APP CONTROLLED ROBOT USING 3 MODES

Bodhimanta Ghosh, Bhushetty Gurunath, Maddanappa, Venkatreddy Geeta D

School of ECE, REVA University

ABSTRACT

Robot is a multifunction and reprogrammable device designed to perform jobs like humans, like picking and droping, loading and unloading, scouting, health care, industrial, aerospace. Robots can do dangerous and efficient jobs to increase productivity, as they can perform 24 hours without rest. This document concerns the design and control of an automotive-type robot controlled by Android that can move in the designated direction through 3 different modes. An Android application was developed using the inventor of the MIT application and a Bluetooth connection was made with a robot that interacts with the microcontroller to control its speed and direction. The goal of this project is to design and controlling the movement of the robot using the Bluetooth device of an Android phone.

Keywords: Bluetooth device, Android operating system, smartphone, microcontroller, MIT application.

I. INTRODUCTION

A robot is a machine, programmable from a computer that can automatically perform a complex series of actions.Industrial robots have been designed to reduce human effort and time to improve productivity and efficiency and reduce production costs. Today, human-machine interaction is moving away from the mouse and the pen and is becoming more widespread and much more compatible with the physical world. The Android application can control the movement of the robot from a great distance using Bluetooth communication to control the interface and Android. The ARMOINO UNO ATMEGA328P-PU can connect to the Bluetooth module via the mobile application.

According to the command inputs received from the Android application, the robot can be controlled. The exit movement of a robotic vehicle is almost precise and repeatable. The purpose of this work is to design and implement an Android-controlled Bluetooth robot that is used for surveillance, home automation, wheelchair, military and hostage applications.

II. RELATED WORK

Several investigations have been made to develop a robotic system controlled by an Android device. The application domains considered for these surveys are different. Therefore, the researchers proposed a different architecture for the Android application and the robotic system.

Jorge Kazacos Winter [2] developed an Android-controlled robot. The goal of his project was the wireless transfer of Internet data between a smartphone and a robot, and the development of the robot and its communication system under a low-cost and open source philosophy. He used the 3D design technique to design the robotic structure with the help of parametric modeling software. This design can be sent to the 3D printer, which will print the robotic components layer by layer and then, using these components, the robot can be easily assembled.

M. Selvam [4] proposed an architecture to develop a robotic system connected to a wireless camera for the purpose of surveillance. He used Bluetooth technology for connectivity between the robot and the smartphone. He has Wireless night vision camera used for remote surveillance. The video captured by the camera is transmitted to the TV unit through RF signal You used the 8051 microcontroller for the robotic system.

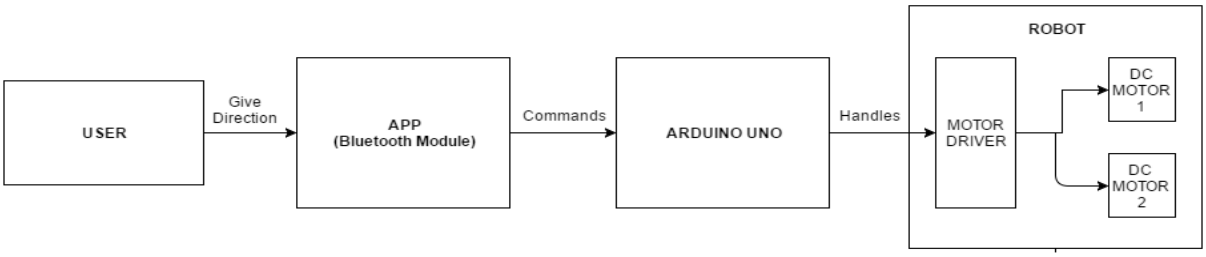
Vito M Guardi [1] proposed a Bluetooth technology design. Android application for a microcontroller controlled robot. The main objective of his work is to show that a single Android application can work with different electronic devices normally used in the field of hobby and robot armor. It has developed a communication protocol for Android smartphones and a robotic platform with Bluetooth connectivity. The Bot bot kit product from the Parallax and Propeller microcontroller board was used which contains 8 independent 32-bit processors and Bluetooth RN-42 parallel technology adapter for robotystem.

Ranjith Kumar Goud and B.Santhosh Kumar [3] have developed an Android-controlled robotic architecture to collect and store objects. The main objective of his work was to create a selection and conservation robot that

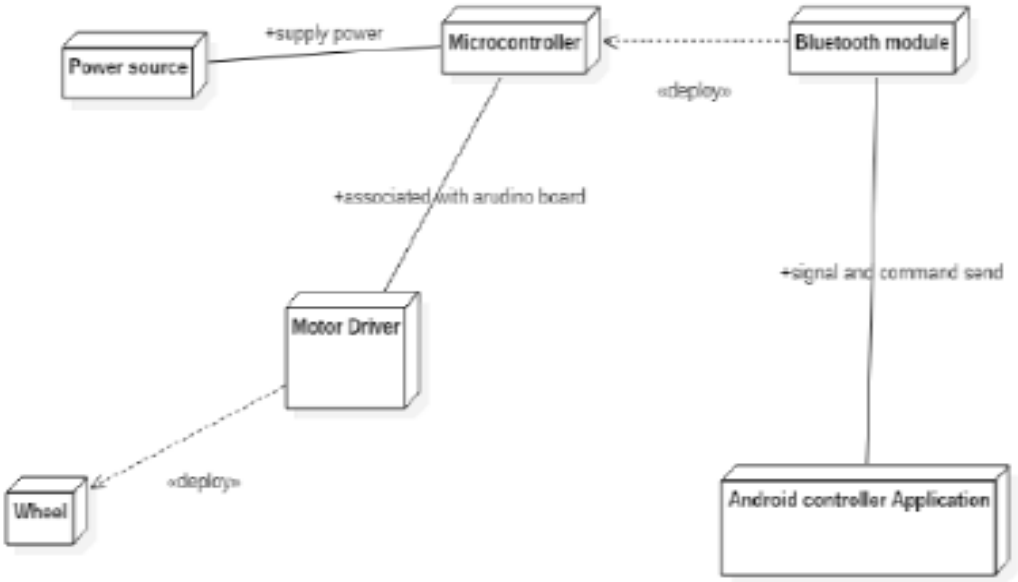
ISBN : 978-93-87793-79-8

could be used to spread bombs from a safe distance. They used 2 robotic hand motors and 2 robot wheel motors to control movement. They used the LPC2148 microcontroller, the wireless remote surveillance camera and the Bluetooth connectivity module.

IV. SYSTEM ARCHITECTURE



In this project we used a toy machine for demonstration. This machine has two DC motors at its front and rear side. The front engine is used to give vehicle steering means turning left or right. And the rear engine is used to drive the car in a forward and backward direction. a Bluetooth module is used to receive Arduino Android UN commands and phone to control the entire system. The Bluetooth controlled machine moves according to the button that is played on the Android Bluetooth mobile app. The Bot can be controlled by the HC-05 Bluetooth module andmicrocontroller with Android smart phone device. Data received from the Bluetooth module receives information about the Android smartphone controller. The regulator acts accordingly in the DC motor of the robot. The robot can be moved in four directions using the Android phone. To accomplish the task, the controller is input with a program written using the embedded 'C' language.

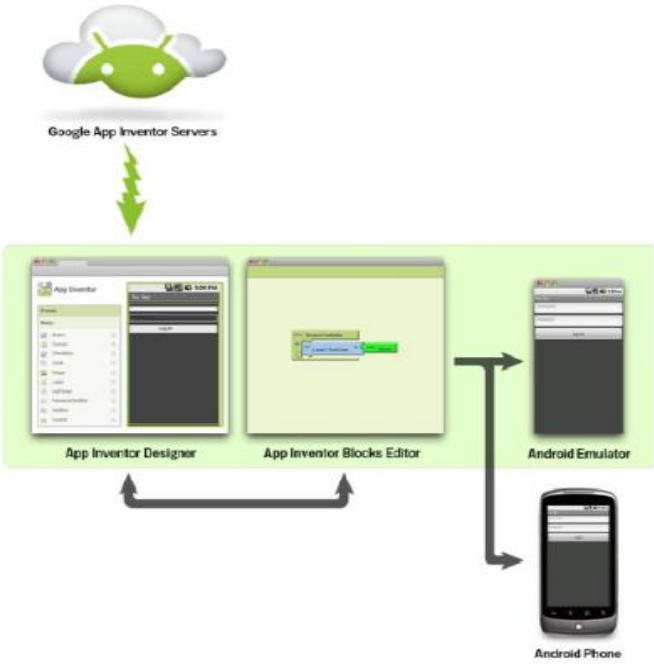


ISBN : 978-93-87793-79-8

V. SOFTWARE IMPLEMENT

5.1 MIT App Inventor

App Inventor for Android is an open sourceapplication originally provided by Google and now being managed by the Massachusetts Institute of Technology (MIT). Allows newcomers to plan the creation of software applications for the Android (OS) operating system. It allows users to drag and drop visual objects to create an application that can be run on Android devices. During the creation of App Inventor, Google relies on an important previous research in the IT sector and on the work done on Google in the online development environment. It consists of 3 parts: (i) designer of the inventor's application, (ii) editor of App Inventor Blocks and (iii) an emulator or Android phone. The software configuration process is simple and the system requirements are fundamental. It is compatible with Mac OSX, Windows and Linux operating systems.

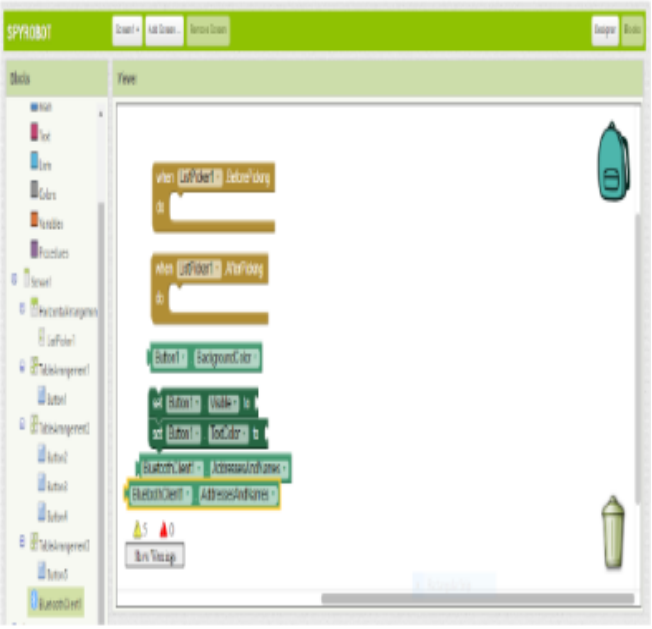


5.2 App Inventor Designer

- **User Interface :** User interface includesthe visible components that you see on screens of any apps. It includes buttons, text boxes, labels, images etc.
- **Layout :** It gives us the option to arrange the components in any particular order like horizontal or vertical.
- **Media :** Camera, Music Player, Voice Recorder, Video Player all these comes under media. In this option we have ready made components available which user can directly implementin the projects.
- **Sensors :** Sensors play important roles especially during gaming applications to control the user actions. App inventor gives us the option to use various sensors like Accelerometer Sensor, Barcode Scanner, Location Sensor, Orientation Sensor and Proximity Sensor.
- The viewer is the true idea of how our application will appear on the phone after installation. It is in the center of the page. As we drag any component into the viewer, it will be added to your project. If the

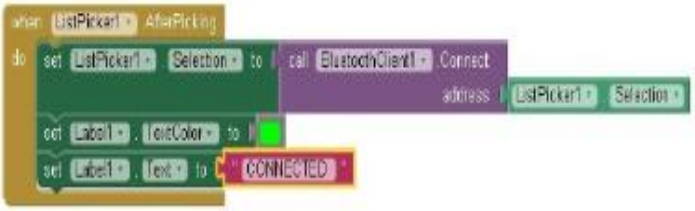
physical property of a component is not visible, it will not be visible in the viewer, but will be positioned below the viewer with a non-visible label

- The Components tab lists all the components you add to your project. Those are all listed below it in the tree structure. You can also nest as if you were using a horizontal layout and then several buttons will display the buttons listed in the horizontal layout.



5.3 An emulator or Android phone

The final phase of the operation consists in testing the application. For users without Android phones, App Inventor offers the possibility to test the application in an emulator that is very similar to the real device. From the Block Editor, the user can link the application to the available emulator via the connection option and check how the application works in the real world. In addition to the emulator, the user can also directly connect the Android phone to the computer via the USB connector and test the application. Real-time testing is the best option to monitor the function of the application.



5.4 Setting Device and Connecting Buttons

The first button is device button set. When the button is touched, the application takes the user to a window with a list of available Bluetooth devices. By touching the correct device, the user can return to the main window, which invites the user with the connection button activated which, when clicked, links the application to the robot, allowing the other available buttons to be used.

ISBN : 978-93-87793-79-8

5.5 IMPLEMENTATION SOURCE CODE

File Edit Sketch Tools Help

bluetooth_with_motor_control_device

```
int a;
int led=13;
int motor1=2;//leftmotor up
int motor2=3;//leftmotor down
int motor3=4;//rightmotor up
int motor4=5;//rightmotor down
void setup() {
pinMode(motor1,OUTPUT);
pinMode(motor2,OUTPUT);
pinMode(motor3,OUTPUT);
pinMode(motor4,OUTPUT);
pinMode(led,OUTPUT);
Serial.begin(9600);
}

void loop() {
a=Serial.read();
if(a=='1')
{
digitalWrite(motor1,HIGH);//forward
```

Done Saving.

File Edit Sketch Tools Help

led_control_using_bluetooth_device §

```
//led control using bluetooth
int a;
int led=13;
void setup() {
pinMode(led,OUTPUT);
Serial.begin(9600);
}

void loop() {
a=Serial.read();
if(a=='1')
{
digitalWrite(led,HIGH);
delay(1000);
}
else
digitalWrite(led,LOW);
}
```

VI. CONCLUSIONS

The smartphone's operating system is an Android capable of developing an effective control program.
This program also uses the blue tooth connection to connect with the robot.
Surveillance has always been a delicate task. And it includes many risks. So it's better to use a robot for this type of work instead of people. And if the user can control the robots with efficiency and precision, then it can be guaranteed with good results and success. Wireless control has been one of the most important needs for people all around the world.But our robotic application project aims to use mobile phones with Android, which are very cheap and easy to get. To this end, the Android mobile user must install an application designed for mobile users.

6.1 FUTURESCOPE AND APPLICATION

The robot can be modified and used for industrial purposes, security purposes, infiltration etc. Future changes can be made to perform different tasks with precise control such as:
A robot mounted with a camera.
A headset, with a color screen.
A mission control center.

REFERENCES

[1] Designing of a Bluetooth Enabled Android App for Microcontroller Driven Robot By Vito M. Guardi,(May 2014).
[2] Android Controlled Mobile Robot By Jorge KazacosWinter,(July2013).
[3] Android Based Robot Implementation For Pick and Retain ofObjects By Ranjith Kumar Goud, B. Santhosh Kumar, (Oct 2014).
[4] Smart phone based robotic control for surveillance applications ByM.Selvam,(IJRET 2014)