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Internet of Robotic Things in Surveillance

Krish Mehta[1], Gaurang Waghela[2], Prof. Manish Solanki[3]
[1, 2]*Student,* [3]*Lecturer, Shri Bhagubhai, Mafatlal Polytechnic, Diploma, In Information Technology*

Abstract: ***These days a new field has emerged known as IoRT which is a combination of IOT and Robotics and known as Internet of Robotic Things. Through IORT, intelligent devices can monitor events, fuse sensor data from a variety of sources, use local and distributed intelligence to determine a best course of action, and then act to control or manipulate objects in the physical world and physically moving through that world. This paper mainly focuses on application of IoRT as a surveillance robot with audio and video features in the domain of security.***
Keywords: IOT, Robotics, Surveillance Robot, Ardino, Sensors, Raspberry Pi, Robotic control.

I. INTRODUCTION

IOT and robotics, two different fields, are coming together to form IoRT (Internet of Robotic Things). In loRT, robotic things can communicate with
other things. It exchanges and shares the information with other robotic things, loTloT devices, and humans in various applications. We design loT devices to handle a selected task. while robots must react to unexpected conditions. computer science and machine learning help these robots cope with unforeseen situations that arise.

Robotic things are capable of recognizing events and changes in their surroundings. While autonomously acting and reacting appropriately. These capabilities enable the convergence of the important, digital, virtual, cyber attributes of robotic things. Smart environments that make robotic things in energy, mobility, buildings, manufacturing, and other sectors are more intelligent.

So far, the robotics and loT communities are driven by varying yet highly related objectives. loT focuses on supporting services sensing, monitoring, and tracking. Data gathering, analytics, communication, and also the cloud leverage the info from somewhat passive sensors. In contrast, robots concentrate on production action, interaction, and autonomous behavior. The loRT{Internet of robotics things) adds a considerable value by combining the 2 fields:

First, the robot can feel that it has embedded tracking capabilities. Simultaneously, it is able to get sensor records from different sources. Second, it is able to examine records from the occasion it monitors, this means that there may be facet computing. Edge computing is wherein records are processed and analyzed regionally in place of withinside the cloud. And it gets rid of the want to transmit a wealth of records to the cloud.

Finally, each number one additive serves the 1/3 one, figuring out what movement to take and take that movement. It can manipulate or control the bodily item withinside the bodily world. Collaborations among gadget and gadget, and among guy and gadget.

Traditionally, surveillance structures are installed in each security crucial area. These structures generally consist of excessive quality cameras, raspberry pi, microcontroller. When considered as a whole, those structures can yield great complexities while installing as nicely as for his or her maintenance. The camera feeds are only seen in certain places and in addition they have limited variety inside which those can be viewed.

II. LITERATURE SURVEY

Some of the researchers have analyzed real-time tracking of the human body , Real-time audio video streaming, motion sensing etc. Have discussed an automated surveillance system, which is used in a range of real-world places starting from smart homes to security in the military. The design of a surveillance robot with audio and video capabilities that uses an Android smartphone to control the robot.The robot consists of the microcontroller, motor drivers, sensors and motors. The robot is capable of surveillancing along with the motion sensing detection and transmission of the audio. We have discussed a Smartphone-Controlled two Axes Robort for tracking of human body and video which uses Wireless Internet and Raspberry Pi Processor connected to a local wifi. The Robot can be moved in (360') with the help of an Android application that can be connected to your mobile phone. We have presented a wireless robot system using an arduino microcontroller. The communication between the mobile and robot is done with the help of the (ZigBee Protocol) which allows devices to communicate in a variety of network topologies. It is a Raspberry Pi based robot which is designed using bluetooth and sensor technology to control the robot and wifi network to transmit the audio video and motion detection. We have shown a surveillance robot for Home Security.

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III. COMPONENTS

To create such an advance surveillance system several components are used such as:

A. Raspberry PI



Raspberry Pi is a series of small single-board computers (SBCs) developed in the United Kingdom by the Raspberry Pi Foundation in association with Broadcom. The Raspberry Pi project originally leaned towards the promotion of teaching basic computer science in schools and in developing countries. The original model became more popular than anticipated, selling outside its target market for uses such as robotics. It is widely used in many areas, such as for weather monitoring because of its low cost, modularity, and open design. It is typically used by computer and electronic hobbyists, due to its adoption of HDMI and USB devices.

B. PIR Motion Sensor



Passive infrared (PIR) sensors use a pair of pyroelectric sensors to detect heat energy in the surrounding environment. These two sensors sit beside each other, and when the signal differential between the two sensors changes (if a person enters the room, for example), the sensor will engage.

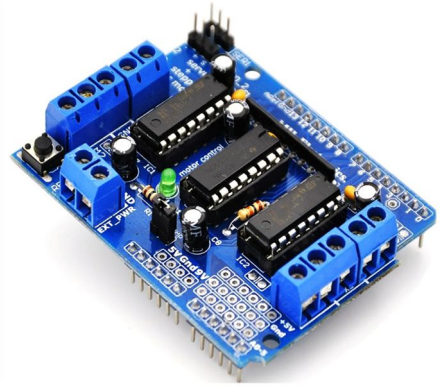
PIR sensors are commonly used in security alarms and automatic lighting applications. PIR sensors detect general movement, but do not give information on who or what moved. ... They work entirely by detecting infrared radiation (radiant heat) emitted by or reflected from objects.

C. Camera with Microphone

Security cameras with Audio either have a built- in microphone on the camera or an audio-input connector to connect an add-on microphone. Regardless of whether the mic is built-in or noisy, these security cameras are a great way to record both video and external, security camera microphones are sensitive enough to pick up sounds from a 40ft radius when in a quiet room. Although results vary based on ambient audio. Choosing a camera for your security camera system depends on whether you need an analog camera, HDCVI camera, or IP camera. Surveillance cameras with built-in microphones allow the easiest connection to a security video recorder.



D. Motor Driver L293D



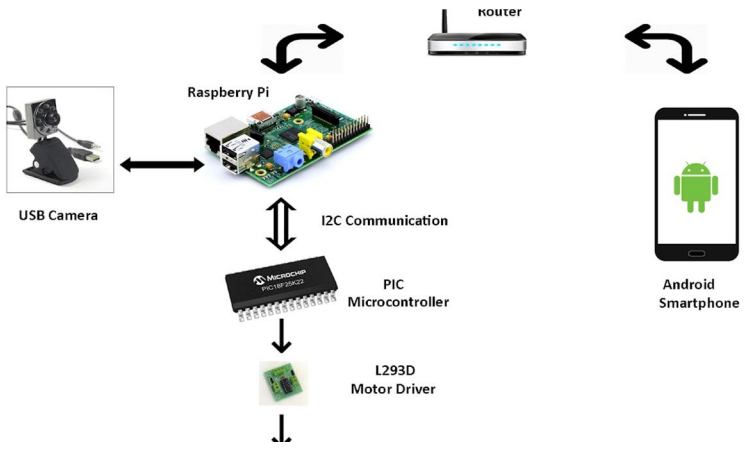
L293D is a typical Motor driver or Motor Driver IC which allows a DC motor to drive in either direction. The L293D is a 16-pin Motor Driver IC which can control a set of two DC motors simultaneously in any direction. The L293D is designed to provide bidirectional drive currents of up to 600 mA (per channel) at voltages from 4.5 V to 36 V (at pin 8!). You can use it to control small dc motors - toy motors. Sometimes it can be extremely hot.

E. PIC Microcontroller



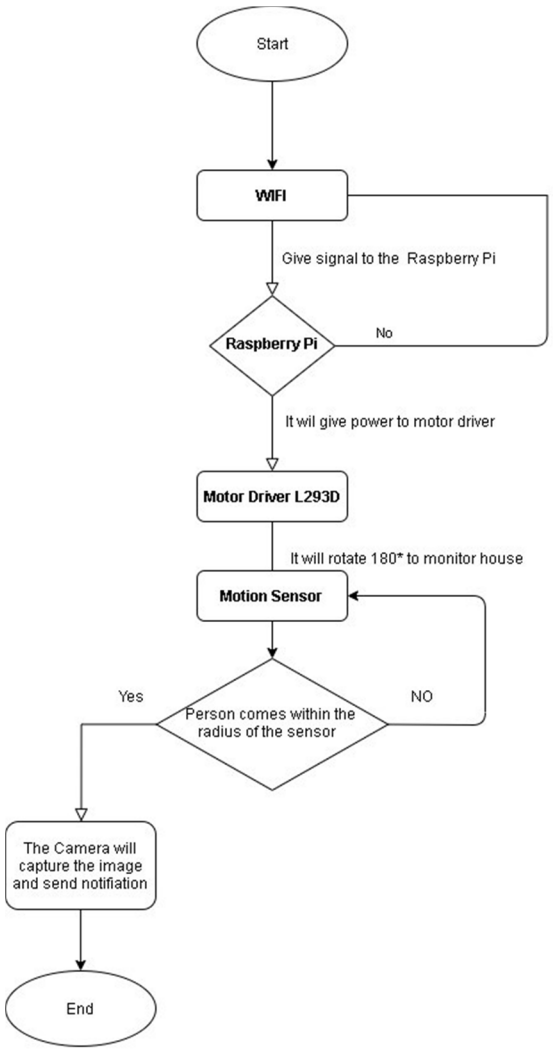
PIC (usually pronounced as *"pick"*) is a family of microcontrollers made by Microchip Technology, derived from the PIC1650 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to *Peripheral Interface Controller*, and is currently expanded as *Programmable Intelligent Computer*

IV. WORKING



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Firstly the wifi will provide signal to the raspberry pi from which it will connected to motor driver and camera by which different activity will be perform like the robot will be keep an observation on the surrounding and if a unknown person will walk in a radius of 20m then the PIR Motion sensor will sense the object and send the message or notification to the owner on his/her phone using an android app whichwill be remotely connected to the phone. If the user is not at his house or if he is in any part of the world he can view the live position or condition of his house by using a specific android app. Here is the flowchart that shows the working of the system.



V. ADVANTAGES

This system is versitile as it can be used for military purposes, home security, etc.The archaeologist and scientist used a similar system to see the internal structure of the pyramids.

This application of smart homes will make things easier for the number of families.

This robot (system) can guide, observe and controlled by humans. This is like a doorman or a moving CCTV along with an audio facility. This can be a perfect replacement for humans in various places where there is threat for us.

VI. CONCLUSION

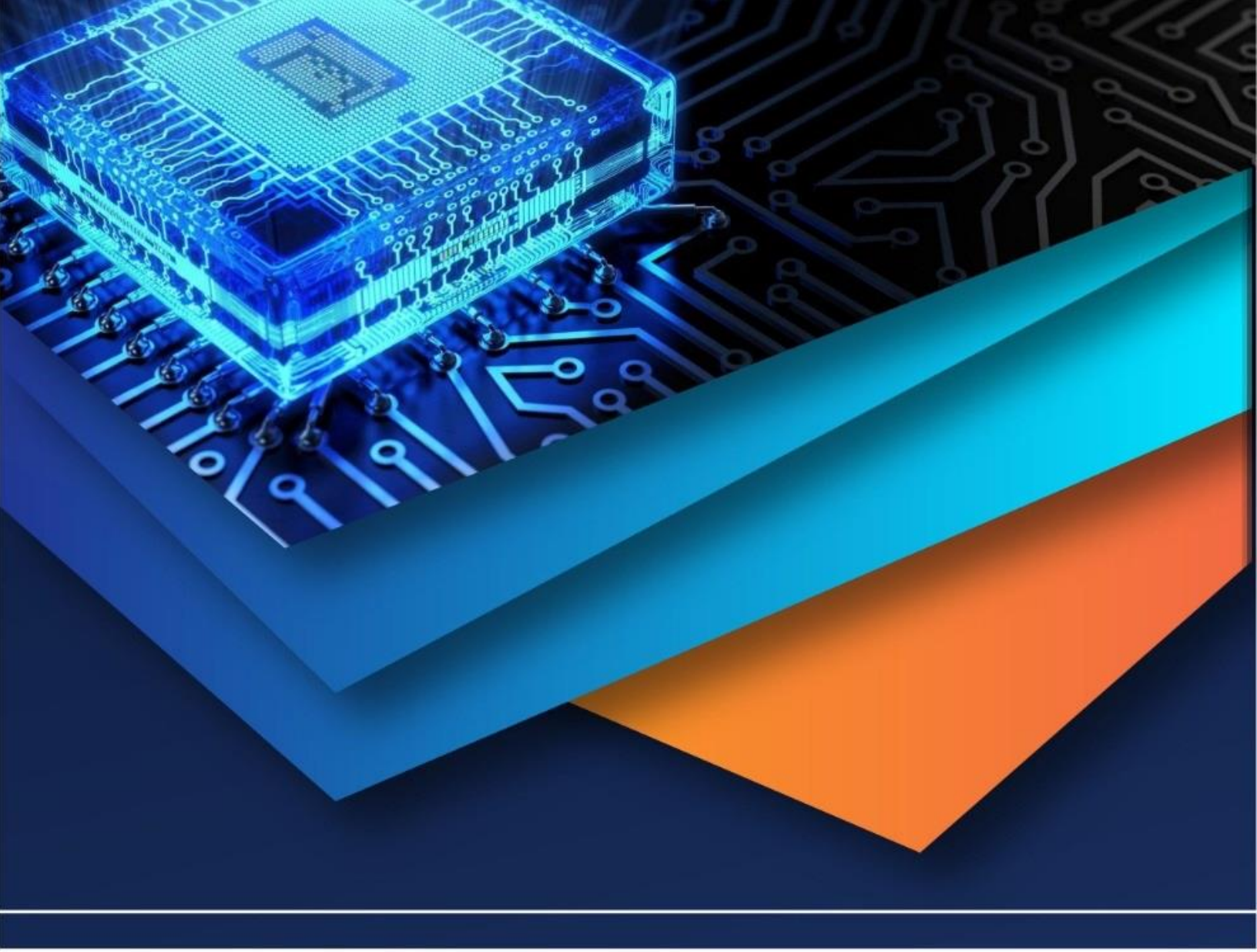
From this paper we came to know how a new technology is emerging with the help of two different fields. Due to this technology a new opportunity is coming out, the paper tells how a surveillance system is created with the Internet of Robotic Things (IORT) and what requirements or components are needed to make a system like this. This system has various features such as audio, video, motion sensing and this device is controlled with a mobile phone using android.

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