

IOT-BASED VOICE CONTROL SURVEILLANCE CAR

Capstone Project Proposal

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Mentor Consent Form

I hereby agree to be the mentor of the following Capstone Project Team

Project Title:

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NAME of Mentor: Deepshikha Tiwari

Project Overview

The advent of new high-speed technology and the growing computer capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drivers and advanced control algorithms.

In this project we are building a voice-controlled surveillance system using robotic car over the internet. This could be a useful and inexpensive security as well as a spy tool. In this IoT Project, we are using Raspberry Pi, a camera and two DC motor with Robot chassis to build this Robotic car. It has a camera mounted over it, through which we will get live video feed and the interesting part here is that we can control and move this robotic car from a webpage over the internet. We built a webpage in HTML which has Left, Right, Forward, Backward buttons, clicking on which we can move the robot in any direction. We can also give these directions by our voice and the computer will translate our speech to text. This project attempts to address the need for a self-contained home as well as outdoor security system.

Need Analysis

There are different types of surveillance systems available such as camera, CCTV etc., In these types of surveillance systems, the person who is stationary and is located in that particular area can only able to view what is happening in that place. Whereas, here, even if the user is moving from one place to another, he/she can keep track of what is happening in that particular place at exact time. Also, another advantage is that it offers privacy on both sides since it is being viewed by only one person.

Currently, security systems require many costly components and a complicated installation process. It can take a lot of time and money. Another point is that the signal strength may not be strong enough to reach every area, leaving portions of the location unmonitored. Also, bad weather can interfere with the signal of these systems. The purpose of the proposed system will be to eliminate the drawbacks of both wired and wireless systems. The proposed system will consist of a single unit, which will monitor the location for various.

Literature Survey

Various researches have been made by different researchers in developing this kind of projects. However, they already serve a different application and have different technologies and implementation methods. Some of those papers are mentioned below stating their technologies and application.

The paper titled “Voice Control Robot Using Android Application” presents the project which is designed to manipulate a robot by speech commands and manual controls for remote operations. An ATMEGA32 micro controller is used along with a Bluetooth device to compute the control unit for sensing the signals transmitted by any Android application. It passes control commands through Bluetooth. The Bluetooth has definite features like controlling the motor’s speed, sensing and distributing the information with smartphone. It also passes information about its direction and distance from the nearest hurdle

1. The paper titled “Voice Control Robot using Android Application” in the International Journal of Engineering Innovation & Research uses an android app which is used to identify human speech which is transformed to text. This text is further processed and used to manipulate the robot car. This text is transferred to the robot car using Bluetooth technology which is further processed by the micro controller to direct the robot accordingly. Using this system, we performed various studies on control mechanism for robots
2. Yungeun Choe, Myung Jin Chung presented “System and Software architecture for autonomous Surveillance robots in urban environments” published in 2012 9th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI) which was held in Daejeon, South Korea. In this paper, they propose a system of the security robot and its software architecture. The proposed system and software architecture will make a robot to perform security missions.
3. The paper titled “Speech Recognition System for A Voice Controlled Robot with A Real Time Obstacle Detection and Avoidance” puts forward a contrivance which can be used in manipulating a robotic vehicle through voice input. The voice recognizer platform is an Android mobile phone which interacts with the robot using Bluetooth. This method allows for precise recognition and uninterrupted data transfer. Additionally, the robot also has the capability to detect obstacles and notify the user. Our proposed mechanism will be useful for applications such as assistive robots for people with disabilities or in industrial applications such as work robots.
4. The paper titled “Implementation of Voice Controlled Robot Using Android Application” involves a system where the human voice is a main root to control devices. With the help of an android mobile app, human voice commands are identified and are then processed to achieve

the corresponding control of any real-world device. By the easy use of an efficient control system using the Arduino microcontroller board, the HC-05 Bluetooth module and a simple user interface based android mobile phone; voice application the control of the robot is achieved

5.The paper titled “Voice Controlled Robot” involves the way a robot works when the voice input is given. This paper expands on how a robot interfaces with user with voice command given by the user. It elaborates on how the whole process happens and suggests the use of an android smartphone to control a robot via voice commands

6.In the paper titled “Remote Voice Controlled Robot” the robot will move in accordance to the voice commands given by the user. This robot is designed using Raspberry pi 3 and it is controlled by an android mobile. This can be moved in forward and reverse directions using 60 RPM geared motors. Also, this robot takes sharp turnings towards left and right directions. By using a voice commands given by the user will be recognized by the android application. This robot takes the instructions from the android mobile which is communicating through Bluetooth and act accordingly. A camera is used for live video monitoring and to control the Robot direction.

Requirement Analysis

Software Requirement:

- Python (Flask Library)
- Raspbian OS (Motion Library)
- HTML and CSS

Hardware Requirement:

- Raspberry pi model 3
- Raspberry pi is a small credit-card sized computer capable of performing various functionalities such as in surveillance systems, military applications, etc.

- Raspberry pi Wifi module

This makes your Internet of Things device cable-free by adding Wi-Fi. Its advantages include low cost, but high-reliability wireless link.

- Raspberry pi camera module

The Camera Module is a great accessory for the Raspberry Pi, allowing users to take still pictures and record video in full HD.

- Motor Driver IC L293D

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.

- Two DC motor
- Batteries

Objectives

- To design a prototype surveillance system that will require minimal installation, while offering more comprehensive monitoring.
- It will be more complete and user friendly than most of the surveillance systems presently on the market
- Home monitoring will be realized by a standalone robotic unit.
- This robot will provide monitoring for no less than 8 hours, and interact with its user by transmitting real-time video footage

Methodology

This is the internet of things (IOT) based project, where we are particularly uses the Raspberry Pi, USB web camera and two DC motor with Robot chassis to build this Robotic car setup. It has a web camera mounted over it, through which we will get live video feed and the interesting part here is that we can control and move this robot from a web browser over the internet. As it can be controlled using webpage, means it can also be controlled by using the other smart devices where we can control through the webpage. We built a webpage in HTML which has Left, Right Forward Backward links, clicking on which we can move the robot in any direction. Also there is an option for voice detection which will initiate the same commands. Here we use the term “Motion” for getting live Video information from USB camera and used “Flask” for sending commands from webpage to Raspberry Pi using python script to move the Robot. The webcam will capture live data with regards to its surroundings and then send it to a desired device through internet. The user will be observing this data on the monitor at the user end. According to the desired movement, the user will control the robotic vehicle through the webpage available at the user end.

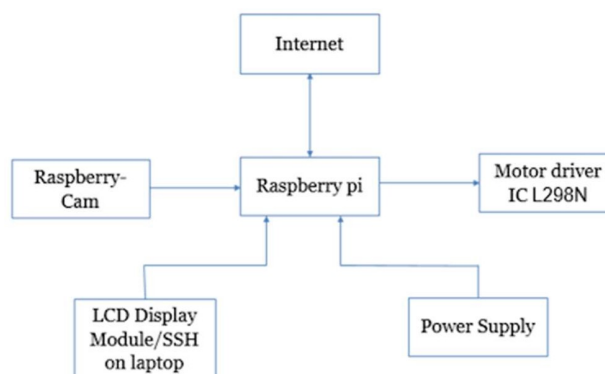


Fig.: Block Diagram of Setup

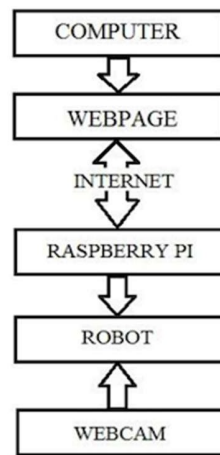


Fig.: Flow Chart of the working

Work Plan

The user will have to login through chrome or Firefox through his/her phone or laptops. After login it will display the control system of the car, like forward, backward, left and right buttons, plus the live stream video monitoring from our robotic car will be shown on our mobile phone or laptops in addition to these there will be a microphone icon present on the screen, by clicking on that icon user can give any command to our robotic car, for example if he says “move forward” the car will go in forward direction and many other commands.

Project Outcomes

1. A voice control car with camera fitted on the top.
2. Easy to control because it will remember our voice, basically voice reorganization.
3. Indoor spying of warehouse, campus surveillance to check the improper activities
4. Tracking locations of terrorist organizations and then plan an attack at a suitable time.
5. Making video surveillance of any disaster affected area where human beings can't go.
6. . Field view surveillance of indoor & outdoor commercial complex, factories & government buildings/organization.

Individual Roles

Name	Role
Gaurav	Frontend Development of WebApp for the interface.
Saksham Miglani	Designing and assembling the circuit.
Dhairya Ahuja	Development of Surveillance Car using Raspberry Pi
Amisha Sachdeva	Project management, financial management and backend development of web

Course Subjects

- (UCS503) Software Engineering
- (UML501) Machine Learning
- (UCS507) Source code management
- (UCS617) Microprocessors
- (UCS614) Embedded System

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