DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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NARAYANA ENGINEERING COLLEGE :: GUDUR

(An Autonomous Institution Under JNTU, Ananthapuramu)

Vision of the Institute

To be one among the premier institutions of the country for professional Education in producing technocrats with Competent skills, Innovative ideas and Ethicsstrong to servethe nation.

Mission of the Institute

- To provide an environment most conducive to learning with state of the art infrastructure, well equipped Laboratories and researchfacilities to imparthigh quality technical education.
- To emphasize on innovative ideas and creative thinking and preparethem to meet the growingchallenges of the industry.
- To inculcate the leadership qualities, multi-disciplinary approach, ethics and lifelong learning in graduates to serve the diversesocietal needs of our nation.

Vision of the Department

To produce technically competent Electronics & Communication Engineers with a motiveto meet the needs of the industry and evolving society through advanced research, professional ethics and lifelong learning.

Mission of the Department

- To enrich the technical skills of the students through effective teaching-learning practices, continuous assessment methods and eminent faculty.
- To continuously enhance creative thinking, research ability and innovative skills of students through training on core and multidisciplinary technologies and skill enhancement programs.
- To inculcate leadership qualities, ethics, social responsibility and gratitude through outreach programs.

Program Educational Objectives (PEOs)

PEO-1: Attain the global and local opportunities and reach greater heights in their chosen profession by demonstrating technical expertise.

PEO-2: Gain recognition by exhibiting problem solving expertise for addressing significant problems of industry and society.

PEO-3: Become good leaderswith ethics and support, contribute and encourage diversity and inclusiveness in theirworkplace and society.

Program Specific Outcomes (PSOs)

PSO-1: Responsive to ideas: Apply the knowledge on core Electronics and Communication Engineering in orderto develop skillsto analyze, designand develop innovative solutions for the real worldproblems.

PSO-2: Domain Expertise: To develop interpersonal skills to demonstrate proficiency using the latesthardware and softwaresolutions by maintaining professional and societal responsibilities.

Program Outcomes(POs)

PO-1: Engineering knowledge: Apply the knowledgeof mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-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.

PO-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.

PO-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 validconclusions.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineeringactivities with an understanding of the limitations.

PO-6: The engineer and society: Applyreasoning informed by the contextual knowledge to assess societal,health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO-7: Environmentand sustainability: Understand the impact of the professional engineering solutionsin societal and environmental contexts, and demonstrate the knowledge of, and needfor sustainable development.

PO-8: Ethics: Apply ethicalprinciples and committo professional ethics and responsibilities and norms of the engineering practice.

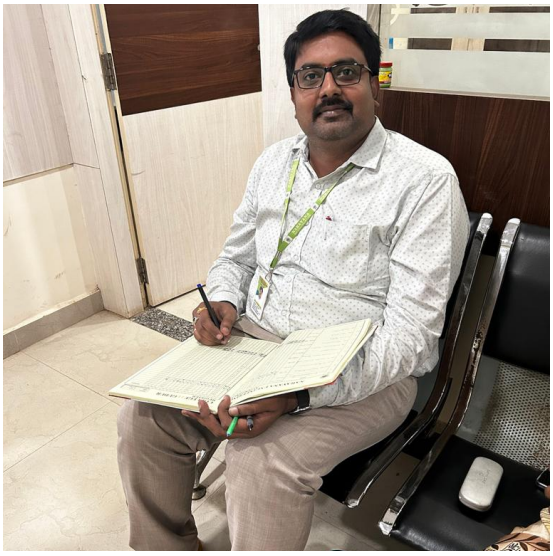
PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multi disciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and withsociety at large,such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and giveand receive clearinstructions.

PO-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 multi disciplinary environments.

PO-12: Life-longlearning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadestcontext of technological change.

Professor Desk



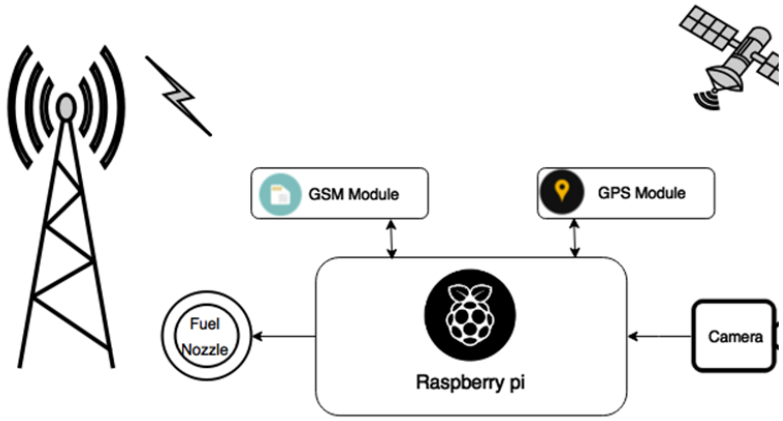
The Department Electronics and communication engineering is an emerging field of engineering. In first half of the course, the students go through the basic engineering concept, physics, mathematics and chemistry. In the second half of the course, the students go through the core study of communication such as design, digital electronics, fundamental of Electronics engineering, signal & circuit, electronic circuits, VLSI, power electronics, computer architecture, and control systems. The Department conduct so many webinars on emerging technologies in our college.

Raspberry Pi Based Intelligent Car Anti-Theft System Through Face Recognition Using GSM and GPS

A major problem today for car owners is that they are in constant fear of having their vehicles stolen from a common parking lot or from outside their home. Image processing based real time vehicle theft detection and prevention system provides an ultimate solution for this problem. In this paper, a low-cost extendable framework for smart car security system is proposed, which consists of a FDS (Face Detection Subsystem), a GPS (Global Positioning System) module, a GSM (Global System for Mobile Communications) module and a control platform.

The system described in this paper automatically take photos of driver and compares his or her face with database to check whether he is an authenticated driver or not. The face detection subsystem bases on optimized PCA algorithm and can detect faces in cars. The other modules transmit necessary information to users and help to keep eyes on cars all the time, even when the car is lost. This system prototype is built on Raspberry pi, controls all the processes. .

The owner is made able to perform car stopping through the message from his mobile. The GPS module in the car detects the location of the car. So by this system the identifification of the thief and the location of the car are simply smarter and cheaper than traditional one



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Smart Receptionist with Smart Lock System

Security and safety is increasing day by day and with improvements brought in the past decade and innovations to bring comfort in our lives. In today's world technology has become a part of an integrated part of the society and therefore the security of an individual's home, office or their organization had to be considered with upmost priority. Smart Receptionist with a smart lock system is therefore mainly designed and developed for security system purpose.

The smart security system is used in situation to see visitor when the main door of office or organization is closed. The purpose of this system is to control the door lock using RASPBERRY PI 3. In this system whenever person enters the office door, image of person is captured by CAMERA MODULE which is compared with database. If the persons images is matched with the database the SOLENOID LOCK opens, but when the image is unidentified it Emails the owner requesting to allow or deny the access.

The system is developed to increase the security level which is called as "Smart Receptionist with Smart Lock System". The system is designed in such way so as to open the door using Raspberry pi 3. And give a access only to authorized person. This effective system provides access control to the door and security system which is based on a face recognition pattern.

19F11A0428

Video Calling/Recording Smartphone Stand

COVID-19 brought the world on its knees starting from 2020 restricting outdoor movement and starting a brief era of work from home. This work from home culture relies heavily on video calling for communication. Also online video platforms have boosted the need for video recording which requires video recording and uploads.The problems with video calling and video recording include maintaining phone alignment and position. User needs to either hold phone in one arm to record or place on a stand on the desk which can record video from bottom up showing users face chin up and ceiling in background. Another issue is face lighting along with charging issue created by charging cable length limitation.

19F11A0436

Waterproof Action Camera Drone

In the world of filmmaking, Drones have opened a world of perspectives and camera angles. In recent years, the explosion in the availability of affordable drones has made it possible for anyone to take stunning aerial shots. Aspiring filmmakers, as well as seasoned directors, have begun exploring the endless creative possibilities offered by drones.

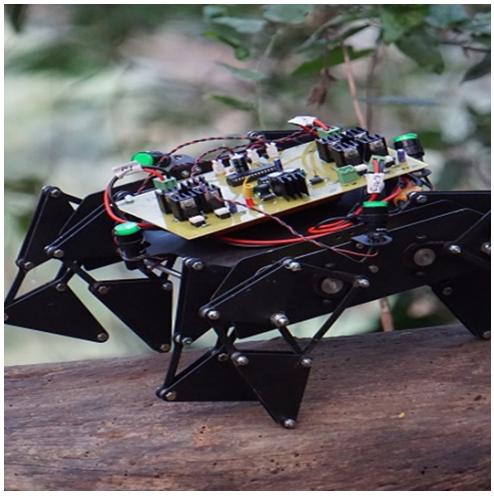
Despite all their advantages, most modern Drones suffer from one major shortcoming- they are extremely vulnerable to water damage. Most drones have a porous outer shell allowing water to seep in and damage the internal circuitry.Due to this fatal flaw, most drones lose their operational capabilities during heavy rains and thunderstorms.

This waterproof action camera drone aims to tackle the vulnerability of conventional drones. Boasting a range of up to a kilometre, this drone is suitable for scouting, as well as shooting. Moreover, this drone can effortlessly carry a payload of up to 500 grams, allowing it to support all kinds of action cameras. Its waterproof body makes sure water remains away from its internal mechanism and circuitry.Thus, allowing the drone to remain operational and letting you shoot stunning and scenic footage even in the pouring rain.

19F11A0440

8 Leg Spider Robot Using Theo Jansen Linkage

Theo Jansen is a renowned Dutch artist best known for his Strandbeest (Dutch for beach animals). These kinetic sculptures are designed to be a fusion of art and engineering. Inspired from nature and bearing an uncanny resemblance to the movement of animals, these mechanisms are built using an array of triangles and connecting links that convert the rotation of an axle into the stepping motion of six or more limbs. Moreover, since these mechanisms mimic the movement of animals, they are far more efficient compared to wheels when operating in sand and on rough terrain. Designed to mimic the movement of arachnids, this eight-legged spider robot builds upon the ingenuity of the Theo Jansen Mechanism.



This system uses a dual motor setup paired to six gears which in turn actuate the eight legs in synchrony. Its remote-control operation enables the operator to control this robot wirelessly. This system also has four 12v LED indicator lights on either side to signal its direction of movement.This system uses a dual motor setup paired to six gears which in turn actuate the eight legs in synchrony. Its remote-control operation enables the operator to control this robot wirelessly. This system also has four 12v LED indicator lights on either side to signal its direction of movement.

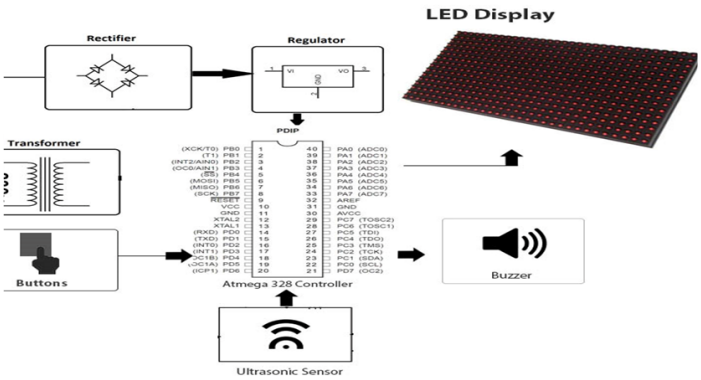
The spider robot makes use of a kinematic motion that is run by theo jansen linkages. This allows to turn the rotational motion of a DC motor into a step motion that mimics animals. The robot makes use of 2 x DC motors o dive the mechanism. The motors are mounted on 2 opposite sides of the robotic chassis or main frame. The drive produced by the motors are used to drive a gear which in turn is connected to 2 more hears. The 3 gears are used to drive a combination of 8 legs. The gear movement is converted into a stepping motion by making use of jansen linkages. This linkage structure allows to provide all direction motion to the combination of 8 legs. The robot can not only move backward and forward but also turn in desired directions. The spider controller is made using a microcontroller based circuitry. The user makes use of a remote controller with 4 x Push buttons. The push buttons when pressed send a particular direction command wirelessly. The receiver controller mounted on robot receives this command and sends it to microcontroller for processing. The microcontroller receives this command and uses the motor drivers to power motors in desired direction thus achieving forward backward left and right direction movement of the spider robot.

19F11A0445

Digital Nameplate with Visitor Sensing

Many houses and offices use nameplates at their property gates. Nameplates have gained huge popularity and people have been trying new and creative nameplate designs for their beloved properties. But Nameplates have a limited size and can only show limited text.Well we here take nameplates to a whole new level by making digital nameplates, that not only display family/office name but also welcome guests when they arrive.

The system makes use of an Atmega 328 Microcontroller along with ultrasonic sensor, LED display board, buzzer, buttons for operation along with some basic electronics components and PCB Board to develop the system.The controller has the input message to be displayed on LED board stored in it. The message could be the Family or office name. This could also contain the names of family members in the family or the company tagline along with company name. The message is with name is showing as scrolling display on the system. This allows a bright moving LED nameplate outside the house or office. The system also consists of an ultrasonic sensor integrated to it.The ultrasonic sensor transmits ultrasonic frequency which does not return to it unless some object stands in 1 meter proximity of it. As soon as a guest arrives and stands in front of it, the ultrasonic waves are reflected from the user and received by sensor.



This trigger on sensor is detected by the microcontroller. The microcontroller now displays the welcome message stored in it. The message may be message like “Welcome to ”. This allows for an automated greeting message to the guest. Also if the family or office is closed or out an away message can be set on the system. This message could be “We are away for Now will be Returning by 26- June”. This allows for a digital fully automated modern nameplate with visitor sensing

19F11A0455

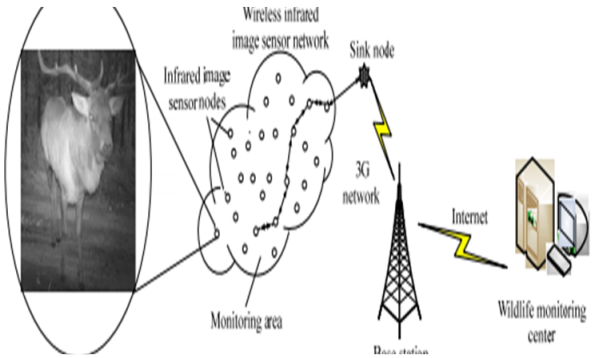
IOT Coal mine system for safety alerting and monitoring

Safety is the most vital part of any type of industry. In the mining industry safety and security is a fundamental aspect of all. To avoid any types of accidents mining industry follows some basic precautions. Still accidents take place in underground mines due to rise in temperature, increased water level, and methane gas leakage. Here we provide safety to worker. When worker in danger he can press panic switch inform security. To enhance safety in underground mines, a reliable communication system must be established between workers in underground mines and fixed ground mine system. The communication network must not be interrupted at any moment and at any condition.

Mines are the world's most dangerous place to work because in the mines, explosion often happens and thousand people are dying. And a recent report states that in such mine accidents an average of around 12,000 people have died. Coal is a nonsustainable origin that cannot be widely replaced by humans, there are several mishaps of coalmines occurring in the mines, and the diggers are putting their lives at risk, by working in the coal mines, even once in a while they end up losing their lives in the coal mines that are an unfortunate part. Mainly such mishaps happen as a direct result of the old equipment and wired devices, resulting in the end, mishandling, spillage of the noxious gases in the coal mines, pose tremendous hazards to the excavators inside the coal mines. So we've designed the coalmine protection system to stay away from this problem. We tackled the issues in our research by testing each of the information collected by the sensors, we use and finishing the analysis using the Thinger system. Controlling can be done automatically or manually.

19F11A0459

A Wildlife Monitoring System Based on Wireless Image Sensor Networks



Survival and development of wildlife sustains the balance and stability of the entire ecosystem.
Wildlife monitoring can provide lots of information such as wildlife species, quantity, habits, quality of life and habitat conditions, to help researchers grasp the status and dynamics of wildlife resources, and to provide basis for the effective protection, sustainable use, and scientific management of wildlife resources. Wildlife monitoring is the foundation of wildlife protection and management. Wireless Sensor Networks (WSN) technology has become the most popular technology in the field of information. With advance of the CMOS image sensor technology, wireless sensor networks combined with image sensors, namely Wireless Image Sensor Networks (WISN) technology, has emerged as an alternative in monitoring applications.
Monitoring wildlife is one of its most promising applications. In this paper, system architecture of the wildlife monitoring system based on the wireless image sensor networks was presented to overcome the shortcomings of the traditional monitoring methods. Specifically, some key issues including design of wireless image sensor nodes and software process design have been studied and presented. A self-powered rotatable wireless infrared image sensor node based on ARM and an aggregation node designed for large amounts of data were developed. In addition, their corresponding software was designed. The proposed system is able to monitor wildlife accurately, automatically, and remotely in all-weather condition, which lays foundations for applications of wireless image sensor networks in wildlife monitoring. The sink node aims at connecting the wireless image sensor network with 3G telecommunication network. It establishes a reliable connection and two-way data transmission between a remote server or mobile users and a wireless image sensor network to meet the practical needs.
The sink node consists of processor, memory, aZigBee transceiver, a 3G communication module andother expanded interfaces. Considering the largeamount of data of the sink node received, PXA270from Marvell has been chosen as the core processormodule. It incorporates the Intel XScale technologywhich complies with the ARM* version 5TEinstruction set (excluding floating-point instructions)and works at 520 MHz.

To work with the PXA270,two chips of HY57V561620 from Hynix have beenselected as 64 MB SDRAM, and two chips ofTE28F128J3C-150 from Intel have been selected as64 MB Flash. CC2520 has been adopted as theaforementioned ZigBee transceiver. We chooseSIMCom SIM5218 as the 3G module.

Specific hardware architecture of a wireless infraredimage sensor node/module block diagram.

The processor used in our sensor nodes is theAtmel AT91SAM7X512, which is based onARM7TDMI (a 32-bit RISC architecture). It operatesat a maximum speed of 55 MHz and features 512 kBof flash and 128 kB of SRAM. Typical core supply is1.8 V. I/Os are supplied at 1.8 V or 3.3 V and are 5 Vtolerant. It can set the parameters of the imager,instructs the imager to capture a frame and run localcomputation on the image to produce an inference.We adopt TI CC2520 as the ZigBee transceiver. TheCC2520 is TI's second generation ZigBee/IEEE802.15.4 RF transceiver for the 2.4 GHz unlicensedISM band. This chip enables industrial gradeapplications by offering state-of-the-artselectivity/co-existence, excellent link budget,hardware support for frame handling and low voltageoperation, thus reducing the load on the hostcontroller. It connects to the processor through SPI.The image sensor module for our platform isOmniVision OV7670 combined with embedded DSPOV529. The OV7670 image sensor is a low voltageCMOS sensor that provides the full functionality of asingle-chip VGA camera and an image processor.The OV7670 provides full-frame, sub-sampled orwindowed 8-bit images in a wide range of formats,operating at up to 30 frames per second (fps). It iscontrolled through the serial camera control bus(SCCB) interface. The OV529 serial bridge containsan embedded JPEG CODEC and a controller chipthat can compress and transfer image data from thecamera sensor to an external device. The imagesensor module connects to the processor throughUART. HC-SR501 sensor module, as the pyroelectric infrared sensor, is cheap, high sensitivityand its detection distance is 7 meters. Its workingvoltage is 4.5-20 V, and the output level is 3.3 Vor 0 V. In addition, a solar energy module isdeveloped, which consists of a microcontrollerMSP430, solar cells, rechargeable battery,measurement circuits, BUCK circuits, etc, to supply power to the node efficiently.

The sink node is responsible for building andmanaging a network. It allows or denies any sensornode to join the network. It collects data of thewireless infrared image sensor nodes and sends themto the base station via 3G networks. Its work processincludes node wake, building network, joining node,receiving data, sending data, and returning todormancy.

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