Robot based Home Automation

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Abstract--- Robot Based Home Automation, nowadays in the society we cannot trust anyone compared to systems and robots. By trusting robots and the internet of things is much more than human beings. When it comes to our home, the concept is to make it smarter, safer and automatic and with the security of a robot. This project looks on building smart wireless and robotic security system which sends second to second information to owners and that too stored in the cloud by using the internet of things in case of any raises an alarm. Home automation by making some set of sensors. Internet of things is growing more by day by day. Internet of Things is a system that uses computers and mobile devices to control home functions through the internet from anywhere in the world. Automatic home is sometimes called as Smart home. The home automatic system differs from other systems by allowing the owner to operate the system from anywhere around the world through an internet connection.

Keywords--- Arduino UNO, Vibration Sensor, Load cell, Smart System, IoT, Alarm.

I. INTRODUCTION

Internet of things is an emerging technology that is making our world smarter. The idea of connecting the world cannot be imagined without the Internet of things [1]. An internet of things based smart home is one such example. In the internet of things enabled smart home environment various things such as lightning, home appliances, computers, security camera, etc.

All are connected to the internet and allowing the user to monitor and control things regardless of time and location constraint. Platform movement is controlled locally, using an Arduino UNO development board, and image processing are done centrally by the general computing system that runs MATLAB[2]. Wireless communication is implemented between the robot and the user. The object is a good research technology related to computer vision (CV) and image processing that deals with detecting instances of semantic objects of a certain class (such as human beings, buildings, or cars) in digital images and videos. It has got some real-world applications such as smart home automation etc[3]. Detection of the particular object by the robot camera is an important aspect and processing the information for the security outside the home for potential threats and smart control of things like main gates, garage and also scanning the person through facial recognition outside the home [4]. The setup also contains the solar panels for lighting purpose in the garden at the night. There is a waterproof fire sensor for when the fire appears accidental in the home automatically it detects and sprinkler will on and water will appear inside the home. Gas sensor also used in the kitchen due to detection of leakage of cooking gas and it gives the alarm. For old age people, the load cell is present in the medical kit because when medicine reduces it gives some text message to the owner to buy the medicine through GSM[5]. The fingerprint sensor is used to unlock the door of the home.

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II. RELATED WORK

Governing of Light

In Generally problem is the user has to switch on or off the light manually. A solution of this problem is when somebody enters the room led light switch on and when leaves the room the light will be off.

Intruder Alert

When a thief or unknown person try to force entry the system detects and also alerts us and take necessary action by itself.

Fire and gas leakage alert system

The system can detect the fire and gas leakage take necessary action accordingly.

Old-age medicine ordering system

The system calibrates the weight of the medicine and orders when necessary. From a study of the existing systems, it is observed that it has various limitations. These limitations can be overcome using the proposed system from the reference papers.

III. OUTDOOR

Block Diagram for Outdoor

The block diagram shows that the MATLAB processes the information that captured by the camera and with the help of max232 or usually called as RS232[6] used to communicate with the Arduino and in parallelly to the driver circuit for the operation to perform and the MATLAB coding is made to capture the face and check with the data base. The MATLAB makes some key points and store. Firstly, The image captured and sent to the system through USB port 2.0.

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The image is pixeled step by step in rows and column. After successful capturing the MATLAB will display the "Partial face detected". The image will be captured again and sent to MATLAB and it compares with the Set of images in the Datasheet. We can have as many as pictures in the data sheet. It makes the key points again if the don't match then it display "unmatched". If the image is matched then it display "matched".

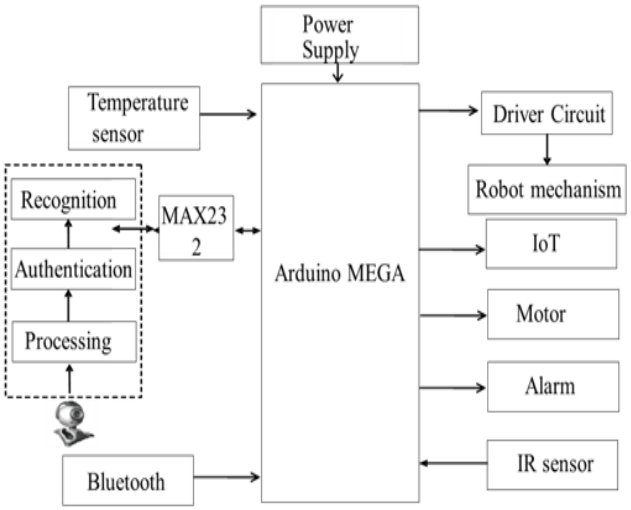

Fig. 1.Block diagram for the out door system

We are using the Arduino Uno and Mega250 as our main controllers with some of the driver circuits for control of the different motors. The proposed system contains the IoT module and Bluetooth to control the mechanism of the bot. The system must be connected to the computer to have the MATLAB access for verifying the face of the person that enters. The system contains few sensors for making the system automated.

The hardware in good lighting hardly takes 6 seconds to process the information and run the motor by 5 revolutions. The system has a light with the IR sensor at night times it activate the light so that the camera can capture the image. The IoT module is used it uploads the data to the cloud and we can monitor the data.

Simulation Results for Output

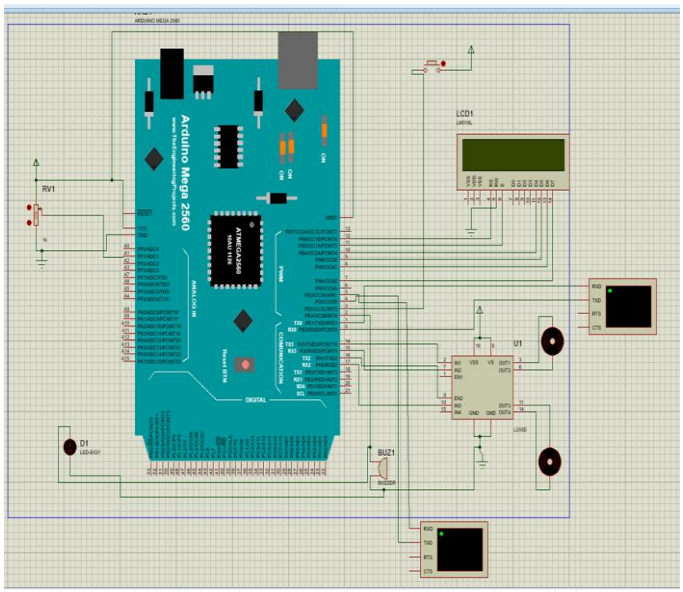

Fig. 2.Simulation for outdoor system

The computer simulation should not be consider upon for exchange for a hardware model. KEIL PROTEUS is a immense carrying out accent for specialized enumerate. It accommodates calculation, measurement and programming in an easy approach status where problems and solutions are declared in recognizable mathematical code.

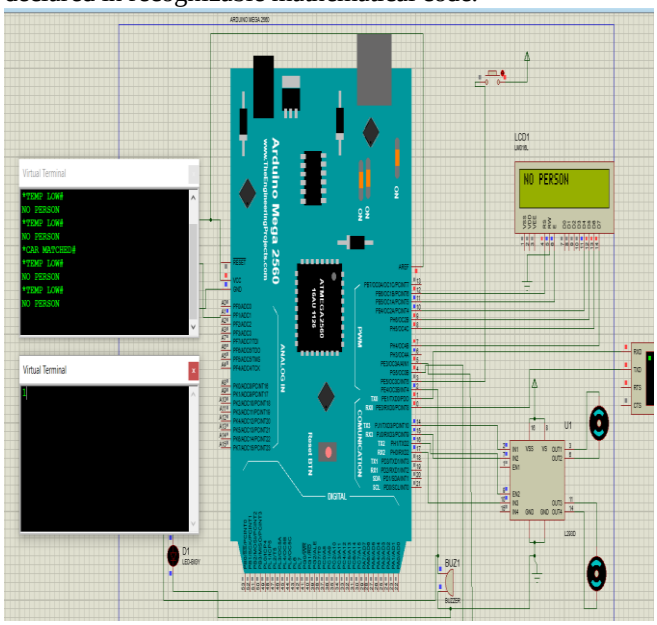

Fig. 3.Simulation for the robot

The simulation shows that the output of the system, when the person at main gate who wants to enter inside there was a camera to detect the person. Before that we have to store the captured images in the cloud itself to compare the person. If the person compared and matched the gate will open if not gate won't open and the unknown person image will be stored in the cloud.

The robot can be controlled manually or else can be moved in a specified path by changing the program. If the robot is moving in different directions it can save the cost of Surveillance because it covers wide angles and larger distance.

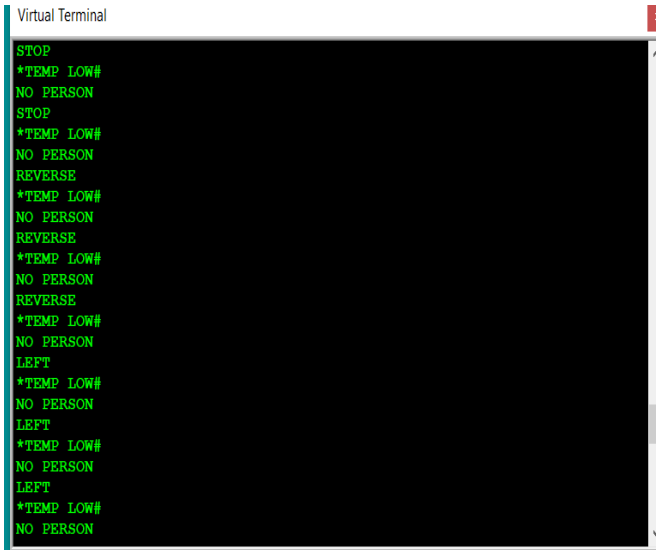

Fig. 4.Virtual termainal report processes done by robot

The data from the temperature sensor and person known and unknown person images which was capture by camera transfers to cloud. From cloud we can be able to check the data[4].

IV. INDOOR

Block Diagram and Simulation for Indoor

The system has a Arduino Uno controller with Delay circuits and motors. The system has a vibration sensor with alarm beside it for indication of breakage. The IR sensors are used to make system automated. The vibration sensor is used for home security [7].

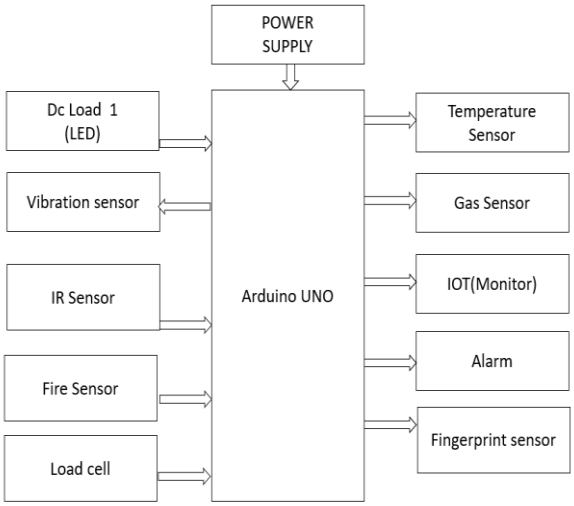

Fig. 5.Block diagram for the indoor system

If there is any breakage or any high pitch disturbance. If the disturbance is higher than the threshold value of the vibration sensor then it sends a signal to the Arduino then the controller produces a signal and sends to alarm.

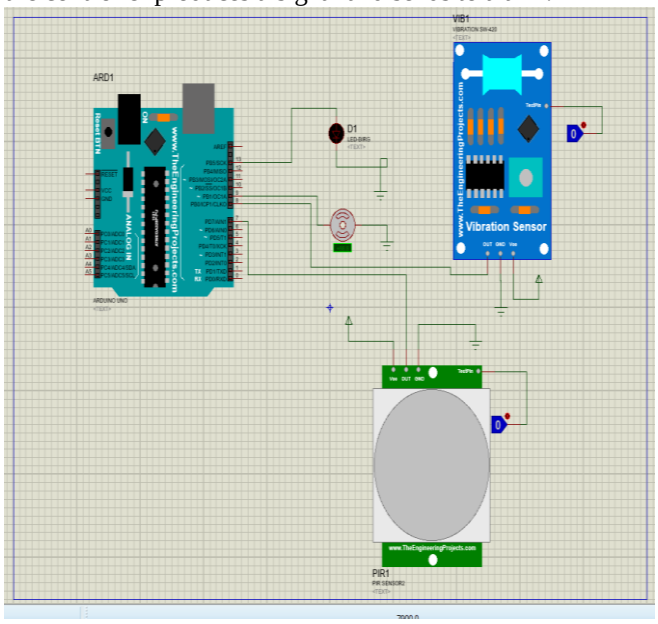

Fig. 6.Simulation of the indoor system

With the help of load cell a several applications are possible but here it used for old age as medicine ordering system with the gsm module included in the system. Through the GSM module the message is sent to the respected person[3].

Advantages of Proposed System

- Proposed system operated by the MATLAB and embedded systems not by humans.
- This system has implemented Wide angle cover camera robot.
- The alternate process is implemented in this techniques like monitor the house related parameter.
- The system is energy efficient.
- Most of the system is automated so, the speed of operation and decision making is quick and it depends on the threshold limits.

V. CONCLUSION

The smart home is emerging as an important part of the smart and intelligent cities which are being proposed and developed around the world. The purpose of a smart home is to improve living standard, security and safety as well as save energy and resources. The smart home plays an important role in development of society. We have proposed a system number of concepts, technologies and devices already existing but from different areas, in one single functional application, succeeding their operation together. In this paper, the robot-based home automation is proposed for controlling whole outdoor by the robot which is also work as security purpose and indoor with smart helpful when we are not at home. It adds additional safety to the home and also protect and prevent from some disaster like gas leakage etc, Thus, if this system is accomplished in countries with huge residents like our nation we can reduce the crime rate and also prevent from some of the accidents.

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