EC-Tech Chronicle

2016-17

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 / 2016-17

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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)

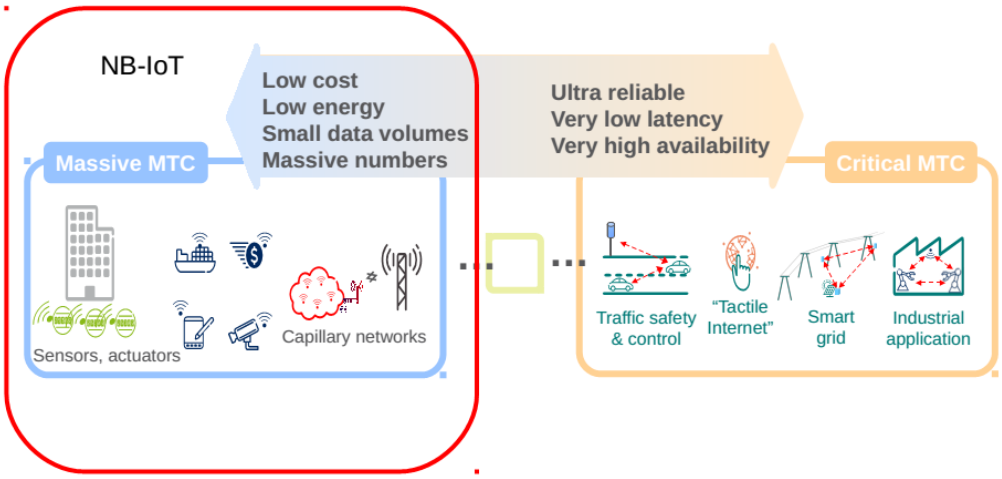
PSO-1	The ability to apply concepts in electronics and communication engineering, to design and implement complex systems in the areas related to analog and digital electronics, communication, signal processing, VLSI & ES.
PSO-2	Ability to provide discerning solutions based on the their expertise in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

NB-IoT

NarrowBand-Internet of Things (NB-IoT) is a standards-based low power wide area (LPWA) technology developed to enable a wide range of new IoT devices and services. NB-IoT significantly improves the power consumption of user devices, system capacity and spectrum efficiency, especially in deep coverage. Battery life of more than 10 years can be supported for a wide range of use cases.



New physical layer signals and channels are designed to meet the demanding requirement of extended coverage – rural and deep indoors – and ultra-low device complexity. Initial cost of the NB-IoT modules is expected to be comparable to GSM/GPRS. The underlying technology is however much simpler than today's GSM/GPRS and its cost is expected to decrease rapidly as demand increases.

Supported by all major mobile equipment, chipset and module manufacturers, NB-IoT can co-exist with 2G, 3G, and 4G mobile networks. It also benefits from all the security and privacy features of mobile networks, such as support for user identity confidentiality, entity authentication, confidentiality, data integrity, and mobile equipment identification. The first NB-IoT commercial launches have been completed and global roll out is expected for 2017/18.

Benefits

NB-IoT consumes minimal power when it's operating.

NB-IoT-only components cost less.

NB-IoT may be able to provide deeper building penetration than LTE-M.

Mrs.G.Srilakshmi
Asst.Professor
Dept of ECE

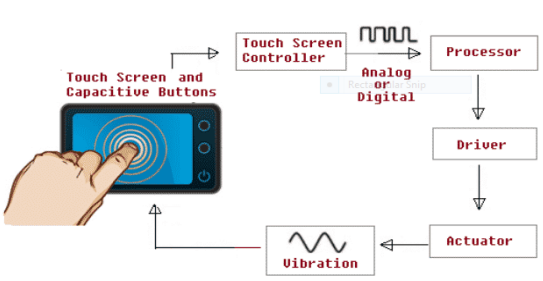
Haptic Technology

Objective

The word Haptic comes from the Greek verb haptesthai, which means "to contact or to touch". Haptic technology adds the consciousness of touch and feeling to computers. It is a tactile feedback technology which takes advantage of the sensitivity of touch which could be by applying forces, vibrations, or motion to the user and recreates actions. Haptic Devices are two types: Active and Passive.

Working

The input to the Haptic Technology System may be a touch, a press on the capacitive buttons on the touchscreen. This serves as an input or the trigger signal which is sent to the touch screen controller. The sensors in the device sense the change in the amount of force applied, change in the angle of the input and sends the information to the processor. The information is further processed generating a waveform which could be either analog or digital which acts as an input to the driver circuit and specific instructions are given to actuator to generate a pattern that creates a vibration. This feedback from actuator which is given back to the touchscreen device acts as a force feedback. The user thus feels this force feedback virtually.



Applications and Advantages

Gaming Industry, Medical Applications, Military Applications, in the field of Entertainment, Arts and Design, Robot Design and Control, Neuroscience, Psychophysics, Mathematical modeling and simulation. The advantages are Digital world can be experienced.

Name: k. syamala

Roll no: 16A31A04J3

Analysis of Short range Wireless Communication Protocols

Wi-Fi is a technology based on the IEEE 802.11 suite of standards that uses radio frequencies (RF) extend wired Ethernet-based local area networks (LAN) to Wi-Fi-enabled devices, allowing the devices to receive and send information from the internet.

Li-Fi is a form of visual light communication that uses light waves from LED bulbs for high-speed wireless communication. It is used to exchange data quickly and securely at a much lower power level compared to Wi-Fi.

Bluetooth sends and receives radio waves in a band of 79 different frequencies (channels) centered on 2.45 GHz, set apart from radio, television and cellphones, and reserved for use by industrial, scientific and medical gadgets. Bluetooth's short-range transmitters have very low power consumption and are more secure than wireless networks that operate over longer ranges, such as Wi-Fi.

ZigBee is a 2.4 GHz mesh local area network (LAN) protocol. It was developed as an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios.

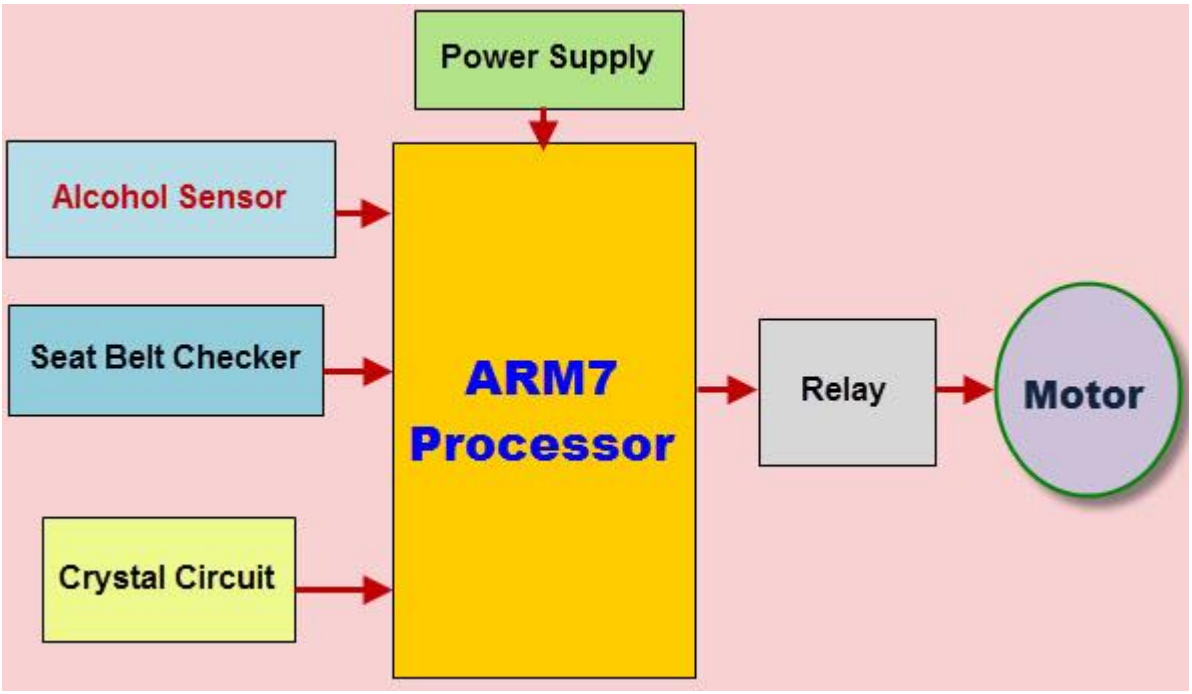
TECHNOLOGY	APPLICATION	SUCCESS METRICS	DATA RATE	RANGE
Wi-Fi	LAN, Internet	Speed ,Flexibility	1-7 Gbps	100m
Li-Fi	LAN, Internet	Security,Speed,Cost	1-3.5 Gbps	10m
Bluetooth	PAN	Cost Convenience	48Mbps	<300m
Zigbee	Sensor Networks	Reliable, Power, Cost	250Mbps	70-300m

Ch,Lakshmi Narayana
Asst.Professor
Dept of ECE

Drunken People Identification using ARM Microcontroller

Objective: Nowadays, many accidents are occurring due to the rash driving by drunken people and this eventually may lead to the loss of many lives. The driving of drunken people leads to death and this problem arises due to the improper checking by the police. To overcome this problem the ARM processor project is developed as a solution for the identification of drunken people to avoid accidents.

Description: This proposed system uses an ARM7 TDMI advanced version microprocessor which acts as the heart for whole system. It is an effective system that ensures multiple functions in a single car. This system automatically checks the following aspects: whether the person is drunk or not, seat belt insertion, and vehicle driving with the use of sensors.



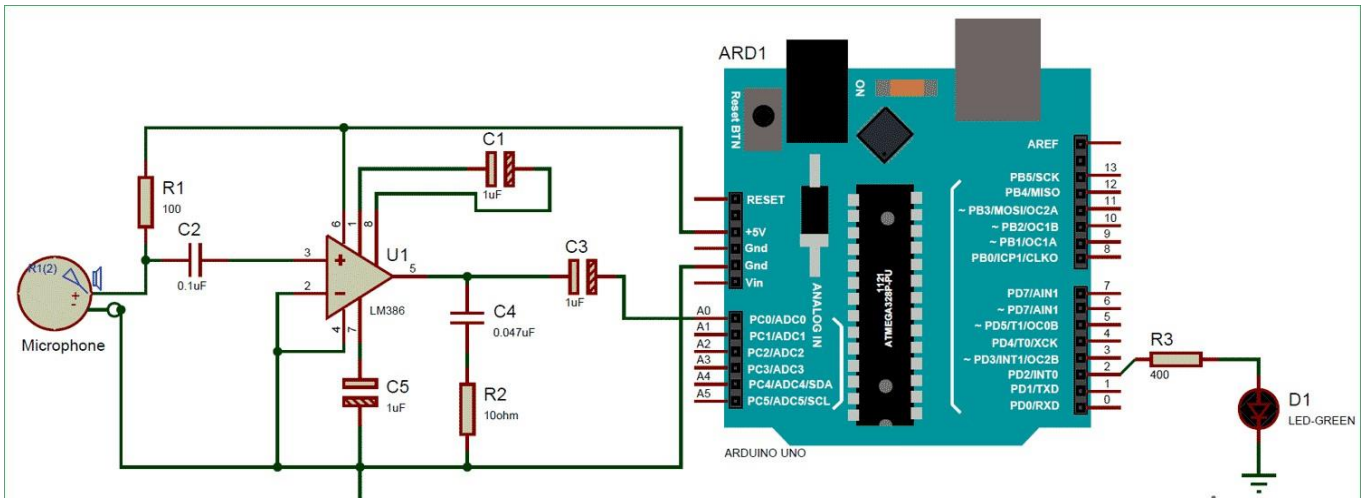
Conclusion: If this prototype detects the drunken people by alcohol sensor or improper seat belt insertion by sensor,then it automatically stops the vehicle with the help of the DC Motor interfaced to the microcontroller by using relays to perform the operation.

Mrs.P.Sunitha
Assoc.Professor
Dept of ECE

Measuring Sound/Noise Level in dB using Arduino

Objective: Noise pollution has really started to gain importance due to high population density. A normal human ear could hear sound levels from 0dB to 140dB in which sound levels from 120dB to 140dB are considered to be noise. Loudness or sound levels are commonly measured in decibel(dB), we have some instruments which could measure the sound signals in dB but these meters are slightly expensive and sadly we do not have an out of box sensor module to measure sound levels in decibels. And it is not economical to purchase expensive microphones for a small Arduino project which should measure the sound level in a small classroom or living room.

Description: So in this project we will use a normal Electric Condenser microphone with Arduino and try measuring the sound or noise pollution level in dB as close as possible to the actual value. We will use a normal amplifier circuit to amplify the sound signals and feed it to Arduino in which we will use regression method to calculate the sound signals in dB. To check if the values obtained are correct we can use the "Sound Meter" android application, if you have a better meter you can use that for calibration. Do note that this project does not aim to measure dB accurately and will just give values as close as possible to the actual value.



Mr.Ch.Venkateswarlu
Asst.Professor
Dept of ECE

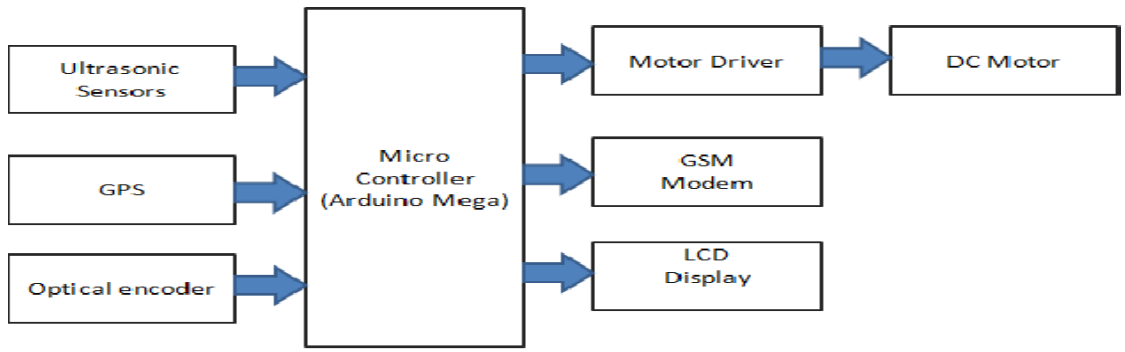
Crack detection in Railway Tracks using Sensors

Objective

In India, railway network plays a major role in transport from one place to another place. If any problem occurs it create a loss in economical side. In today scenario Indian railways has one of the largest network in the world. However based on reliability and safety Indian railways have been not reached the standard levels. One of the main factor is cracks in the railway track. Manual detection of track is not fully effectively in time consumption. So in this paper it is aimed towards the solution to the problem of railway track by using IR sensors to detect the crack and it is implemented using 2500 Microcontroller using GSM based GPS.

Working

The railway system are provide facility such as high speed, with economical, environment friendly, safety, and better characteristics of railway systems. These characteristics can be performed by time to time maintenance and control measurements. But depending on different factors, deformations and derailment may occur on the superstructure of railways. Improper maintenance and the currently irregular and manual track line monitoring mistake from workers also a problem in railway. Such deformation and derailment are determining on time and taking precautions is very important for the safety of railway systems. Therefore effective solution system is design on this problem is introduced in this paper. For providing protection to the railway accident because of cracks occur in the rail road, we design a detection system of cracks in the track based on IR sensor which is operated with GSM & GPS technology. It is used to determine the exact location of railway deformations and send message to the controlling station and signal system of railway will be stop automatically. This system also used in another application where cracking problem is occurred.



Conclusion

The model of Automatic Railway track deducts developed partially to some content. Considering the cost and time constraints the train engine and control room (nearest railway station) have been developed and also we have just created a database using visual basic in pc and we are in process of linking together the train engine and the server.

Mr.G.Sivakumar
Assoc.Professor
Dept of ECE

SigFox

SigFox provides a cellular style network operator that provides a tailor-made solution for low-throughput Internet of Things and M2M applications.

For a host of applications from smart meters to control nodes that need connectivity over long ranges the only option until recently has been to use a cellular connection. This option has several disadvantages because cellular phone systems are focused on voice and high data rates. They are not suited to low data rate connections as the radio interface is complex and this adds cost and power consumption - too much for most M2M / IoT applications. The SigFox network is aimed at providing connectivity for a variety of applications and users. It is not aimed at one area, but at being for general use by a variety of different types of users. The SIGFOX network performance is characterized by the following:

- Up to 140 messages per object per day
- Payload size for each message is 12 bytes
- Wireless throughput up to 100 bits per second

The SigFox radio link uses unlicensed ISM radio bands. The exact frequencies can vary according to national regulations, but in Europe the 868MHz band is used; in the US it is 915MHz; and 433MHz in Asia.

The SigFox radio link uses unlicensed ISM radio bands. The exact frequencies can vary according to national regulations, but in Europe the 868MHz band is used; in the US it is 915MHz; and 433MHz in Asia.

Ch. Lakshmi Narayana
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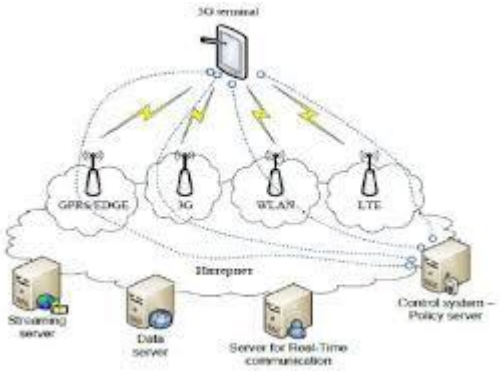
Radio Architecture for 5G

Today there may be five or more radios in a single phone, all competing for the crowded spectrum available. As a result, single-band radios have been overwhelmed with the capacity demanded by users as they expect data-rich content, demanding wider bandwidth in offices, vehicles and homes.Coming soon, 5G will introduce 10Gbit/s data rates for faster throughput to enable connected environments and expand the IoT at a greater rate than today's 4G networks.Multi-band radios are selected in designs because they make more spectrum bandwidth accessible. The landscape of 5G is likely to be a 'shared space' with 4G networks, and one where they jointly access legacy and new bands, including the sub-1GHz band which is used for voice, mobile broadband and the IoT. The mid-band, 1GHz to 2.6GHz, was used by 2G, 3G then 4G and will evolve for 5G. It offers better wide area and indoor coverage than the higher 3.5GHz to 6GHz bandwidth which will be exploited by 5G technology for higher throughput at low latencies. This will enable mission-critical connected applications like autonomous vehicles.



RF designers will have to balance signal bandwidth with power consumption, both of which impact the overall size of the radio.The ability of multi-band radios to be reconfigured allows them to access the sub-6GHz (i.e. 1GHz to 6GHz) spectrum for broader coverage without size or power penalties or, in many cases, the systems bill of materials.Companies like Skyworks have developed multi-band front-end modules. One example is the SKY680xx IoT series, which integrates multiple RF front-end components. The wide bandwidth demands of 5G can be met by moving frequency translation and filtering from the analogue to the digital domain. Two RF converters that are part of this wave of digitisation are the AD9081/AD9082 mixed signal RF converters, introduced by Analog Devices. They have been engineered for developers to install multi-band radios in the same footprint as single-band ones, to increase call capacity three-fold, compared with the call capacity available in today's 4G LTE base stations, says the company.

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