International Journal of Research in Advent Technology (IJRAT) Special Issue
E-ISSN: 2321-9637
National Conference "MOMENTUM-17", 14th & 15th February 2017
Available online at www.ijrat.org

ANDROID BASED MULTI-TERRAIN ROBOT USING WIRELESS NETWORK

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Abstract
Nowadays, robot is widely used. The previous system is based on RF technology to control the robot. But this system having some drawbacks like Interference in communication, lack of security and it is easier to "eavesdrop" on transmissions, higher cost than infrared and data transmission rate is lower than wired and infrared transmission. Some of these drawbacks can be overcome by in our system. With each passing day the gap between machines and humans is being decreases with the introduction of new technologies to ease the standard of living. In our proposed system a robot series utilizes four wheels to drive over just about any terrain surfaces. It is works on any indoor surface and outdoor surfaces. This is an intelligent robot that can easily move on uneven surfaces too. This robot is based on Android technology. Android application and smart phones are becoming each time more powerful and equipped with several accessories that are useful for Robots. This system describes how to control a robot using mobile through Bluetooth communication, some features about Bluetooth technology and robot. Bluetooth is wireless technology standard for the exchanging data over short distances (the ISM band from 2.4 to 2.485 GHz do not required an operator's license) from fixed and mobile devices.

Keyword- *DC Motor, Driver Circuit, Bluetooth*

I. Introduction

An embedded system is a system which is going to do a predefined specified task and is even defined as combination of both software and hardware. A general purpose definition of an embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant."Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious. All embedded systems are including computers or microprocessors. In some cases a microprocessor may be designed in such a way that application software for a particular purpose can be added to the basic software in a second process, after which it is not possible to make further changes. Android is an open-source platform, It has been widely used in smart phones. The purpose of our system is to provide powerful computational android platforms with simpler robot's hardware architecture.

A host Bluetooth device is capable of communicating with up to seven Bluetooth modules at same time through one link. We are developing the remote buttons in the android app by which we can control the robot motion with app. And in which we use Bluetooth communication to interface controller and android. Controller can be interfaced to the Bluetooth module though UART protocol. According to commands received from android the robot motion can be controlled. The consistent output of a robotic system along with quality and repeatability are unmatched.

This can be moved forward and reverse direction using geared motors of 60RPM. Also this robot can take sharp turnings towards left and right directions. This system uses LPC2148 MCU as its controller. The Bluetooth module is used here. Bluetooth module will be connected to the robotic system for communicating between the android phone and robot. Although the range of each Bluetooth device is approximately 10 maters but this distance can be increased to 100 meters with optional amplifiers placed at strategic location within a building. From any authority, Bluetooth supports both voice and data. This system is much useful for military applications. This kind of robot can be used in different military applications also

like it can be send to locate the terrorist position as well as in war to locate the enemy soldiers position. It can also be used in places of natural calamity to know the conditions of injured people.

II. Literature Review

What is a Robot?

The word "robot" is used among ourselves as a natural thing. The fictitious and actual existence of robots is widely known, and the reality of robots play an active role in various fields, especially in industries. But, when asked about robots, we are likely to have a difficult time giving a clear answer to the question of what robots really are.

The dictionary will give you descriptions about robot such as:

(1) A man-made doll automated by means of complicated and delicate devices. i.e. Artificial man

(2) Machines capable of automatically operating without the need of human aid by employing the devices as described above.

The definition of robot: In recent years, the definition of a robot is generally used to mean an unmanned system or automation, as often seen in the industrial applications, deep sea planetary probes etc.

Year of Publication	Author	Method Used
2003	AdzlyAnuar, Salman Yussof	The robot proposed for clearing up the mines.
2007	Jong HoonAhnn	This paper outlines the strategy adopted for establishing two kinds of communications.
2010	Guilherme A. S. Pereira, Luciano C. A. Pimenta1	This paper represent a methodology for motion planning in outdoor environments.
2012	Arpit Sharma, ReeteshVerma, Saurabh Gupta	This paper analyses the motion technology to capture gestures through an android smart phone.
2014	Rakesh Kumar, Ravikumar	This robot uses RF technology to controlrobot.
2015	G. V. Ramana Reddy, L. Srinivas Reddy	This paper represent a Pick and Place technology to control the robot.

III. Block Diagram

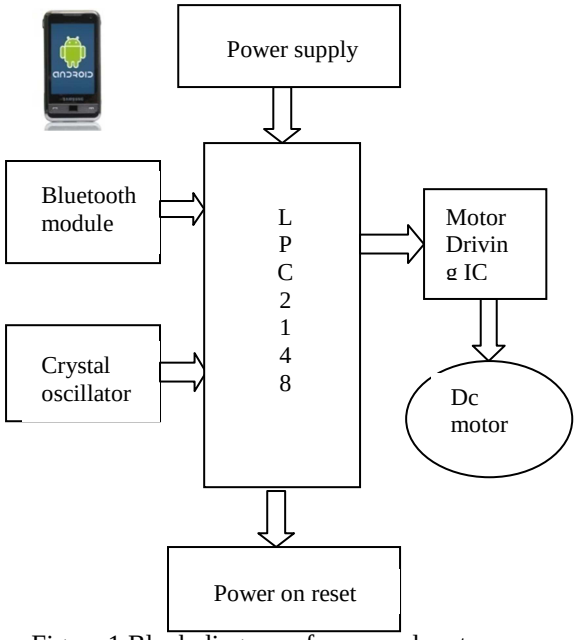

Figure 1 Block diagram of proposed system

ARM 7 Controller & motor driver needs 3.3V to enable & 12V is needed for motor through the driver circuit. In this project firstly we are giving the supply to LPC2148. Then controller generates the pulse. The generated pulse is a PWM signal, which giving to motor driver IC L293d. The function of this driver circuit to generate 12V DC pulse, which can drive two 12V dc motor simultaneously. The motion of robot can be given by android Mobile. The signal is given by android mobile app then it is given to the Bluetooth module transmitter which transmits to the LPC2148. Information is transmitted with the help of

Bluetooth module transmitter which is connected to the android mobile.

IV. Background

This section takes a brief look at Android smart phones and its features, how smart Phones will help to develop a community in the environment it is used in.

i. Android Platform

Android devices are powerful mobile computers and they become more and more popular smart phones used worldwide. They becomes more and more popular for software developers because of its capabilities and open architecture, also it's based on the java programming language. Because Android uses the Java programming language getting started with the Android API is easy; the API is open and allows easy access to the hardware components. Android devices provide many communication interfaces like USB, Wi-Fi and Bluetooth, that can be used to connect to the robot. We use android platform because it is the vast used in the word and runs the largest number of smart phones worldwide.

ii. Connectivity and Communication

For the communication of the robot with the cell phone or mobile we are use a Bluetooth device. The Bluetooth device is attached to the robot that receives and transmit the data from the mobile

. Bluetooth: Bluetooth is a wireless communications protocol running at 2.4 GHz band, with client-server architecture, suitable for forming personal area networks. It is used for low power devices such as mobile phones. It can be easily fitted with a module to allow Bluetooth communication. Bluetooth is the only appropriate wireless communications protocol because there is no fear of getting the frequency interference.

V. Design

The Android app is generally developed by using JAVA language but this Android app can also be build without knowing the Java language.

i. System Architecture

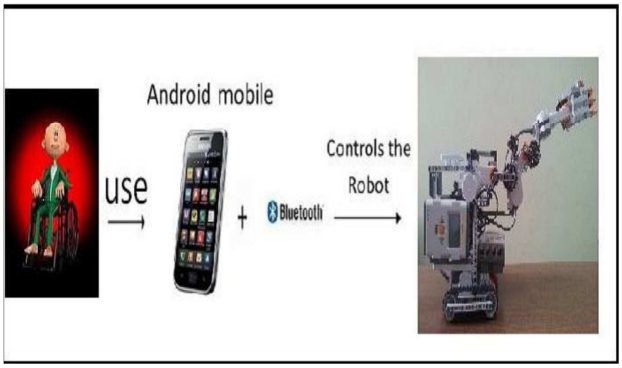

Figure 2 System Architecture.

ii. Mobile Application

The Mobile application consists of 5 buttons viz. such as Right, Left, Forward, Reverse, Stop.

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Figure 3 Status- Not Connected.

The above figure consists of an overlook of the app. Right now all the 5 buttons are disabled until the Bluetooth is connected.

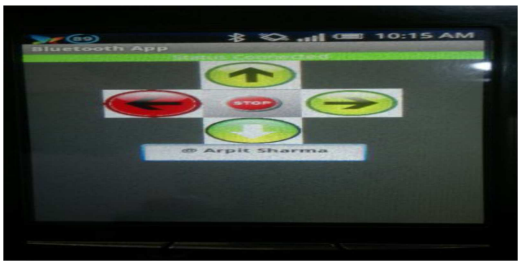

Figure 4 Status- Connected.

Now since the Bluetooth of the mobile is connected to another Bluetooth Module, the status shown as a "Connected".

VI. Advantages

i. Not as sensitive to weather/environmental conditions
ii. More efficient
iii. Robust
iv. Low cost
v. Low power consumption
vi. Safely climb on uneven surface
vii. Self-balanced

VII. Applications

i. In military Applications
ii. Forest Applications
iii. Agriculture
iv. Mining

VIII. Conclusion

In this paper we have studied the implemented a Multi-Terrain Robot Designed to Travel on Water Surface, Indoor and Outdoor Uneven Surfaces with the help of Bluetooth wireless communication. The importance of designing and developing a system able to detect the potential. Those sources are easily available now days hence our proposed system become more cost effective and economical. Our proposed system will use mobile application for interfacing Bluetooth module & controller.

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