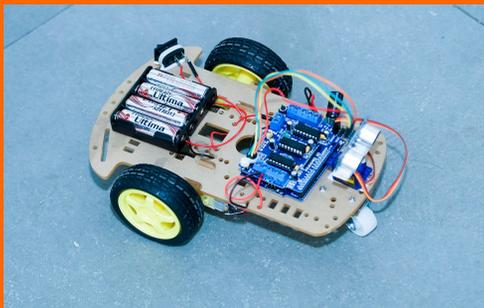
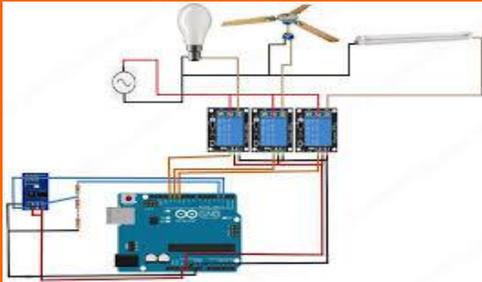


EMBEDDED SYSTEM USING ARDUINO



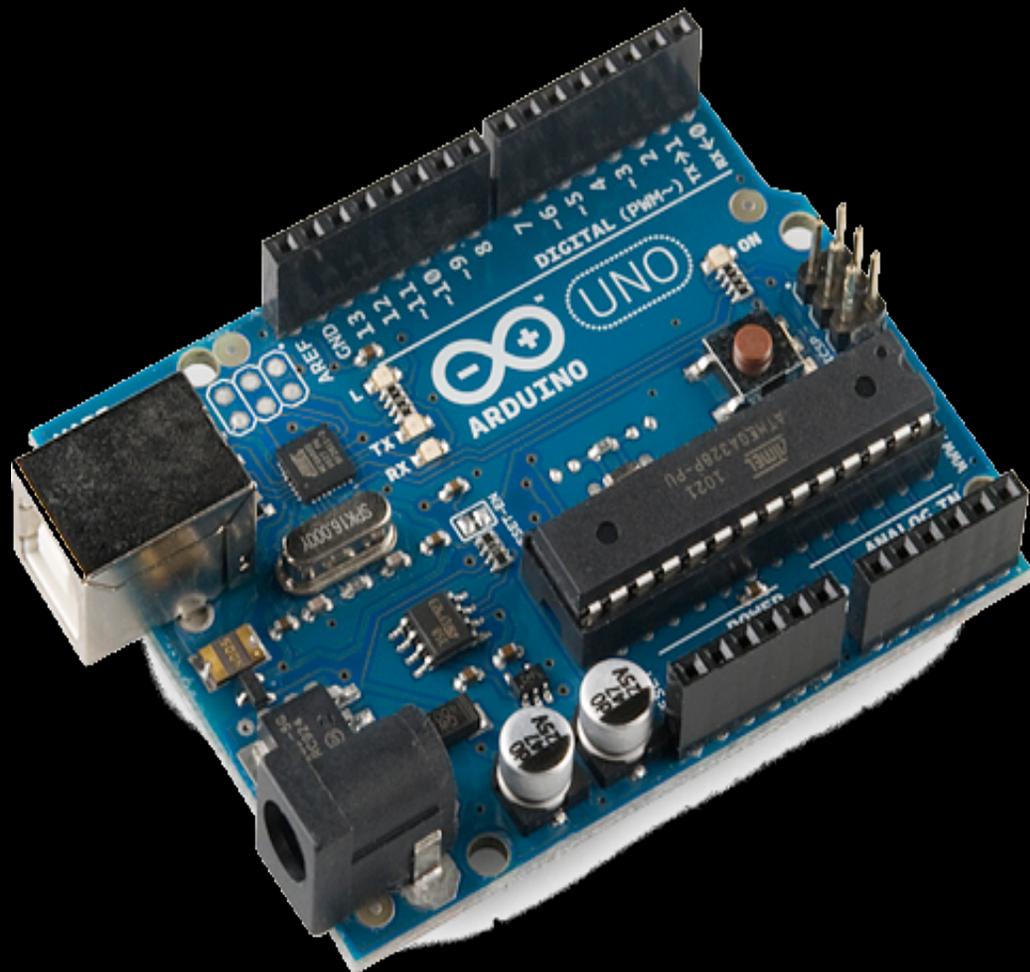
Bluetooth Controlled Car



Home Automation System



Line Following Robot





Message From Dean, FCAIT

Prof. R. P. Soni

The Arduino and Raspberry Pi kits have become very popular amongst students, hobbyists and novices who want to experiment with their ideas to build primitive working prototypes of projects which they may improve upon later amalgamating other technologies. The FCAIT offers support and knowledge about these kits as part of the curriculum and last year it was found that several students had prepared projects using Arduino and displayed working models during CyberShadez 2017.



In 2003, the Arduino project was started as a program for students to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. It is interesting to note that the name Arduino comes from the name of a bar in Ivrea, Italy, where some of the founders of the project used to meet.

The Raspberry Pi was launched in February 2012, a computer, which is now in its third generation, became an instant hit with computer geeks, despite its original purpose as an education device designed to encourage interest in computing among school children. 10 million pieces have been sold so far beating the wildest expectations of its creators.

This issue is devoted to articles prepared by students on embedded systems centered around Arduino. You too should continue to write about the technologies you are fond of and submit your writeups to editorial board. They will take it further to make it worthy of publishing in your own magazine.

-R. P. Soni

From Editorial Desk

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In recent times, there has been wide acceptance of Open Source Hardware equipments by developer community as well as users. Thus, there has been innovations in various industrial products through electronics and hardware prototyping. A layman is able to learn various Arduino functionalities and apply them to develop basic as well as professional products.



With this issue, we put forth some projects of Embedded Systems on Arduino developed by the SY - BCA students.

There is the snapshot of the National Level Technical Festival CYBER SHADEZ 2017 on the theme "5G".

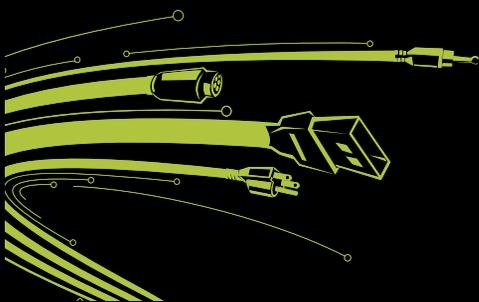
The issue portrays the University extravaganza of the I.M. Nanavati Sports Meet 2017 (hosted by the FCAIT) and ASMITA, the youth festival. We have encompassed the felicitations of the students who have participated and brought laurels to the institute. The issue holds descriptions of CSI, CWDC, ISR, Educational tours, Farewell and other extra curricular activities organised by the institute. There are Faculty Achievements inked to decorate the academic enhancements. The spotlight on the students in different media coverage is showcased.

So just take a dip into this literary ocean and enjoy your reading.

We would like to hear the suggestions and queries from you at dkosmos@glsica.org.

Have a happy reading!!!!!!

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Home Automation System Using Android App



Nowadays, people have smartphones with them all the time. So it makes sense to use these to control home appliances. Presented here is a home automation system using a simple Android app, which you can use to control electrical appliances with clicks.

Commands are sent via Bluetooth to Arduino Uno. So you need not get up to switch on or switch off the device while watching a movie or doing some work. The circuit is built around Arduino Uno board, Bluetooth module and a 8-channel relay board. The number of channels depend on the number of appliances you wish to control. Arduino Uno is powered with a 12V DC adaptor/power source. The relay module and Bluetooth module can be, in turn, powered using a board power supply of Arduino Uno.

Bluetooth module supports master and slave mode serial communication (9600-115200 bps) SPP and UART interface. Using these features it can communicate with other Bluetooth-enabled devices like mobile phones, tablets and laptops. The module runs on 3.3V to 5V power supply.



A relay allows you to turn on or turn off a circuit using voltage and/or current much higher than what Arduino could handle. Relay provides complete isolation between the low-voltage circuit on Arduino side and the high-voltage side controlling the load. It gets activated using 5V from Arduino, which, in turn, controls electrical appliances like fans, lights and air-conditioners. The software program is written in Arduino programming language called Processing.

Arduino Uno is programmed using Arduino IDE software. The app on your smartphone sends data when you click on buttons in the mobile to Bluetooth module connected with Arduino board. Received data of the Bluetooth is connected to Arduino. Arduino Uno processes the received data and controls the relay board accordingly.

Krunal Patwa, Manan Purohit, Dhaval Shah, Parvez Momin, Badrish Soni, Vishal Solanki, BCA SEM-IV

Laser Light Security System Using Arduino

This system is used for security. It consists of LASER light and LDR. The LDR module has an onboard potentiometer to adjust the sensitivity of LDR, so that it only senses laser light falling onto it.

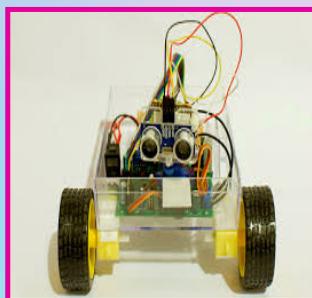
The concept is quite simple and similar to what we see in movies where antique, priceless ornaments are protected under laser lights. As someone crosses these lights, an alarm runs on to indicate unauthorised presence. This project works similarly.

In normal conditions, where there is always laser light falling on the LDR, the LDR module always gives a high signal to microcontroller. When someone crosses this laser light, it will behave as an obstruction between the LDR module and laser light, resulting in no light falling on LDR. In such cases LDR module gives a low signal to the Arduino, which indicates it to switch on an alarm (or LED in this case).

Here we are using only a pair of LDR and LASER module. But for better and efficient security results, a group of such LASER and LDR modules can be used simultaneously. We can also use only one laser light with an optical system which will scatter light on different LDR modules. This system can also be used to count the no. of visitors and hence control something through this data. It will enhance the effective distance (can be used for long range projects) and accuracy.

Jay Argade, Malav Bhavsar, Muskan Chandnani, Krupali Mehta, Nisarg Patel, BCASEM-IV

Obstacle Avoidance Robotic Vehicle Using Ultrasonic Sensor for Obstacle Detection



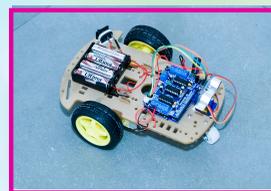
The obstacle avoidance robotics is used for detecting obstacles and avoiding the collision. This is an autonomous robot. Ultrasonic sensor is most suitable for obstacle detection and it is of low cost and has high ranging capability. When an electrical pulse of high voltage is applied to the ultrasonic transducer it vibrates across a specific spectrum of frequencies and generates a burst of sound waves.

Whenever any obstacle comes ahead of the ultrasonic sensor the sound waves will reflect back in the form of echo and generate an electric pulse. It calculates the time taken between sending sound waves and receiving echo. The echo patterns will be compared with the patterns of sound waves to determine detected signal's condition.

The ultrasonic receiver shall detect signal from the ultrasonic transmitter while transmit waves hit on the object. The combination of these two sensors will allow the robot to detect the object in its path. The ultrasonic sensor is attached in front of the robot and that sensor will also help the robot navigate through the hall of any building.

Bhrgav Tank, Malini Sathyablan, Disha Shah, BCA SEM-IV

Smart Car (Bluetooth Controlled Car)



The Smart Car Model is based on the Arduino and bluetooth connection. It is controlled by the mobile application. It is basically consists of DC Motors, Motor Driver, Power Bank, Battery Connector, Buzzer, Ultrasonic Sensor, LED Lights, Arduino UNO, Bluetooth Module etc.

Bluetooth controlled car is controlled by using Android mobile phone instead of any other method like buttons, gesture etc. Here only needs to touch button in android phone to control the car in forward, backward, left and right directions. So here android phone is used as transmitting device and Bluetooth module placed in car is used as receiver. Android phone will transmit command using its in-built Bluetooth to car so that it can move in the required direction like moving forward, reverse, turning left, turning right and stop. Bluetooth Module HC Bluetooth module consists two things one is Bluetooth serial interface module and a Bluetooth adaptor. Bluetooth serial module is used for converting serial port to Bluetooth. This car have two dc motors at its front and rear side. Front side motors are used for giving direction to car means turning left or right side (like real car steering feature). And rear side motors are used for driving the car in forward and backward direction. A Bluetooth module is used to receive command from android phone and Arduino UNO is used for controlling the whole system.

We have given the power to the smart car model through the power bank. The buzzer is used to sound alert.

The ultrasonic sensor is used to detect objects or obstacles. if any obstacles found in the range of the sensor the buzzer beeps. In Smart car model we have used the LED lights (sight indicator, front and back light for signal). LED lights are controlled by the mobile application.



Application Interface for car

Chetan Mahajan, Suman Mandwani, Payal Sangtani, Khushbu Shah, BCA SEM-IV

POV Display Using Arduino

POV is Persistence of Vision. In simple words, When a person sees an object, its image remains in the retina of the eye for a time interval of $1/16^{\text{th}}$ of a second. This phenomenon is known as persistence of vision. This phenomenon is used in the POV Display to form images. We turn the LEDs on and off in such a way that the different images overlap each other forming letters.

The propeller display consists of following blocks.

1. Interrupter Module
2. Microcontroller
3. LED module
4. DC motor
5. DC power supply



Interrupter module consists of two independent, high gain, internally frequency compensated operational amplifiers. Arduino is taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. LED module consisting of 8 bright LEDs.

These LEDs are connected with each of the port pin of microcontroller, with a series current limiting resistor. Repeated scanning of the display is must for continuous vision.

This task is achieved using circular rotation of the whole circuit assembly. So, DC motor is used as the prime mover. For microcontroller, as well as the DC motor, a regulated DC power supply is required. We have to provide +5V to the arduino, while +12V to the motor. Applications can find their way into cost effective solutions for large public displays, information systems for various places as Railway station, bus stands etc.

Darshil Joshi, Divyesh Ahuja, Shrey Shah, BCA SEM-IV

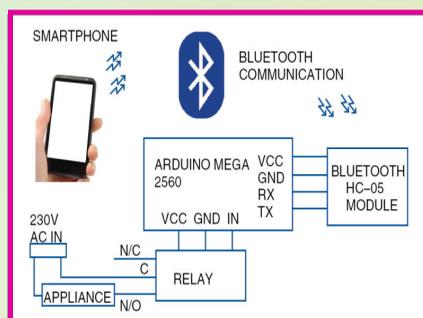
SMALLOW



SMALLOW is an automated house that functions on voice commands given by the users. The Bluetooth device receives this input signal from android device. It is also called voice controlled home automation system.

This system is especially beneficial in case of handicapped or aged people who find it difficult to walk and operate the electrical switches to turn on or off the loads. This system solves this issue as now the user just has to give voice commands to turn on or off the switches.

It also has an ability to accept written commands using a terminal if user is unable to provide voice commands.



SMALLOW uses 'ARDUINO MEGA' to function and decide about the outputs. The Components used in it are Arduino Uno board, buzzer, HC-05 bluetooth module, leds and PIR motion sensor module. The Bluetooth receiver is interfaced with microcontroller in order to accept the commands and then react accordingly.

It is accessible by an Android/iOS application. In future development aspects an GSM 900 module to send messages to the desired module and also you can add Ethernet module to connect it to Internet.

Prem Raval, Vatsal Dave, Riddhi Purani, Sarthak Trivedi, Ayush Patel, Akhilesh Rami, BCA SEM-IV

Ultrasonic Sensing Radar



Radar is an object detection system which uses radio waves to determine the range, altitude, direction, or speed of objects and when ultrasonic waves are used instead of electromagnetic waves, it is called an ultrasonic radar. Radar systems come in variety of sizes and have different performance specifications. The main components in any Ultrasonic radar are the Ultrasonic Sensors. Ultrasonic sensors work on a principle similar to radar or sonar which evaluates attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object. This technology can be used for measuring wind speed and direction (anemometer), fullness of a tank and speed through air or water, humidifiers, sonar, medical ultra sonography, burglar alarms and non-destructive testing. Systems typically use a transducer which generates sound waves in the ultrasonic range, above 20,000 hertz, by turning electrical energy into sound, then upon receiving the echo turn the sound waves into electrical energy which can be measured and displayed.

Shivani Kiri, Hiren Kothiya, Hardik Prajapati, Rahul Rathod, BCA SEM-IV

Line Following Robot

A Robot is any machine which is completely automatic, i.e. it starts on its own, decides its own way of work and stops on its own. It is actually a replica of human being, which has been designed to ease human burden. It can be controlled pneumatically or using the simple electronic control ways.

Robot can be fixed robots or mobile robots. Mobile Robots are robots with a mobile base which makes the robots move freely in the environment. One of the advanced mobile robots is the Industrial based Line Follower Robot. It is basically a robot which follows a particular line path and decides its own course of action which interacts with obstacles. The path can be black line on the white floor (visible) or a magnetic field (invisible). Its application start from basic domestic uses to industrial uses. Line Follower industrial based robot is used to carry the heavy weight parcel or materials from one place to another place. The Line follower robot can also be used to carry children in shopping malls, homes, entertainment places. The use of this robot is to transport the materials industries. The movement of robot is completely depends on the track. The robot can do anything you set them to do.

Industrial Based Line Follower Robot

A Industrial based line follower robot is a robot which follows a certain path controlled by a feedback mechanism.

Building a basic Industrial based line follower robot

Building a basic Industrial based line follower robot involves the following steps:

1. Designing the mechanical part or the body of the robot
2. Defining the kinematics of the robots

NATIONAL LEVEL TECHFEST "CYBER SHADEZ - 2017"

Faculty of Computer Applications & IT (BCA, M.Sc-IT, iMSc(IT) PGDCA) and Faculty of Computer Technology (MCA) hosted the National Level Technical Festival "Cyber Shadez" on 4th March, 2017. The theme of the TechFest was "5G - The Next Generation Wireless Communication".

The objective of the TechFest was to provide a platform for the dynamic young students to showcase their technical talents with competitive spirit. The events organized during the festival were Montage - Poster/Collage Presentation, Web Craft - Removing Bugs from Code, Ad-lib - Extempore, Give and Take - Debate, Gem Collection - Database Treasure Hunt, Jumble Trumble - Rearrange Code Snippet, Artful - Web Page Design, Poster Presentation of Arduino/Raspberry Pi live projects.

The inauguration was graced by the guest presence of Dr. B.H.Joshi, Pro-Vost, GLS University, Dr. Dharmesh Shah, Registrar, GLS University. The Guest of Honour for the event was Mr. Ajay Iyer, Vice President, Product Engineering & Product Delivery, Sterlite Technologies Limited.

Prof. R.P.Soni, Dean, FCAIT welcomed the dignitaries and the participants. He initiated the event by presenting his views of the theme and how 5G Technology will be changing our lives. Dr. B.H. Joshi blessed the event and urged students to find how computer is working as a human brain now a days. Dr. Dharmesh Shah spoke about how this techfest would work as one of the learning tool in student's life. Mr. Ajay Iyer in his keynote address introduced the students to the field of 5G- The Next Generation Wireless Communication. Dr. Harshal Arolkar, Head, M. Sc (IT) proposed vote of thanks.

In the pre-lunch session, four events named Jumble Trumble, Web Page Designing, Poster Presentation of Arduino/Raspberry Pi live projects for UG students and Preliminary round of Debate and Extempore were held in parallel. The students of BCA Sem IV presented various real-life live projects like Home Automation System, Obstacle Avoidance Robotic Vehicle, Line Following Robot, Smart Dustbin, Smart Car Model based on Aruduino / Raspberry Pi. The post lunch session started with Database Treasure Hunt, Web Craft and Poster Presentation in parallel.

The event ended with a prize distribution. The event received positive feedback from students. The staff members of Faculty of Computer Applications & IT and Faculty of Computer Technology along with student volunteers coordinated the entire event with great success.



I.M.NANAVATI GLS UNIVERSITY INTER COLLEGE SPORTS MEET- 2017

Every Year GLS University organizes annual sport meet. This year Faculty of Computer Applications and Information Technology (FCAIT) hosted the "I.M.NANAVATI GLS UNIVERSITY INTER COLLEGE SPORTS MEET - 2017". The Sports Meet was held during 2nd to 7th January, 2017. Various events and games like Cricket, Basket Ball, Foot Ball, Badminton, Kabbadi, Volley Ball and Athletic events were played during the Sports Meet. Around 1200 students participated enthusiastically in various sports events.

FCAIT Achievements in Sports Meet:

- BCA - 1st runner up, Cricket Tournament (Girls)
- BCA - 2nd runner up Cricket Tournament (Boys)
- BCA - 2nd runner up Basket Ball Tournament (Boys)

- Gufran Vhora - Gold Medal, Long Jump
- Ashish Kumar - Silver Medal, Discuss Throw
- Kuntal Panchal - Silver Medal, Long Jump
- Ashish Kumar, Chitra Purohit - Silver Medal, Badminton Mix
- Gufran Vhora - Bronze Medal, 400 Meter Race



Youth Festival - ASMITA

"ASMITA", 2nd Youth Festival of GLS University was organised from 4th to 6th February, 2017, hosted by Faculty of Business Administration. There were 30 events in varied categories such as Academic, Performing Events and Fine Arts. The students of FCAIT performed enthusiastically and won prizes in various events.

Winners are:

Event Name	Student Name	Course Name	Rank
Public Speaking	Riyaz Sidtar	BCA	1 st
Creative Writing	Sharia Syed	BCA	1 st
Western Music	Karan Bhogle	BCA	2 nd
Poetry Recitation	Malini Sathyabalan	BCA	2 nd
Mehndi	Krina Patel	PGDCA	3 rd
Just a Minute	Riyaz Sidtar	BCA	3 rd
Instrumental	Deep Shah	BCA	3 rd
Photography	Dhruv Parmar	iMScIT	3 rd
Fashion Show	The College Team		3 rd



External Achievements

Name of the Student	College Name	College Event Name	Event Name	Rank
Pandeji Vandan	SSCCC	FLASH	Poster Presentation	1 st
Shah Jeel			Paper Presentation	2 nd
Shetty Indu				
Shah Abhishek	Rollwala College of Computer Science	Tech kaushalya 2016	Treasure Hunt	1 st
Rana Mehul				
Sathwara Bhavesh				
Dani Shubhanshu	NRBBA	Vishleshan Plus	Solo Dance	1 st
Tanwani Vishal	NIEM (National Institute of Event Management)	Event Manager of the Year Awards	Event Manager of the Year Awards	1 st
Rabdu Niyomi				
Shah Jeel	N. V. Patel College of Pure and Applied Science, Vallabh Vidhyanagar	Techno Astrum 2016 State Level IT Competition	Poster Presentation	2 nd
Pandeji Vandan				
Raghani Khushabu	Charusat University	IGNITE-2017 State Level Competition	Brain Scratch	1 st
Tanwani Vishal			DIGI Web	2 nd
Tanwani Mohit			Brain Scratch	2 nd
Shetty Indu				
Mehlana Vraj			MOUSELESS	1 st
Tanwani Vishal	RBIMS	AGRIM TECHFEST-2017	IT-QUIZ	2 nd
Sadnani Muskan			Add Made	2 nd
Raghani Khushabu				2 nd
Lakhotiya Amit				2 nd

