

Wireless Controlled Trolley Using Android Application

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ABSTRACT: The project is designed to develop a wirelessly controlled trolley, on which objects can be placed and which has the ability to move from one place to another without any disturbance. Any light Weighted object can be placed on that trolley like structure. The Trolley controlled by android application where trolley and android application should be in the range of WiFi that is approximately 100 metres .If any obstruction comes between the trolley and android application the range may slightly decrease and we are using camera module which is used for live streaming , that is what work the trolley is doing should directly reflect back to our android application.

KEYWORDS: Wifi-module, Live Streaming, Arduino uno , Motors, Application.

I. INTRODUCTION

The project is designed to develop android based trolley which can majorly be used for household purposes. It can safely carry things like mobile phones, laptops and other objects from one place to another safely and without human himself moving. The trolley is controlled by an android application. At the transmitting end using android application device, commands are sent to the receiver to control the movement of the trolley either to move forward, backward and left or right etc. At the receiving end , there is a Arduino uno which acts as receiver which is interfaced with Motor driver IC and Motor . The android application device transmitter acts as a remote control that has the advantage of adequate range, while the receiver end is fed to the Arduino Uno to drive DC motors . Controlling the trolley can be achieved by any smart-phone running on Android Operating system . The main advantage of this trolley is that it can be used for carrying highly reactive chemicals for one place to another in industries . Secondly, There will be a live streaming Application which will help the remote user to see if there any hurdles or objects when the trolley is moving. This gives a more convenient way to user by watching the trolley and controlling it on same place itself.

A. Existing System

The prior Implementation involves using a bluetooth Module which is interfaced with microcontroller which drives the Motor driver IC. But the Problem was there wasn't much Distance covered since Bluetooth module covers less distance than Wifi-Module.

II. LITERATURE SURVEY

A. Surveillance Robot Using Arduino Microcontroller, Android APIs and the Internet:

In this paper , they have proposed a low cost effective four wheel robot using Arduino and smart phone app. We have inculcated Arduino and smart phone concept in our project. We had focused on Arduino Implementation which is discussed in this project . Arduino implementation with motor driver IC and how it receives signal and rotate motors accordingly.

B. Implementation of Smartphone Environment Remote Control and Monitoring System for Android Operating System-based Robot Platform:

This paper basically controls robot through a smart phone over the internet. But to overcome the constraints of availability of internet, we create an ad-hoc network. So we have used Smartphone concept referring this paper and added the communication method of socket programming. Development of live streaming application which is merged with app controller i.e we have made single application which has robots controls and simultaneously live stream the video.

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III. PROPOSED SYSTEM

One can need an object which is placed at a different place while he/she is in the middle of an important work, or one urgently needs to send some object to other person while he himself is not able to move from his desk. In all such situations what comes to solve the problem is this proposed trolley. We designed a trolley which is wirelessly controlled by the user with the help of his/her smartphone. The trolley or the container will be able to hold small to medium sized object inside it. This trolley will be equipped with wheels so that it can move around the corridors easily. Moreover, Mobile phone camera on it will always capture the path ahead of it, so as to assist the user to navigate through easily and uninterrupted. The user's smartphone will be provided with an application using which the movements of the trolley can be controlled. The user need not worry about the visibility of the trolley to him/her, as the live stream of the way ahead of the trolley is displayed on the same mobile application simultaneously. The communication between the smartphone and the trolley is done via the Wifi technology for an effective communication and better radius of operation. The user connected to the trolley will be the only one able to control it. Once his/her task is done the user can free the trolley i.e. disconnect from the trolley and make it available for others to connect and use.

IV. SYSTEM SPECIFICATION

A. Hardware Specifications

Arduino Uno: The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. This Arduino Uno will be an Intermediate between robotic trolley and Smartphone.

Wi-Fi Module: ESP8266 is an Wi-Fi transparent transmission module with ultralow power consumption. It offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor. This wifi module is interfaced with arduino Uno so that it can accept the signals from smart phone/app.

Wheels: Standard / Fixed wheels would be more preferable for this project.

DC Motors: Used for converting electrical energy (signals) into mechanical energy that is to rotate wheel forward, backward, right and left.

L293D: It is a typical Motor Driver IC which allows DC motor to drive in either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction.

LED's: There is no major role of LED's but this can be help to check whether the connection is proper and to check whether the circuit arrangement is working correctly.

Battery: Depending upon the voltage battery is made available. Mostly we need to work with 12V.

Smart Phone: Smartphone in which an app which would be implemented by us is installed. Through this app we can control the trolley.

B. Software Specification

Android Studio: Android Studio is the official IDE for android application development which is used to develop complex android applications. The controller app is designed using android IDE.

Arduino Ide: It consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer. This IDE is used to burn the program on the microcontroller.

V. WORKING

Android controlled trolley is controlled by android application through WiFi module. Android application sends control signals (right, left, forward, backward, stop) to control the trolley. The signal is sent over WiFi as a character to the WiFi module present in the trolley and then the trolley works as per the signals received.

Moreover, to control the trolley in efficient way the user gets live view of the path ahead of trolley on the same controller app present on the smartphone. For live streaming we have used a phone with camera which is placed on the trolley, the camera preview frames captured by this phone are then converted into byte array and sent to the controller application over the wifi communication channel. The received stream of images are displayed on the controller application in a frame layout just above the buttons used for controlling.

The trolley on the receiving end is driven with the help of two dc motors which are easily controlled and instructed to rotate as per the need, with help of a motor driver IC L293D. The other components involved include arduino board, and wi-fi module. The interfacing of these components is seen in the Fig.1

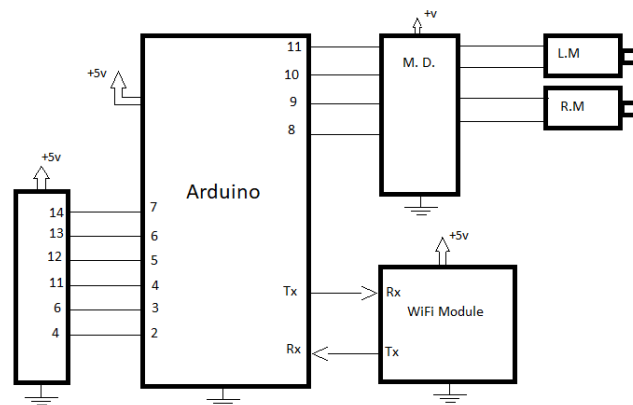


Fig1. Interfacing of arduino and other components.

The L293D helps in rotating the motors in both clockwise and anti-clockwise individually, when given proper signals to do so. Inorder to take a right turn, the right wheel should rotate in backwards direction and the left wheel in forward direction, similarly for every action to be performed the logic changes. This can be understood well with the help of Fig.2 which shows the actual implementation of the circuit.

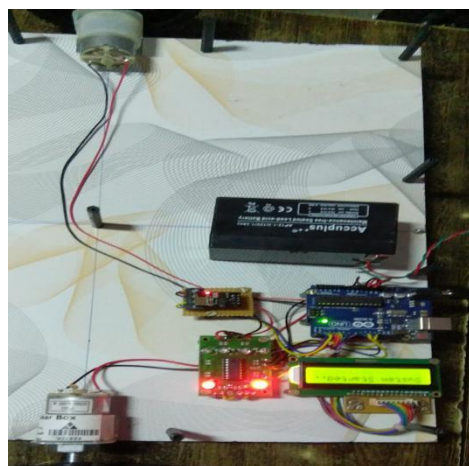


Figure 2. Actual implementation of the circuit.

This logic of different required combinations of rotation to perform different movement is stored in the arduino-uno board. The Arduino board sends this logic of performing the action in the form of corresponding control signals to the L293D IC. The arduino board sends the corresponding control signals upon receiving the same request from the controller application at the wifi module connected to the arduino board. The wifi module receives the control character and gives it to the arduino which in turn performs the further action.

VI. RESULT

Android Controlled Trolley is capable of lifting weight of 7-8Kg. The speed of trolley is independent of the weight which makes it efficient in terms of weight or object which needs to be moved from one place to another. Live

streaming is very essential concept encapsulated in trolley which allows the user to view what's in front of trolley and helps to avoid any obstacle. The final model of the trolley can be seen in the Fig.3

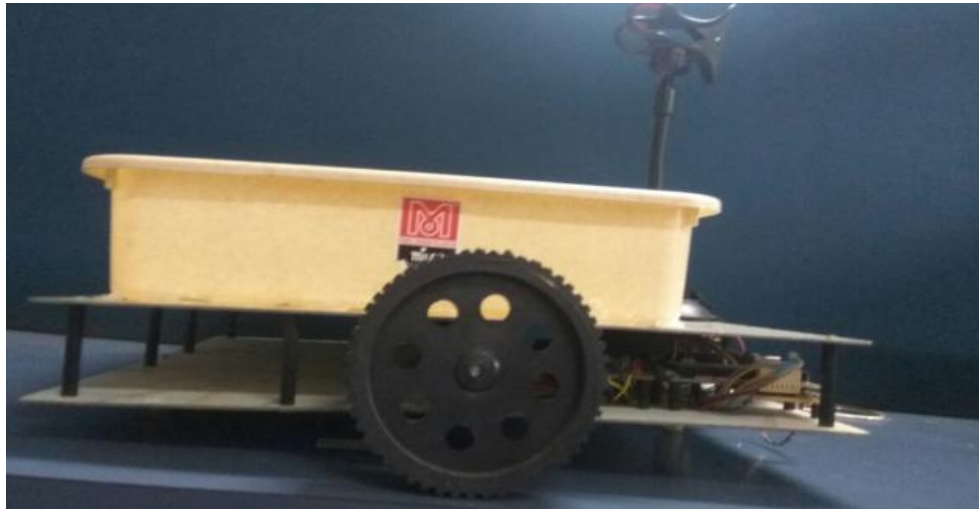


Figure 3. The trolley consisting of the mobile camer holder.

The trolley also works properly in the regions with slope, since it has a good grip around the wheels. The speed of the trolley can be enhanced using more powerful motors and more voltage battery. The model is purely working as basic example of load carrier which can be controlled by the android application shown in Fig.4. It can further be enhanced and implemented in Industries, for Domestic purpose ,Malls and Marts on large scale.

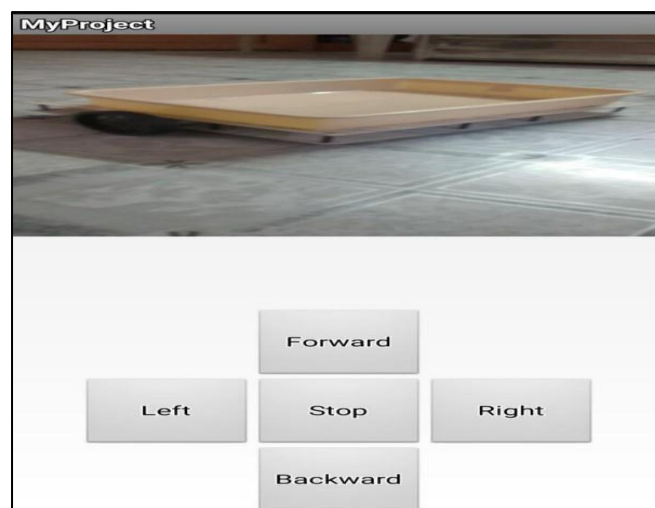


Figure 4. Screen shot of android application

VII. CONCLUSION

The implemented android controlled trolley has shown results as expected, with the help of successful communication between the android interface application and the ESP8266 module interfaced with arduino in the trolley. The complete project is capable of real life application such as in an office environment or even for household purposes. The result of live stream is also satisfactorily good and gives appropriate guidance to the user so as to properly move the trolley. The mobile vehicle is capable of moving in their environment and is not restricted to only one location. These type of projects are the main focus of a lot of research and development. They can find a wide

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variety of applications in industries and military applications. They can be also used widely as consumer products, in residential environment

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