Voice Controlled Guiding Robot

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***Abstract*—This paper presents a proposal for using robot for guiding tourists or visitors in historical places, complex architectured buildings. The objective is to develop a robot that is a combination of software and hardware for human machine interaction. The design provides robot to communicate with visitors through android application via Wi-Fi module mounted on it through voice command. The robot guides visitors in tourist places and give brief description of each object which is preserved in that place in the desired language preferred by the visitors.**

Keywords—complex architectured, android application, Wi-Fi module, voice command

I. INTRODUCTION

A robot is a machine especially one programmable by a computer capable of carrying out a complex series of actions automatically. Robots can be guided by an external control device or the control may be embedded within. Robots can be autonomous or semi-autonomous. Autonomous robots are those which work by themselves or the robots which artificially intelligent robots which can decide and describe their work by no interference of humans. Semi-autonomous robots are predefined robots in which they work or the task to be done is programmed before the task is made. The branch of technology that deals with the design, construction, operation, and application of robots, as well as computer systems for their control, sensory feedback, and information processing is robotics. The main objective of this paper is to develop a low cost and efficient robot that can be used to detect the location that the user wants to reach in a complex unknown building or a campus. The basic strategy is to have a calculation on the speed with respect to time, which reaches its destination step by step as per the predefined path.

II. PROBLEM STATEMENT

Most of the designs have problem with circulation and way finding, which creates ongoing problem for visitors. The visitor's experiences stress at feeling lost, and may miss or arrive late to meetings. Generally people have more difficulty in finding their way around in places with complex route network. Results in waste of time and getting stress in finding routes.
Due to lack of proper tourist guide with knowledge of

different language in historical museums has decresed tourists from other country's and affecting Indian economy.

III. PROPOSED SOLUTION

The human interaction with the robots is the key functions that can spread the use of the robot in human daily life. Guidance systems (e.g., in museums, tourist navigation in cities, etc.) are one of the potential applications for guiding visitors or tourists. In this paper, we would like to discuss about the smart robotic vehicles that operate on voice command and act as a guide to the visitors in museums or tourist places respectively. The process of detecting voice signals and sending the command to the microcontroller takes with the help of google assistant.

IV. WORKING

The guide robot works with the help of Wi-Fi and guide the visitor with voice guidance by taking them along. To do this, design has to be divided into two parts:
1.Interfacing the Wi-Fi module on robot with hardware
2.Interfacing the Wi-Fi module on robot with software

1. Interfacing the Wi-Fi module on robot with hardware:

The hardware unit consists of Wi-Fi module inbuilt on microcontroller i.e, nodemcu, relay, SD card adaptor, arduino, motor driver, voltage regulator, speaker, DC gear motor.
The basic system design using the above components is shown in the below figure 1

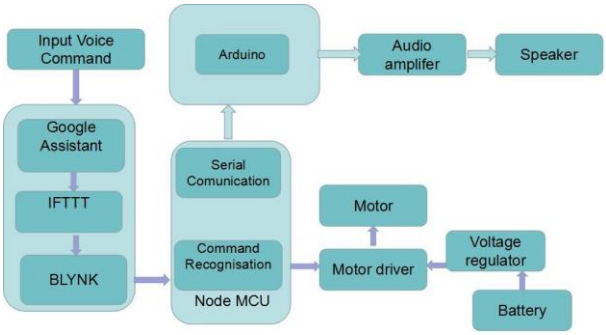

Fig. 1. Block Diagram of Guide robot

Nodemcu: It is the master control unit where its digital pins are connected to its slaves that is relay, motor driver and arduino.
Voltage regulator: Power from the battery is step downed and feed to the relay when the relay is on motor driver get the power supply.
Relay: It is used to turn on and off the robot over internet using digital pins of nodemcu.
Motor driver: It is used to control the DC gear motor, power supply from the relay is given to this module which in turn distributed it to separate ports, based on the nodemcu virtual pin status. High and Low signal make the gear motor run according to the program to reach the destination.
After the robotic vehicle reach the destination audio response is given to do this part nodemcu and the arduino has to be linked and arduino should be connected to SD card through SD card adaptor and also to a speaker. The voice response are stored in SD card in wave format once the nodemcu triggers the arduino the respective audio response is given out through the speaker.

2. Interfacing the Wi-Fi module on robot with software:
The software that are mainly used in the proposed project is ifttt, blynk.
ifttt and blynk are used to connect Google assistant to nodemcu.
Google Assistant is a virtual assistant that can detect human voice and respond to the user by searching the web.
In this project, we need to customize the response from Google assistant by using ifttt and trigger nodemcu using blink.
Blink: It is a mobile platform to control many microcontroller boards over the internet. Blynk as many applications, like controlling hardware remotely, displaying sensor data over the internet, and much more.
Setting up of blink app is required to use its features, to do so we need to login and create a project by selecting the microcontroller board we are using.
We get an auth token for every project we create once we create our project we get an auth token to the registered email address, we need to note down the token which we need to use in our programming and setting up Ifttt application.
We create virtual buttons and these virtual buttons are used inside the looping statements of the programming to do specific tasks.
When different buttons are pressed different function takes place based on the program.
Ifttt: It stands for "if this then that". The idea of if ifttt to connect one application to another application to perform different customized functions. Here we use ifttt application to establish a link between Google Assistant commands and blink app virtual buttons. launching ifttt application we need to login and create applets. The applets have two parts "this" i.e, triggering part and "then" i.e, action part. In this part of an applet we need to select Google Assistant and customize the user command and the response commands. In that part of an applet select Webhooks and enter the URL in this
format IP address/auth token/pin number, in method we need to select put since it is triggering another application and in the body it will be 1 inside a double inverted comma to turn on blynk and 0 to turn off the blynk button.
nodemcu will be programmed in such a way that once the action occurs in ifttt respective action takes place in microcontroller unit. Once it receives signal from the blink via Wi-Fi which is inbuilt on the nodemcu. To output the command once the action is completed by the nodemcu we establish a connection between Arduino and nodemcu. The nodemcu triggers the respective part of Arduino program and it is programmed in such a way that once the respective command comes to the Arduino the respective audio file is played as user guidance audio.

V. CONCLUSION

The location locator robot is automobile system that has ability to recognize its predefined path, move and change the robot position to remain in track.
The voice commands are successfully transmitted via inbuilt wifi-module, the desired operations successfully take place. This project reduces human efforts at places or situations where human interventions are difficult. Such systems are brought into use at places such as industries, museum, historical places, etc.

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