DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

E-MAGAZINE

Revolution Advancement in Electronics

Department of Electronics and Communication Engineering
Anantha Lakshmi Institute of Technology and Sciences

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To produce professional engineers in Electronics and Communication with Ethical consciousness to meet local and global demands.

M1: Providing an ambience of teaching-learning process through the state-of-art infrastructure and modern tools for impacting latest technical skills among the students.

M2: Providing students centric facilities and training for the students to acquire a strong collaboration with Electronics Industry.

M3: Providing value-based education to find solutions for societal needs.

Program Educational Objectives (PEO's):

PEO1: Graduates can acquire the competent knowledge in Electronics and Communication Engineering.

PEO2: Graduates can have successful entrepreneurial and professional careers in the core and allied areas of electronics and communication engineering.

PEO3: Graduates can possess communicative skills and work efficiently on team-based projects in electronics, communication, with a sense of social responsibility.

Program Specific Outcomes (PSO's):

Students must be able to:

PSO1: Design and develop customized electronic circuits for domestic and industrial applications.

PSO2: Analyze and design the Digital Systems in Electronics using hardware and modern tools and fulfill the gap between academics and industry.

PSO3: Apply professional ethics and ethical responsibility to a successful career in open-ended problems of Electronics and Communication Engineering by adhering to technological changes.

Face Tracking and Movement Following Drone

We all must have seen a drone and some of us might have even operated one. Most of the drones available in the market are operated manually either with the help of an RC remote or by using a phone over a WiFi connection. Operating a drone this way can be a bit tricky, especially when there are lots of controls and buttons. To make the experience of flying a drone even more fun, I have decided to do something different by building a smart drone control system that can be operated with the help of our facial gestures. If we want the drone to take footage of a particular face and track it, then we can use this system.

Here I have used a DJI Tello drone that is programmed and controlled using Python and its SDK. So the components you need here are only a Tello drone and a PC or laptop. That's it.

As I have used the Linux OS, the commands and the setup instructions are based on Linux. You can run Linux on Windows using VirtualBox, an open-source hypervisor that supports a large number of guest operating systems.

First of all, set up the Python environment in the OS. Then install the OpenCV, dlib, NumPy and face recognition Python modules using the following commands:

T… allowing different functions to be performed such as:

L…

sudo pip3 install python-opencv
sudo pip3 install Face_recoginition
sudo pip3 install numpy

After installing the above modules, install the Python modules that enable connection with the Tello drone to control it. For this, there are various Python modules available but here we will use the Tello Python to control the Tello drone. Before making a drone control system, check some functions and commands, which we will use for controlling the drone.

Moving the drone forward within a certain distance (in cm) using drone.forward(cm)
Rotating the drone to 90 degrees in a clockwise direction using drone.cw(90)
Flipping the drone upwards, backwards, left or right using drone.flip('l')
Creating a live stream through drone camera using drone.streamon()
Landing the drone using drone.land()

To control the height and left or right movements of the drone, use your facial gestures but for take off, use the automated takeoff function on startup. To land the drone and to stop the code from running, use the keyboard key 'Q'. Refer to the same code for face recognition as given in several of my other projects including Face Recognition-Based Car Lock, AI Robot, Smart Door and many more. By implementing this code, you can control the drone using your face movements.

Coding

In addition to including the same code for face recognition, import the Tello drone libraries and modules (mentioned in the Prerequisites section). After that, create two variables that will store the face location coordinates, which will facilitate the calculation of the face movements and navigation of the drone. Initialise drone.streamon() in the code along with drone.takeoff().

Fig 2.

In the while loop of the face recognition code, add another code that analyses the directions of the face movements. Check the current location of the face and using the if condition compare the present face location

In the while loop of the face recognition code, add another code that analyses the directions of the face movements. Check the current location of the face and using the if condition compare the present face location with the previous face location. If they do not match, then it means that the face has moved to a new location. If the new location has a value greater than or smaller than the previous location, use it to determine the directions of face movement.

Use the upward, downward, left or right direction movements of your face to move the drone. By using the left-point and top-point position values, one can determine and compare the face position and movement direction for controlling the drone in the same direction.

Suppose the previous left-position = 30 in the x-coordinate and the new left-position = 40 in the x-coordinate. Since the new left-position is greater than the previous left-position, you have to move your face towards the new direction i.e. right. This will in turn move the drone in the same direction. Similarly, the drone will move in other directions depending on the change in coordinates.

Testing

Switch on the Tello drone and then connect the device on which you will run the above given code. I am using Raspberry Pi, which is connected to the Tello WiFi for running the code. After a few seconds, the connection is made. On running the code, the video of the face appears. By moving your face within the camera frame upwards, downwards, left or right directions you can control the drone.

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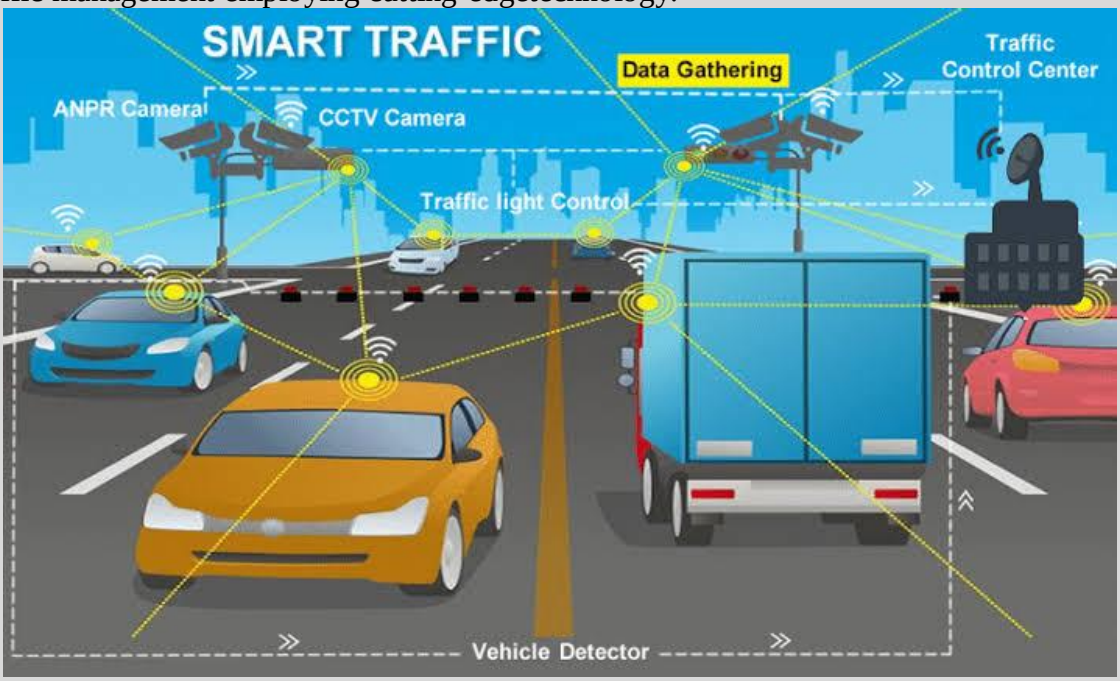
Traffic Management System using IoT

Day by day, traffic jamming problems are occurring in metropolitan cities, particularly in the downtown regions. To overcome this problem, a system like IoT based traffic management system is implemented.

In this project, IoT plays a key role to interact with ambulance drivers to discover the signal condition for selecting the way wherever traffic jams and violations are monitored and controlled dynamically by traffic officers onsite via centrally monitored otherwise controlled using the Internet. But this is a general method & it is applicable in any Metropolitan city.

The expansion of technology in metropolitan centers draws people to cities, which causes excessive traffic on the roadways during peak hours. This exacerbated the traffic situation, resulting in a delay, a loss of resources, and a waste of time. Like any other metropolitan metropolis, Riyadh, Saudi Arabia, has everyday traffic congestion during business hours. The current traffic management has made many attempts to ease traffic congestion in cities; despite these measures, the problem has not been solved adequately. To handle this road congestion, there is a need to appropriately store the big data collected by traffic sensors and utilize it for efficient traffic management employing cutting-edgetechnology.



This study provides an architecture for a smart traffic management system that uses modern technologies such as the Internet of Things (IoT), cloud computing, 5G, and big data to aid conventional traffic management systems and efficiently handle the stated problem. The proposed technique has the potential to reduce traffic congestion significantly. Our proposed solution encourages mobility by using roadside messaging agents to offer real-time traffic information on traffic congestion and unexpected traffic incidents. Citizens will save time by getting these early warning messages, particularly during peak hours. As part of the suggested method, each signal dashboard gets traffic information. A case study is used in the research to evaluate alternative solutions to traffic congestion. The case study results show that the proposed strategy outperforms the present options.

Bank Locker System using Embedded System

The main objective of this project is to design a security system for a bank locker using technologies like GSM & RFID. This project gives security to homes, offices, and especially banks. In this project, only an authentic person recovers money from the bank locker. This system includes a door and this system can turn on, verify the user & unlocks the locker door for accessing the bank locker. As compared with other systems, both the RFID & GSM are very secure systems.

In this system, the RFID reads the identification number using a passive tag & sends it to the data to the microcontroller. If this identification number is applicable then immediately locker will be opened otherwise microcontroller will send al alert to the user mobile number. This project is very secure as compared with other systems.

Now a day's personal security is a major concern in all the aspects. Most of the people have their personal asserts such as cash, gold, silver etc, in a locker due to security of the accessories. But the security of those asserts is not assured because of robbery and theft problem happening in day today life. In order to overcome the drawback, we proposed a system based on Cloud computing for providing and ensuring high security in the bank, Jewellery shop, home and every place where security of the locker is more important. The proposed system consists of wireless switch, Raspberry pi 3, GSM and finger print scanner in order to allow only authenticated customer to open their lockers to take their accessories. If the authentication fails, the GSM automatically sends the message to the customer regarding failure of locker opening, and gives the alarm signal that makes the people in the bank to notice.

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Propeller LED display

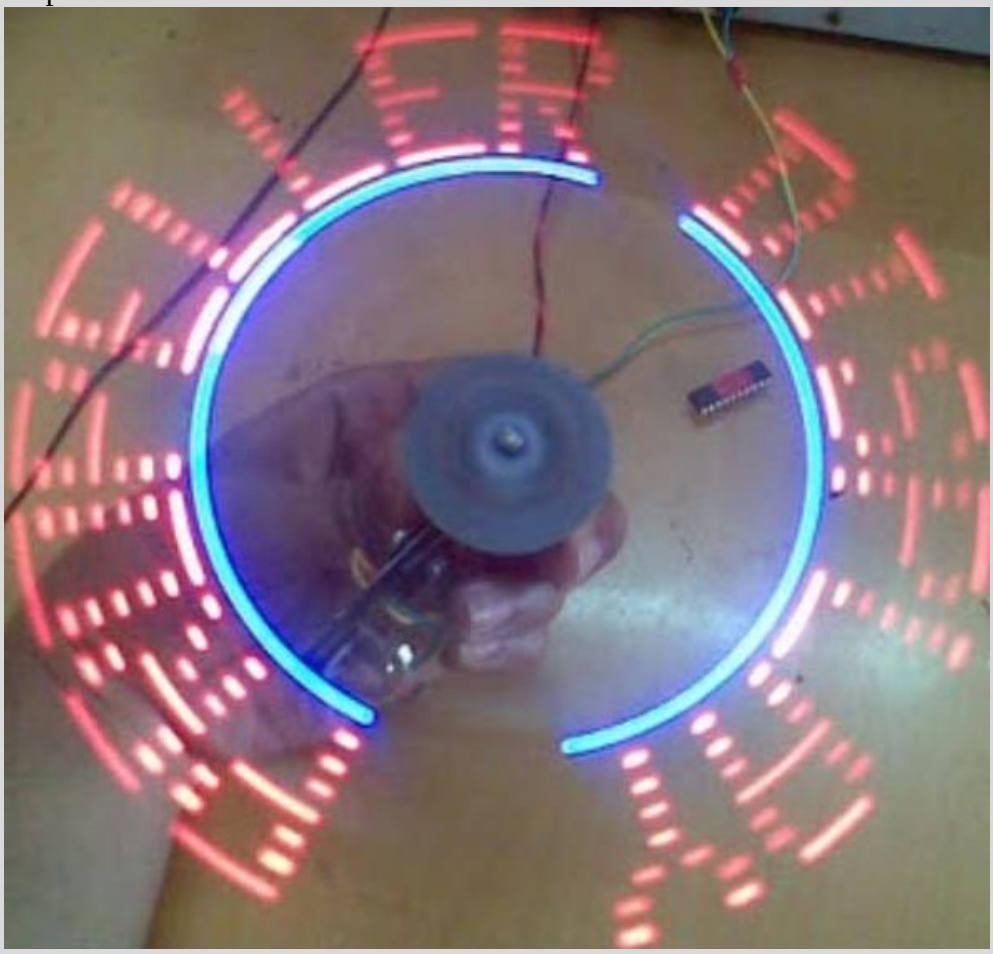
Propeller is a term connected with a rotating object: motor or pump, and is used in this project. Propeller rotates a set of light-emitting diodes for displaying numbers, characters and symbols in a rotating manner that's the reason why it is termed as a Propeller LED Display. Some of the features of Propeller LED Display include displaying messages in a typical manner; displaying numbers in analog and digital clocks, self cooling systems, and so on. Propeller runs on a single battery with wall adapter facility.

A propeller clock is a linear array of light emitting diodes rotating at a high angular velocity to generate a circular screen. The implementation of these display systems increases the curiosity of the learners because the concept involved in this project is exciting. Before proceeding further with this propeller concept, let us have a look at the normal display system to have a better understanding of it, and to differentiate it from others.

Pre-Programmed Digital Scrolling Message System

This project is designed to display messages in a scrolling format on an alphanumeric-LED display. This type of LED display board circuit is available in public places like railway platforms, transport vehicles, banks, schools, hospitals, industries, etc., to display information.

This project uses two decoders for turning each segment of seven-segment display. As we are using 16-characters display, for better utilization of microcontroller pins, these decoders play a key role. This 3 to 8 demultiplexer or decoder uses three pins from the microcontroller, and based on its high and low values, the output of the decoder varies



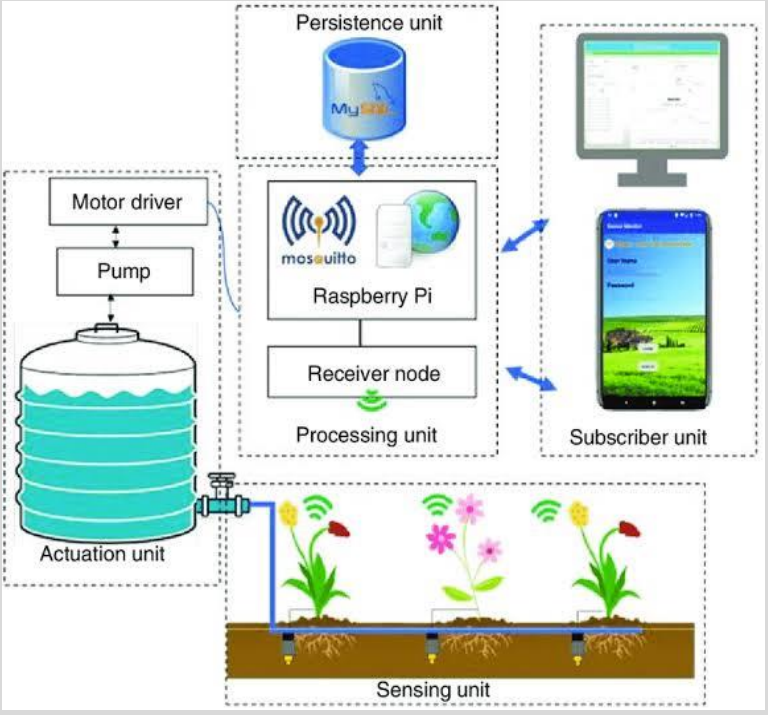
In a motor-driver circuit, the power from the AC mains is stepped down to a motor-operating range by a step down transformer. Because it is a DC motor, the AC voltage is converted into DC using a bridge-rectifier circuit, and then it is regulated to a motor voltage.

SMART IRRIGATION SYSTEM

The key objective of the paper is to monitor the soil's moisture content during its dry and wet conditions with the aid of a moisture sensor circuit, calculate the corresponding relative humidity and irrigate it based on its nature using a PC based LabVIEW system, NI myRIO, IOT, GSM and an automatic water inlet setup which can also monitor and record temperature, humidity and sunlight, which is constantly modified and can be controlled in future to optimize these resources so that the plant growth and yield is maximized.

A record of soil moisture, temperature, rainfall is maintained in a database for backup. This backup is used for weather forecasting and directs the farmers regarding the type of crop to be cultivated in future. IOT gives the whole information to the operator about the irrigation. In this paper, we experiment for different soils suitable for different crops in various climatic parameters that govern plant growth and allow information to be collected at high frequency and with less labour requirements.

Aim is to develop a wireless three level controlled smart irrigation system to provide irrigation system which is automatic for the plants which help in saving water and money. The main objective is to apply the system for improvement of health of the soil and hence the plant via multiple sensors. Appropriate soil water level is a necessary pre-requisite for optimum plant growth. Also, water being an essential element for life sustenance, there is the necessity to avoid its undue usage. Irrigation is a dominant consumer of water. This calls for the need to regulate water supply for irrigation purposes. Fields should neither be over-irrigated nor under-irrigated. The objective of this thesis is to design a simple, easy to install methodology to monitor and indicate the level of soil moisture that is continuously controlled in order to achieve maximum plant growth and simultaneously optimize the available irrigation resources on monitoring software LabVIEW and the sensor data can be seen on Internet. In order to replace expensive controllers in current available systems, the Arduino Uno will be used in this project as it is an affordable microcontroller.



The Arduino Uno can be programmed to analyze some signals from sensors such as moisture, temperature, and rain. A pump is used to pump the fertilizer and water
into the irrigation system. The use of easily available components reduces the manufacturing and maintenance costs. This makes the proposed system to be an economical, appropriate and a low maintenance solution for applications, especially in rural areas and for small scale agriculturists.

This research work enhanced to help the small-scale cultivators and will be increase the yield of the crops then will increase government economy.

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