EC-Tech Chronicle

2017-18

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 / 2017-18

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)

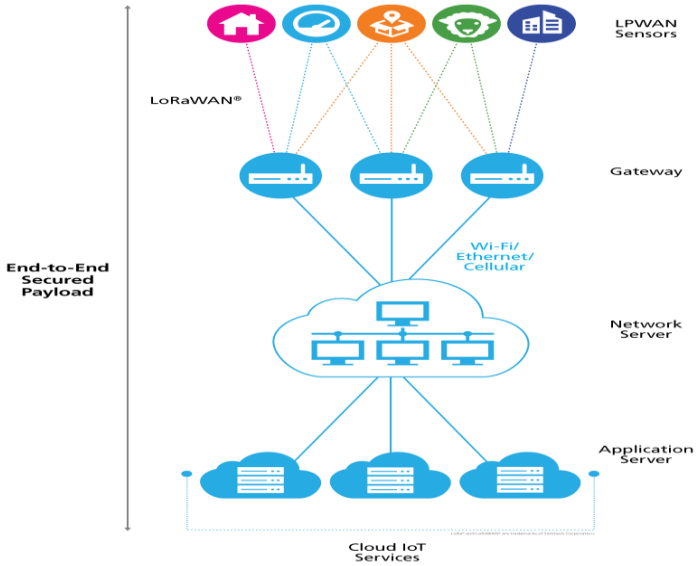
1	**Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.**
2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching 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.

LoRa

LoRa is a '**Lo**ng **Ra**nge' low power wireless standard intended for providing a cellular style low data rate communications network.

Aimed at the M2M and IoT market, LoRa is ideal for providing intermittent low data rate connectivity over significant distances. The radio interface has been designed to enable extremely low signal levels to be received, and as a result even low power transmissions can be received at significant ranges. The LoRa modulation and radio interface has been designed and optimized to provide exactly the type of communications needed for remote IoT and M2M nodes.

Although LoRa had been fundamentally developed by Semtech, opening he standard out enabled it to be adopted by a wide number of companies, thereby growing he ecosystem and gaining significantly greater engagement, a wider variety of products and an overall increase in usage and acceptance.



There are several key elements of LoRa technology. Some of its key features include the following:

- Long range: 15 - 20 km.
- Millions of nodes
- Long battery life: in excess of ten years

Ch,Lakshmi Narayana

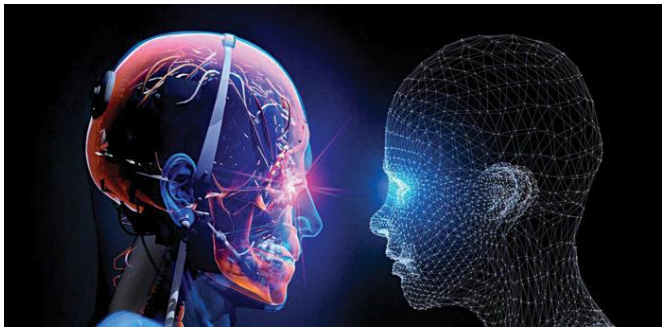
Asst.Professor

Dept of ECE

Artificial Intelligence in Healthcare

AI technology is making its presence felt in the healthcare industry at a very fast pace. However, these new developments raise the question: Will AI replace doctors and nurses in the future?

Tens of millions of people die each year from diseases that are treatable. Cancer treatment is not affordable by many. Now, AI is being employed in diagnosing cancer, tuberculosis, skin, eyes, stroke and other conditions, and it is more precise, accurate, faster and cheaper. AI is not only an industry-disrupting force but an important component that leads to affordability and accessibility for common people.



An ultrasound machine is quite costly, but as technology progresses, its cost will come down and it will be affordable by individuals. There are promising signs of AI solutions in ultrasound imaging. For example, iQ probe with semiconductor chips, developed by Butterfly Network, can be used by patients to perform their own ultrasound tests. Understanding the results of an ultrasound can be hard for untrained patients, but iQ has an AI component in it. As AI gets smarter, risks-associated image interpretation will eventually reduce. Israel-based DiA Imaging Analysis, in partnership with GE Healthcare, has developed Vscan, a smartphone-sized ultrasound device. It also collaborates with Google Cloud to offer AI-powered automated ultrasound analysis for patient care, enabling quick analysis and easy accessibility anywhere, anytime.

There is concrete proof that AI is way better than a radiologist in detecting various parameters of the human body. A recent report showed that Google AI machine can tell vital body details including gender, heart conditions or other cardiovascular problems just by scanning the eyes.

K.Raghuram
Asst.Professor
Dept of ECE

ARM Microcontroller

An ARM processor is one of a family of CPUs based on the RISC (reduced instruction set computer) architecture developed by Advanced RISC Machines (ARM).

ARM processors are extensively used in consumer electronic devices such as smartphones, tablets, multimedia players and other mobile devices, such as wearables. Because of their reduced instruction set, they require fewer transistors, which enables a smaller die size for the integrated circuitry (IC). The ARM processor's smaller size, reduced complexity and lower power consumption makes them suitable for increasingly miniaturized devices.

ARM processor features include:

- Load/store architecture.
- An orthogonal instruction set.
- Mostly single-cycle execution.
- Enhanced power-saving design.
- 64 and 32-bit execution states for scalable high performance.
- Hardware virtualization support.

The simplified design of ARM processors enables more efficient multi-core processing and easier coding for developers. While they don't have the same raw compute throughput as the products of x86 market leader Intel, ARM processors sometimes exceed the performance of Intel processors for applications that exist on both architectures.

Mr.T.VishnuMurthy
Asst.Professor
Dept of ECE

Replacing Silicon

In fact, according to UnitedSiC President and CEO, Dr J. Christopher Dries, there are over 300 million low-voltage chargers being used in the market today, and each one includes a flyback converter. With such a great reliance on these devices, power conversion has never been so important, so designers are looking to boost efficiency, avoiding the conversion losses which come from using traditional switching circuits used in power converters.Right now, the low voltage charger market is dominated by silicon and has been for decades.

GaN Systems

"Silicon dominates the market and if we are going to be serious about increasing efficiency we need to reduce the thermal output of these devices," explains Aly Mashaly, Manager Power Systems, ROHM Semiconductor Europe."It used to be the case that if you left a laptop on for a few hours it became extremely hot, today we have seen a marked improvement due to the increased efficiency of the electronics. However, as devices become more power hungry so there's a need to improve the efficiency of low-voltage adaptors – it's a growing trend we need to address."At present, the low-voltage adaptor is well served by silicon powered by MOSFETs," says Dr Dries, who goes on to explain that it's an affordable solution because consumers aren't willing to spend a lot of money on a phone charger. But equally, he argues, people are always looking to improve efficiency, in particular in terms of size and weight."After all, don't we all want our charging time to go down, the weight of the charger to be less and the cost to be reasonable?"

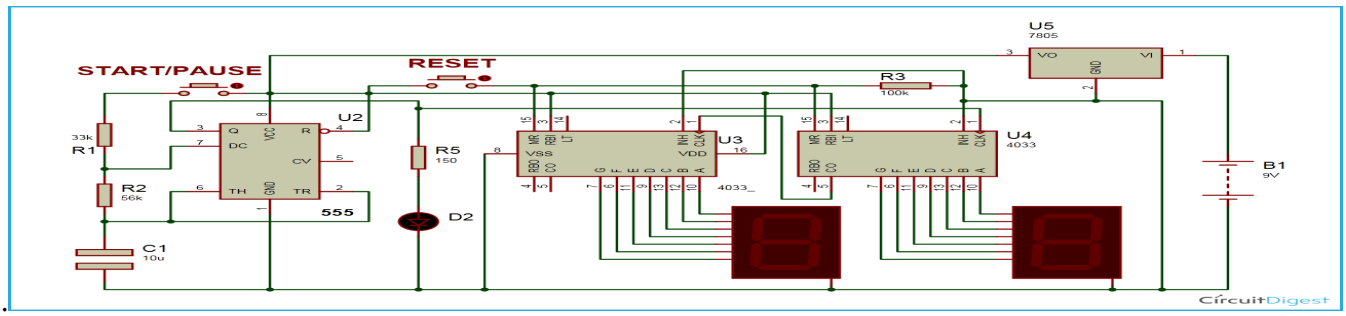
To help push this forward, UnitedSiC is developing a silicon carbide alternative which it believes can compete with and outperform its more affordable counterpart.A lot of silicon carbide or SiC companies are focused on the high-power market – that is anything from 600V and up, for example on-board car chargers," Dr Dries, explains. "We saw a market opportunity to take our SiC devices into the low-power segment with our SiC JFET solution. Virtually no one has done this. We enable people to spend just a little bit more than they would for silicon, but for that they get extraordinary levels of performance in terms of efficiency and operating frequency.

Mr.B.Sudhir
Asst.Professor
Dept of ECE

Digital Stopwatch

Objective

Often we need stopwatch to count the time taken by a person to complete the event and also to differentiate the time of two events. Now our ultimate aim is to design a stopwatch using digital components like 555 timer IC, resistors, capacitor, IC 4033, push buttons, common cathode seven segment displays, battery connector, bread board, LED and voltage.

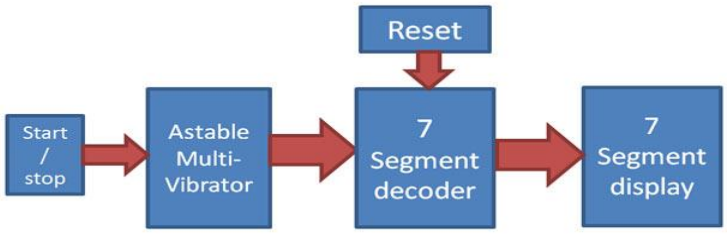


Working

In this stop watch circuit we have generated one second delay by using 555 timer based astable multivibrator. By using some calculation we can easily generates one second delay. In astable multivibrator there is two resistors and one capacitor is responsible for delay by charging or discharging capacitor through resistors. Calculation formula for generating delay for astable multivibrator is given below.

F=1/T= 1.44/(R1 + 2R2) C1.

In this methodology we have selects R1 is 33K, R2 is 56K and C1 is 10uF. Astable multi-vibrator generates one seconds delay, this delay is oscillations or pulse of 0 and 1. So we will use this pulse for triggering the seven segment decoder then seven segment decoder changes the digit number with the one second of time period.



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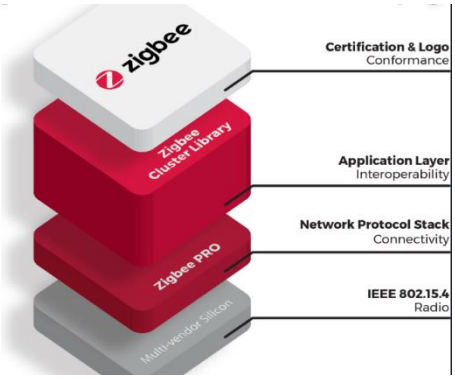
D.SHANTHI

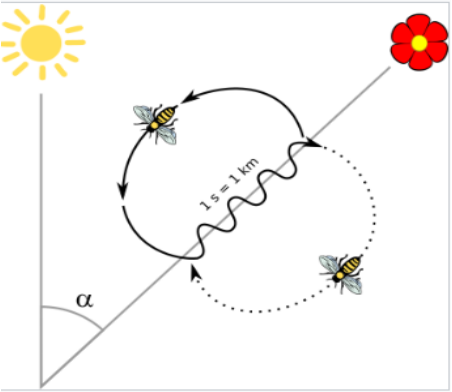
ZIGBEE Technology



ZigBee is an IEEE 802.15.4 based specification for a suite of high-level communication protocols used to create 'personal area network' with small,low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs, designed for small scale projects which need wireless connection. Hence, ZigBee is a low-power, low data rate, and close proximity (i.e., personal area) wireless ad hoc network.

The technology defined by the ZigBee specification is intended to be simpler and less expensive than other wireless personal area networks(WPANs), such as Bluetooth or more general wireless networking such as Wi-Fi. Applications include wireless light switches, home energy monitors, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate wireless data transfer.

Its low power consumption limits transmission distance to 10-100 meters line-of-sight, depending on power output and environment characteristics. ZigBee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. ZigBee is typically used in low data rate applications that require long battery life and secure networking. It has a defined rate of 250 k bit/s, best suited for intermittent data transmissions from a sensor or input device. ZigBee networks are secured by 128bit symmetric encryption keys.



ZigBee was conceived in 1998, standardized in 2003, and revised in 2006. The name refers to the waggle dance of honey bees after their return to the beehive.

Waggle dance is a term used in beekeeping and ethology for a particular figure-eight dance of the honey bee. By performing this dance, successful foragers can share information about the direction and distance to patches of flowers yielding nectar and pollen, to water sources, or to new nest-site locations with other members of the colony.

Cases

ZigBee protocols are intended for embedded applications requiring low power consumption and tolerating low data rates. The resulting network will use very little power. Some of the typical application areas of ZigBee include home automation, wireless sensor networks, industrial control systems, embedded sensing, medical data collection, smoke and intruder warning, building automation, remote wireless microphone configuration.

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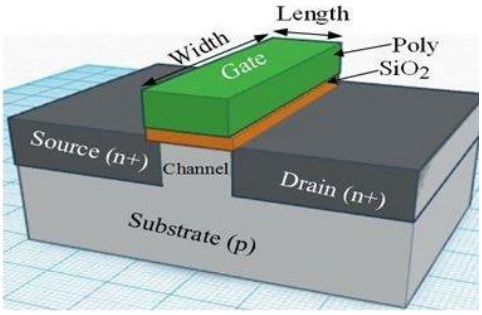
R.V.S.Swaroopa

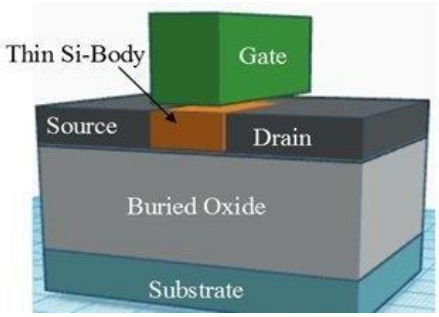
Evolution of FET

Introduction



Metal oxide semiconductor in the name MOSFET stands for the thin insulating layer of silicon oxide layer in the region between metal and semi conductor. The term field effect stands for the fact that the operation of the device mainly depends on the electric field applied between its terminals called GATE and SOURCE analogous to the base and collector in transistor to control the current through it. MOSFETs has several advantages because of its high scalability and miniaturisation. It can be scaled down to small dimensions. Numerous modern technologies would not exist without the

Silicon-On-Insulator (SOI)



The main difference between conventional MOS structure and SOI MOS structure is that SOI device has a buried oxide layer, which isolates the body from the substrate.

Advantages of SOI Devices:

- Owing to oxide layer isolation, the drain/source parasitic capacitances are reduced. So, the delay and dynamic power consumption of the device is lower compared to bulk CMOS.
- Due to an oxide layer, the threshold voltage is less dependent on back gate bias compared to bulk CMOS. This makes the SOI device more suitable for low power applications.

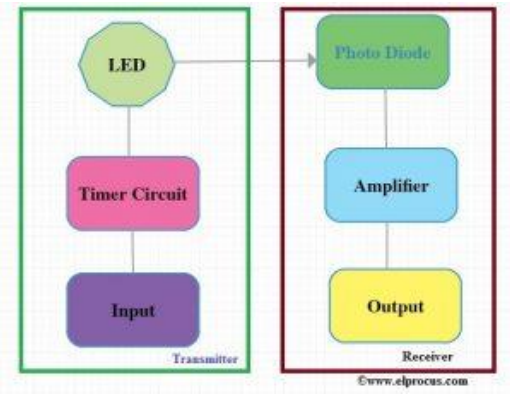
I. POOJA
16A31B0406

Li-Fi Technology

Introduction

Li-Fi-light fidelity is similar to Wi-Fi technology and it is one of the future wireless communication technologies. The main feature of this technology includes fully networked, bidirectional and high-speed wireless.

Li-Fi system mainly includes two parts namely the transmitter and receiver. The input signal at the transmitter section can be modulated with a specific time period then send the data using LED bulbs in 0's and 1's form. Here, the flashes of LED bulbs are denoted with 0's and 1's. At the receiver end, a photodiode is used to receive the LED flashes strengthens the signal & gives the output.



Working

Li-Fi is a VLC (visible light communications) system and the speed of this system is very high. Li-Fi uses normal LEDs to allow the data to transfer and increase the speed up to 224 Gigabits/sec. The data transmission of this technology can be done via illumination. The essential devices of this system are the bright light emitting diodes.

Advantages

- Speed-The speed of the Li-Fi is very high, and we can watch the videos without buffering.
- Security- The light of the Li-Fi doesn't run through the partition, therefore, it is more protected and hacking is not possible.
- Risk-free-Li-Fi utilizes light waves which are harmless.
- Consistent- The data transfer is more protected.

Ms.D.V.V.Lakshmi

Asst.Prof-ECE