detect if the button is pressed. So that is how a Blind person can track his stick.

B.S.S.Vidya
Asst.Professor
Dept of ECE

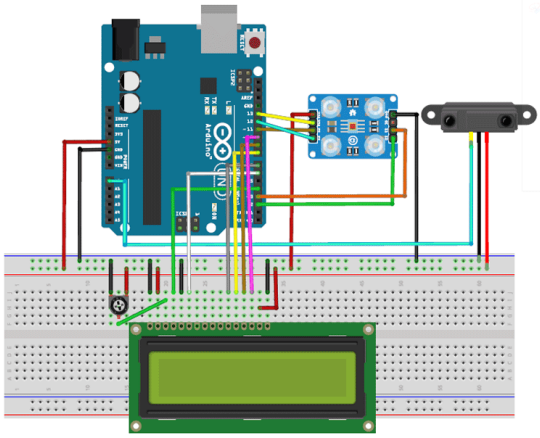
Bluetooth Electronic Home Appliances

Objective

In this project we are going to work on an innovative arduino project idea, where we can count the paper currency notes and calculate their amount, by sensing the paper currency using Color Sensor and Arduino**.** TCS230 color sensor will be used for detecting the currency notes and, Arduino UNO for processing the data and showing the remaining balance on 16x2 LCD.

Working

The TCS3200 color sensor is used to sense a wide range of colors. We previously interfaced TCS3200 color sensor with Arduino and Raspberry pi, and also built some useful projects like Color sorting machine.



TCS230 sensor has inbuilt infrared LEDs that are used to light up the object whose colour is to be detected. This ensures that there will no impacts of external surrounding light on the object. This sensor reads a photodiode of 8*8 array, which comprises of 16 photodiodes with red filters, 16 with blue filters, 16 with green filters and 16 photodiodes without any filter**.** Each of the sensor arrays in these three arrays is selected separately depending on the requirement. Hence it is known as a programmable sensor**.** The module can be featured to sense the particular color and to leave the others. It contains filters for that selection purpose. There is a fourth mode called '**no** filter mode' in which the sensor detects white light.

Conclusion

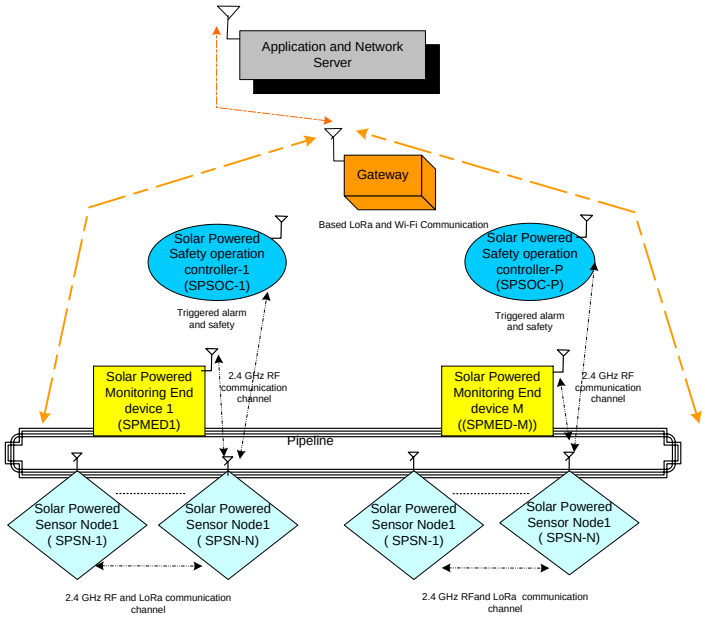
The output signal of the TCS230 colour sensor is a square wave with a 50% duty cycle and its frequency is proportional to the light intensity of the selected filter.

Ch.Satish
Asst.Professor
Dept of ECE

Energy Harvesting Remote Pipeline Monitoring Using IoT

Objective

In this Article, we reviewed and proposed the energy harvesting types for end sensor nodes for pipeline monitoring in remote areas.



Procedure

The architecture from figure 4 shows solar-powered sensor nodes to collect data from pipeline parameters like Corrosion, Gauge pressure, Temperature of oil, Leaks, etc. The above architecture consists of the monitoring section, a communication protocol for transmitting data, safety operation controller and Application server via LoRa gateway to store information. In the monitoring section, critical parameters of the pipeline should be measured. Various smart wireless sensors with solar energy harvesters are used to monitor critical parameters that give long lifetime for sensor nodes that are remotely placed. The monitoring Section of the pipeline with solar energy has different categories like hardware-based, Software-based and conventional methods used in pipeline leakage detection and comparison of advantages and limitations of methods are reviewed. Especially hardware vibration detection method using the accelerometer sensor is focused. The energy received from the solar panel is stored in batteries and it is a centralized battery that power supply given to all communication devices. The gathered information is sent to 2.4 GHz RF controller board and LoRa controller board via microcontroller which will perform some computations. Now the data will be communicated to Servers via LoRa gateway.

Conclusion

We proposed an energy harvesting system for pipeline monitoring in remote areas.

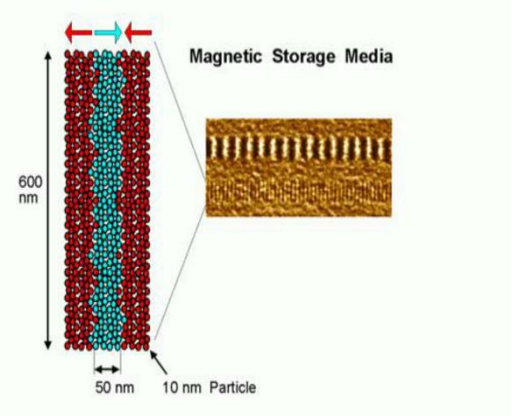
Ch,Lakshmi Narayana

Asst.Professor

Dept of ECE

SILICON MEMORY

The limits of pushing storage density to the atomic scale are explored with a memory that stores a bit by the presence or absence of one SI atom. The memory can be initialized and reformatted by controlled deposition of si. The writing process involves the transfer of SI toms to the tip of a scanning tunnelling microscope. The constraints on speed and reliability are compared with data storage in magnetic hard disks and DNA. The physics icon Richard Feynman estimated that all of the information that man has carefully accumulated in all the books in the world, can be written in a cube of material one two-hundredth of an inch wide. Thereby, he uses a cube of 5×5×5=125 atoms to store one bit, which is comparable to the 32 atoms that store one bit in DNA. Such as simple, back of the envelope calculation gave a first glimpse into how much room there is for improving the density of stored data when going down to the atomic level.



In the meantime, there has been great progress towards miniaturizing electronic devices all the way down to single molecules or nanotubes as active elements. Memory structures have been devised that consist of crossed arrays of nanowires linked by switchable organic molecules or crossed arrays of carbon nanotubes with electrostatically switchable intersections A bit is encoded by the presence or absence of a Si atom inside a unit cell of 5×4=20atoms. The remaining 19 atoms are required to prevent adjacent bits from interacting with each other, which is verified by measuring the auto correlation.

A specialty of the structure in figure is the array of self-assembled tracks with a pitch of five atom rows that supports the extra atoms. Such regular tracks are reminiscent of a conventional CDROM. However, the scale is shrunk from μm to nm. Although the memory created now is in two dimensions rather than the three-dimensional cube envisioned by Feynman, it provides a storage density a million times greater than a CD-ROM, today's conventional means of storing data.

The highest commercial storage density is achieved with magnetic hard disks, whose aerial density has increased by seven orders of magnitude since their invention in Feynman's days. Currently, the storage density is approaching 100 Gigabits per square inch in commercial hard disks. Typical storage media consist of a combination of several metals, which segregate into magnetic particles embedded into a non-magnetic matrix that keeps them magnetically independent.

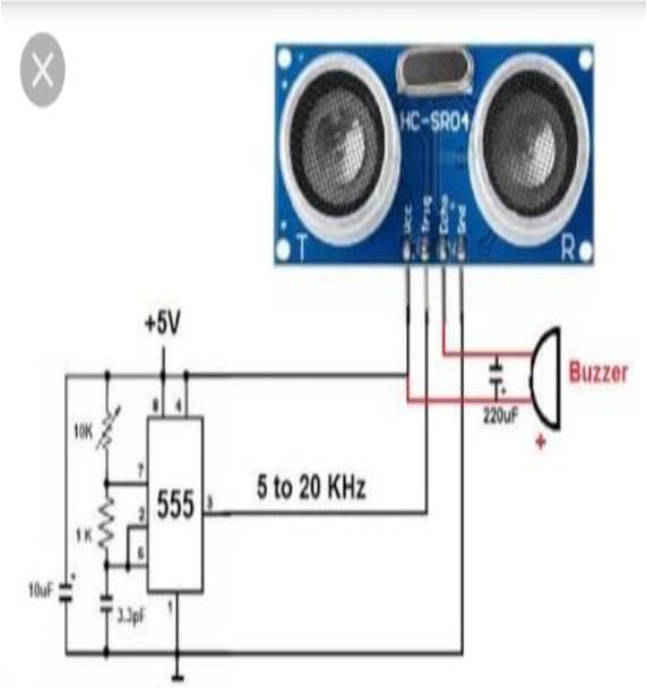
R. JYOTHSNA

16A31A04K0

POTHOLE (MANHOLE) DETECTION

Today's the developing world shows various adventures in every field. In each field the small requirements are very essential to develop big calculations. By using different sources we can modify it as our requirements and implement in various field. In earlier days the measurements are generally occur through measuring devices. But now a day's digitalization as is on height. Therefore we use a proper display unit for measurement of distance. We can use sources such as sound waves which are known as ultrasonic waves using ultrasonic sensors and convert this sound wave for the measurement of various units such as distance, speed. This technique of distance measurement using ultrasonic in air includes continuous pulse echo method, a burst of pulse is sent for transmission medium and is reflected by an object kept at specific distance. The time taken for the sound wave to propogate from transmitter to receiver is proportional to the distance of the object.

Distance measurement using ultrasonic sensor of a transmitter part of ultrasonic module units ultrasonic high frequency waves in the form of polices after collision of these wares with any object, these wares detected by microphone time taken by these wares from transmitter and receiver is used to measure distance from any object. We had used a ultrasonic sensor module of HC-SR04, because this ultrasonic module is initiated with pulse of 10us.since the population has been increasing day by day the roads have been flooded with the vehicular traffic this is the reason to make vehicle intelligent by introducing Pothole detection.



G.Bhanu sravani

17A31A0473

Raspberry Pi

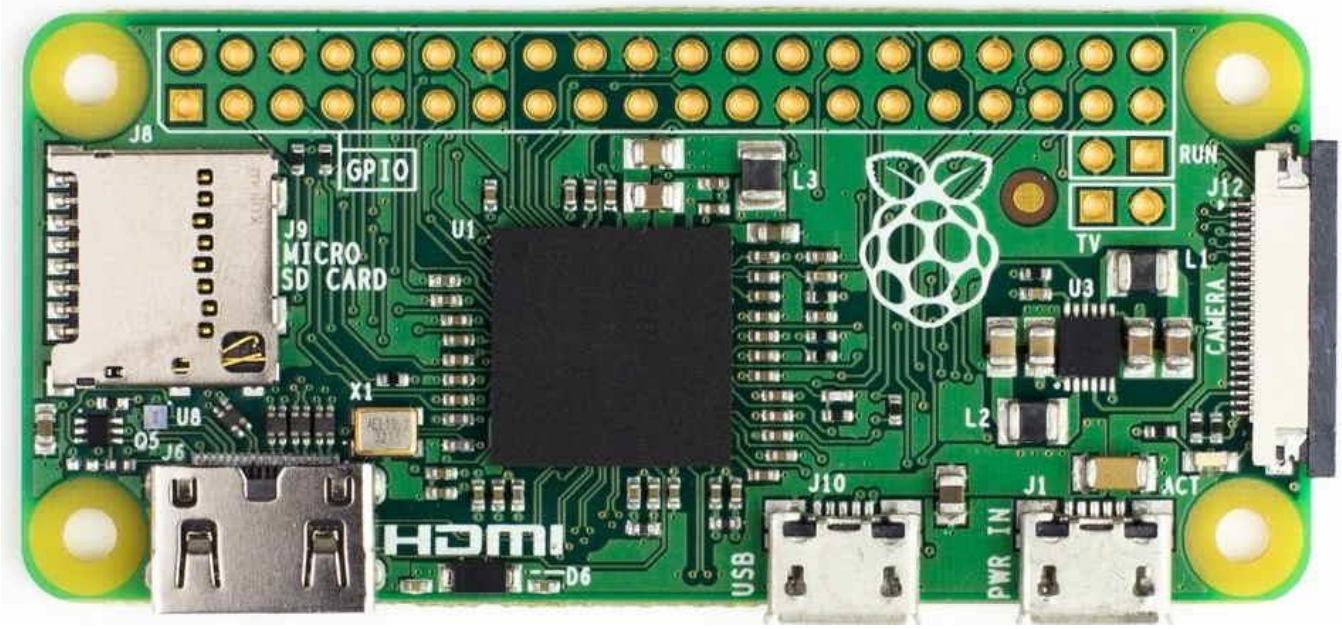
Raspberry Pi is a small single board computer. By connecting peripherals like Keyboard, mouse, display to the Raspberry Pi, it will act as a mini personal computer.

Raspberry Pi is popularly used for real time Image/Video Processing, IoT based applications and Robotics applications. Raspberry Pi is slower than laptop or desktop but is still a computer which can provide all the expected features or abilities, at low power consumption. Raspberry Pi Foundation officially provides Debian based Raspbian OS. Also, they provide NOOBS OS for Raspberry Pi. We can install several Third-Party versions of OS like Ubuntu, Archlinux, RISC OS, Windows 10 IOT Core, etc.

Raspbian OS is official Operating System available for free to use. This OS is efficiently optimized to use with Raspberry Pi. Raspbian have GUI which includes tools for Browsing, Python programming, office, games, etc.

We should use SD card (minimum 8 GB recommended) to store the OS (operating System).

Raspberry Pi is more than computer as it provides access to the on-chip hardware i.e. GPIOs for developing an application. By accessing GPIO, we can connect devices like LED, motors, sensors, etc and can control them too.



It has ARM based Broadcom Processor SoC along with on-chip GPU (Graphics Processing Unit).

The CPU speed of Raspberry Pi varies from 700 MHz to 1.2 GHz. Also, it has on-board SDRAM that ranges from 256 MB to 1 GB. Raspberry Pi also provides on-chip SPI, I2C, I2S and UART modules.

Mr.M.Srinivas

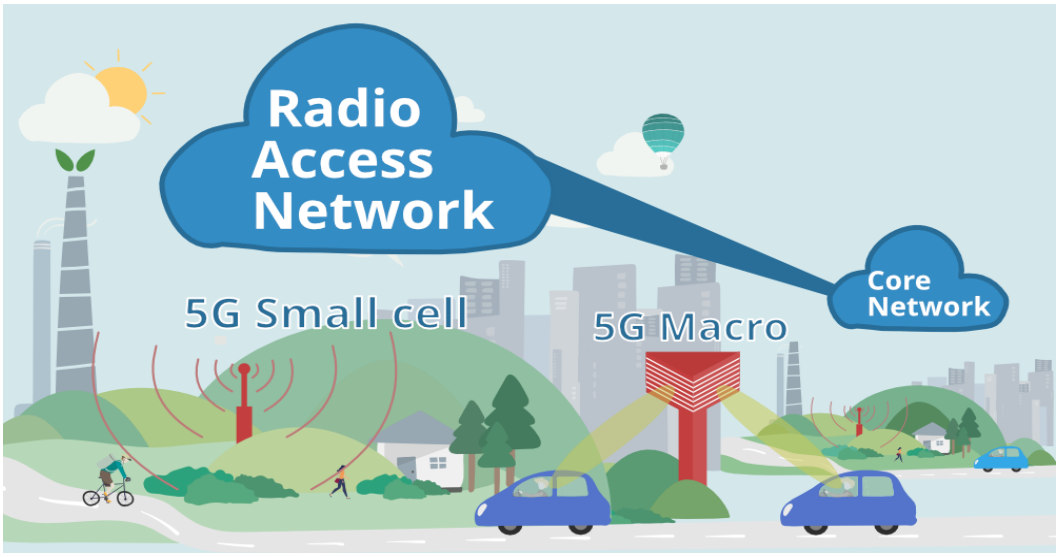
Asst.Prof-ECE

5G Mobile Wireless Technology

The 5G mobile cellular communications system provides a far higher level of performance than the previous generations of mobile communications systems.The new 5G technology is not just the next version of mobile communications, evolving from 1G to 2G, 3G, 4G and now 5G.

Instead 5G technology is very different. Previous systems had evolved driven more by what could be done with the latest technology. The new 5G technology has been driven by specific uses ad applications.

The data speed for wireless broadband connections using 5G would be at a maximum of around **20 Gbps**. Contrasting that with the peak speed of 4G which is **60 Mbps**, that's a lot! Moreover, 5G will also provide more bandwidth and advanced antenna technology which will result in much more data transmitted over wireless systems.



Benefits

- 5G will make our smartphones much smarter with faster and more uniform data rates, lower latency and cost-per-bit and this, in turn, will lead to the common acceptance of new immersive technologies like Virtual Reality or Augmented Reality.
- 5G will have the convenience of ultra-reliable, low latency links that will empower industries to invest in more projects which require remote control of critical infrastructure in various fields like medicine, aviation, etc.
- 5G will lead to an Internet of Things revolution as it has the ability to scale up or down in features like data rates, power, and mobility which is perfect for an application like connecting multiple embedded sensors in almost all devices.

Mr.P.KrishnaChaitanya

Asst.Prof-ECE