

Application Oriented Utility Handling Technology

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ABSTRACT

This paper deals with enabling security, communication and feeding the pets even in the absence of care takers. This paper proposes a framework consisting of sub units that are controlled by a main controlling unit. The functioning of overall unit is controlled by an android application. The system is based on Raspberry Pi embedded system. And the main aim of the paper is to create a flexible, low cost home automation system which is more user friendly.

Keywords :- Raspberry PI 3,PIR,Security,Pet Care Unit

I. INTRODUCTION

The rapid development of technology, the continuous cost reduction of electronic devices as well as their small size leads using them for the convenience of everyday life of modern man. This paper uses Raspberry pi 3 that automates the monitoring of conditions of the house and changing the conditions of other devices. Having the proper equipment a house enables the user to know at any moment the situation on site and to control any device connected to the network .This allows the user to constantly monitor the surroundings with limited number of electronic devices with lower power consumption.

In this paper we are implementing three main tasks, they are home security, pet care unit and two way communication system with an electronic box. World is changing and thus the life style of human too, all are busy with their work hence most of the times no one is left behind the home .So to maintain the activities in the home while people are not in station is a herculean task.

Today more than 80% of the population in our world are using smart phones. By using the possibilities of the smart gadget to control the functions that we need to do while we are not in station, save the labour cost for home servants and can save time too.

II. LITERATURE SURVEY

In another related work, home automation is done using GSM technology. Controlling the system by interfacing the microcontroller with Bluetooth. The system is protected with a manual keypad. A Compiler Code Vision AVR is used to design a program that controls the system along with maintaining all security functions [1].

In another related paper a PIR based security system which saves the power consumption and the memory space. Passive Infrared Radiation (PIR) sensor is used to detect the presence of a warm body within a specific detection range. Video capture and image recording was developed with the installed software. The PIR mainly detects the motion of an intruder.

The software repeats the process. This process helps in power consumption [2].

Another recent study was related to SMS Based Home Automation System. This system proposes the model implementation of a basic home automation system based on SMS technology. GSM electronic equipment uses SMS technology to exchange information. The second module is the microcontroller, that is that the core because it acts as the bridge between the GSM network (the user) and sensors and actuators of home automation system [3].

III. PROPOSED SYSTEM

Whenever the presence of a stranger is sensed by the PIR sensor placed at the front of the casing, the camera become activated meanwhile the android application indicates the PIR status on the users mobile phone. Thus video capturing process initiated instantly and the live video which is been capturing is stream to the cloud sever through the help of the internet and a mobile module is interface with the host system to provide communication between the strangers. This system also implements the idea of home delivery even in our absence. We make use of a box counter which can be controlled by the user. This counter works by the proper operation of a dc motor. This is controlled by a limiting switch to control the opening and closing of the door. On reception of the item the counter can be opened and after the item has been received it can be closed.

Another module is the pet care unit which is designed to feed the cattle even in our absence. In this case we have to store food and water separately in bottles and by setting a proper delay time it can be fed in to them by using a motor. We don't have to worry about any kind of such situation as we are able to control it via mobile.

IV. HARDWARE

Main module contains a mini computer which is Raspberry pi 3 model B. The main advantage of minicomputer over the conventional controllers is it has got its own

operating system hence coding and running the programs are quiet easier and there is no need of an external system to burn the program codes.

A touch screen is been provided to the main module so that the user can easily be able to communicate with the mini computer and also the user can see the program running in the system terminal and can correct the system if any error occurred. Raspberry pi 3 is operate in 5v dc but most of the external peripherals need more than 5v and need more current too, hence because the driver circuit are added to system. For the better working of the system required a better power supply system as well as the power regulation system is also required for the main module.

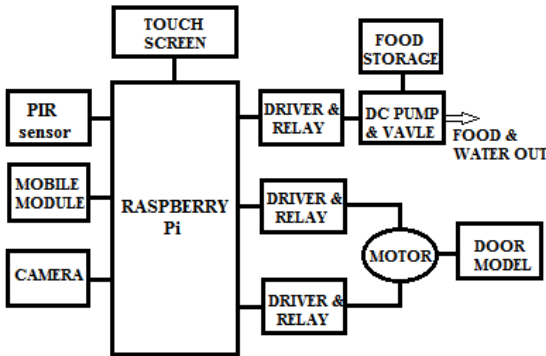


FIG 1:MAIN BLOCK DIAGRAM

The ac voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation.

A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

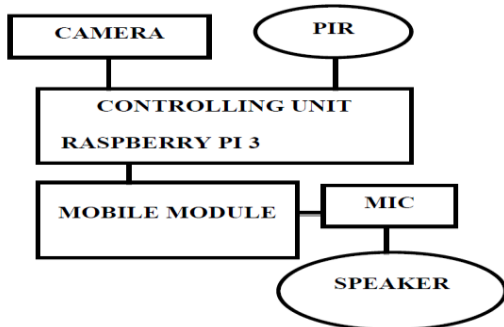


FIG2: HUMAN PRESENCE SENSING AND COMMUNICATION UNIT

Whenever the presence of a stranger is sensed by the PIR sensor placed at the front of the casing, the camera become activated meanwhile the android application indicates the PIR status on the users mobile phone. Thus video capturing process initiated instantly and the live video which is been capturing is stream to the cloud sever through the help of the internet. We are streaming the video to the web site called developer viewer there by login on to the site via host system user id and password we can able to watch the video live or by connect to through the LAN connection we can remote the host system and access the live video.

When the presence of the human is retrieved from the PIR sensing range the sensor went to idle state and thus the camera become inactive and the live video streaming stop function by leaving the last image produce in the video during streaming process and this still image will be over right by time of next video streaming.

If we want to communicate with stranger present during the time when PIR sensor becomes active, we provide a mobile module with the auto answering enable. hence if need to communicate via audio call can be done by simply calling on to the host mobile system from the user mobile and can proceed the two way audio communication between the user and the stranger.

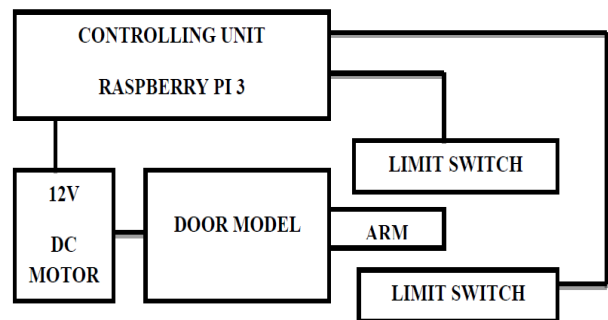


FIG 3:ELECTRONIC BOX

Electronic box is a device which is used to store the parcels or any other items which are delivered while the user is not in home. Electronic box word itself indicates a box which can control electronically by the user. This unit consist of a 12v DC motor, two limit switches and a door model.

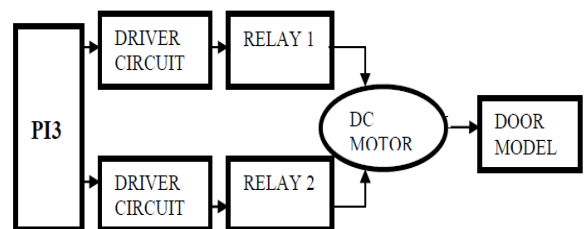


FIG 4:ELECTRONIC BOX LAYOUT

Fig 4 shows the circuit layout of the electronic box which consist of the controller unit is been interfaced with driver circuit (limit switch and transistors) and two relays for controlling the positive and negative polarities of the DC motor input. The total control of the electronic box can be done via an android application developed for the user mobile phone through the help of reserved switches to open and closing the door user can be able to activate the electronic box from anywhere. At the initial state the arm of the door model is in contact with the one of the limit switch, thus the controller unit switch ON relay 1 and switch OFF relay 2 results in forward motion of the DC motor makes the door open meanwhile the door arm touches the next limit switch causes that particular limit switch become ON and thus the controller identifies the door open limit and delay the motion of the DC motor for the next command input, thereby the door is always remain in open position. And if the user input the command for the door to be close the controller switch ON the relay 2 and switch off the relay 1 thus results in backward motion of the DC motor and the door arm touches the second limit switch hence that limit switch become ON thus the controller identifies the limit of the extreme limit and then freeze the motion of the dc motor makes the door in close state. The relays are uses in this circuit to couple the 12v, 4amp motor with the 12v, 1amp relay input as well as to couple control 5v from the raspberry pi.

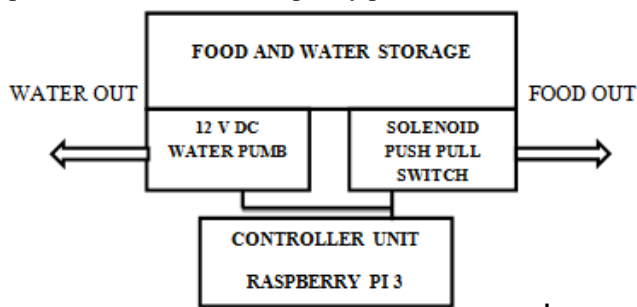


FIG 5:PET CARE UNIT

Pet caring is one of the issues faced by the people while they were not in home. Hence we are implementing a new concept called the pet care unit. It contain three main parts storage tank to store food and water, 12v 1amp DC pump and a solenoid push pull switch operating at 12v. User can controls the operation of the pet care unit through an android base handset. Using the application developer view, we provides switch to make the pet care unit ON and OFF.

While switch ON the pet care unit button, both the DC pump as well as the solenoid push pull switch. The time delay of the pump and solenoid switch can be set as the user needs and thereby the system becomes inactive after the predefined time delay, normally set as 30 seconds or the unit can be turn OFF via android application.

When switch ON the PCU (pet care unit) button provided in the android application the host server will activates the program code through the main controller unit. Result the

controller will switch on the pump and the solenoid push pull switch there by the water stored in the tank will pump to the bowl as well as the solenoid push pull switch will magnified due to presence of the solenoid inside the actuator, thus the trigger provided at the centre of the of the actuator pulls back that create a gap in the valve and the food stored in the storage will move down and when the power supply to the actuator become dead the trigger push back to the initial position thus the valve become closed and the pump will turn OFF.

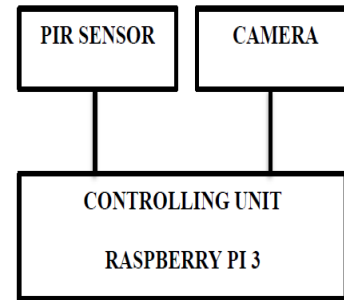


FIG 6:SECURITY SYSTEM

Today a lot of security purpose devices are available in the market. Each and every day modified versions these devices are reintroducing in the market too and Why these devices are most popular in the market, the reason is people are always trying to lead a secure life they are always trying to protect their life as well as their property in a secure manner. This vision inspires us to add a security system to our technology. The security system are designed to perform in the unwanted presence of stranger and rest of the time system is remains in a sleep mode which will helps to conserve the unwanted power loss. Our security system consists of a PIR sensor (pyro-electric sensor) and a camera module which are interfaced with the controlling unit of our system.

In most of the cases a security breach is occurred either through doors or windows hence these possibilities for the breaches are need to be sealed by using better security devices, hence we are using PIR sensor for detecting the presence of unwanted human and camera modules are using to capture the videos. The design proposal of the security system is by placing PIR sensor beside the doors and windows and place a camera module at the right position for capturing the video. Hence when the PIR become active when it detects any presence of the human and generates an output voltage this voltage is sense by the controlling unit and send a notification to the user mobile via an android application and activates the camera module for the time being the PIR is active the camera module will always be alive and stream the video live to the allocated sever. Only the user can access the live video from the server by login using the user id and password.

V. CONCLUSION

In this project we have designed and implemented a low cost system that will ensure the intelligent control of a house upon user authentication. We accomplished this through the utilization of low cost devices and the development of user friendly interfaces for an android application. Our system provide multiple operations such as communication system between the stranger, electronic box to store the delivered items that can operate using an android application, pet care unit and a security system to ensure total security for the home that enable live monitoring. Single system with multiple functions with an affordable price and zero maintains we hope this project will change the concept of automation in the future.

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