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Arduinodroid Controlled Car

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Abstract— *Now a days smart phones are becoming more powerful with reinforced processors, larger storage capacities, richer entertainment function and more communication methods. Bluetooth is mainly used for data exchange; add new features to smart phones. Bluetooth technology, created by telecom vendor Ericsson in 1994, shows its advantage by integrating with smart phones. It has changed how people use digital device at home or office, and has transferred traditional wired digital devices into wireless devices. Now guess what we can do in the near future by controlling digital device just by our cell phones. This paper emphasises on the idea that we can make any digital device into a controlled robot and make it roll on our finger tips; and here is basic example of how we can do it.*

Keywords— *Robotics, Arduino, Android, Bluetooth, Integrated Development Environment*

I. INTRODUCTION

The main purpose of this project is to develop a remote user interface to control a Robot via a wireless technology. There is a need to communicate with the robot remotely in order to control the robot movements and pass critical data both ways. The current IR controls are not good enough because the robot does not have an IR transmitter but only a receiver, meaning that the communication is one way. The IR communication works only in line of direct sight and any objects in the way will obstruct the communication. Bluetooth communication will enable us to control the robot up to 100 meters without the need for direct sight which means that the robot could be located behind a wall or some other object and the communication would not be lost. The project aims in designing a Robot that can be operated using Android mobile phone. The controlling of the Robot is done wirelessly through Android smart phone using the Bluetooth feature present in it.^{[1][2]} Here in the project the Android smart phone is used as a remote control for operating the Robot. Android is a software stack for mobile devices that includes an operating system, middleware and key applications. Android boasts a healthy array of connectivity options, including Wi-Fi, Bluetooth, and wireless data over a cellular connection (for example, GPRS, EDGE (Enhanced Data rates for GSM Evolution), and 3G). Android provides access to a wide range of useful libraries and tools that can be used to build rich applications.^{[3][4]}

II. LITERATURE REVIEW

The objective behind making this robot was to bring the functionalities of a robot service in a cheap and onto a mobile device which almost everybody is having. So while surveying as to on which platform or rather operating system the project has to be implemented ,we selected android for the following reasons:

- Android is an open source platform
- Supports multifunction
- Provides rich tools to make interactive application
- Downloading the software's required for making the application are absolutely free Along with this we surveyed the popularity of the operating system. Market share of android which was mere 2.8% in 2009(initial stage), boosted to 48% till August, 2011 which is almost half the share of the total market. Our basic aim is to make the application reach as many people as possible and this goal is achieved by implementing the application on android. Share of worldwide 2011 Q2 Smartphone sales to end users by O.S, according to Gartner.

Therefore if we become successful in making a robot which is controlled by an Android then almost half of this world can control their home appliances or small robots without expending any much of their fortune.

III. PROPOSED SYSTEM

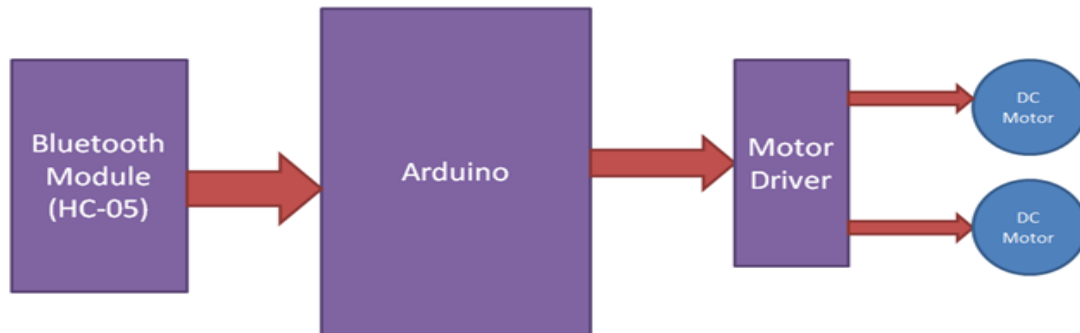


Fig. 1 General Block Diagram Of connection

A smart phone Android operated robot. Now here is a simple to control your robot/robo car using Bluetooth module HC-06 and 89c2051 microcontroller with your android Smartphone device. The controlling devices of the whole system are an Arduino, Bluetooth module, DC motors are interfaced to the microcontroller. The data receive by the Bluetooth module from android smart phone is fed as input to the controller. The controller acts accordingly on the DC motor of the robot. The robot in the project can be made to move in all the four directions using the android phone. The direction of the robot is indicators using LED indicators of the Robot system. In achieving the task the controller is loaded with program

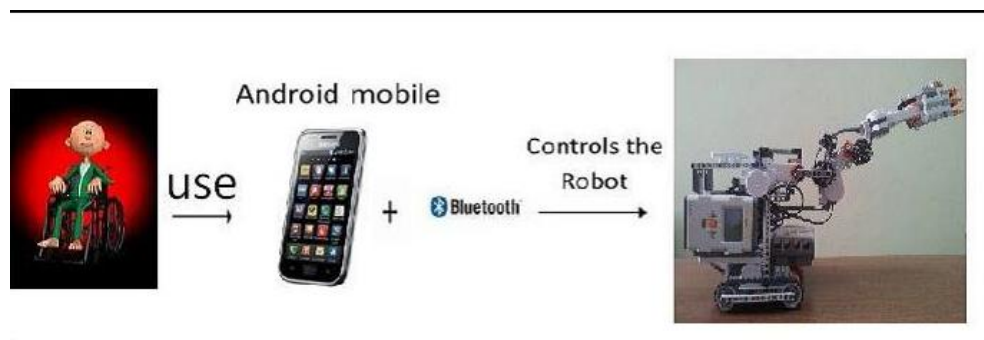


Fig. 2 System Architecture

IV. EQUIPMENT REQUIRED

A. ARDUINO DEVELOPMENT BOARD

The Arduino is a software company, project, and user community that designs and manufactures computer open-source hardware, open-source software, and microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices. The project is based on microcontroller board designs, produced by several vendors, using various microcontrollers. These systems provide sets of digital and analog I/O pins that can interface to various expansion boards (termed *shields*) and other circuits. The boards feature serial communication interfaces, including Universal Serial Bus (USB) on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino project provides an integrated development environment (IDE) based on a programming language named *Processing*, which also supports the languages C and C++.

B. HC SERIAL BLUETOOTH

HC Serial Bluetooth product consists of Bluetooth serial interface module and Bluetooth adapter. Bluetooth serial module is used for converting serial port to Bluetooth. Bluetooth serial module's operation doesn't need drive, and can communicate with the other Bluetooth device. But communication between two Bluetooth module require at two conditions: i) The communication must be between master and slave. ii) The password must be correct.

C. MOTOR DRIVER

A motor driver is a little current amplifier; the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor. Future Electronics has a full programmable motor driver selection from several chip manufacturers that can be used for a motor driver IC (integrated circuit), bipolar stepper motor driver, H bridge motor driver, servo motor driver, DC motor driver, brushless motor driver or for any circuit that may require a motor driver. Simply choose from the motor driver technical attributes below and your search results will quickly be narrowed in order to match your specific motor driver application needs. If you have a preferred brand, we deal with several semiconductor manufacturers such as Freescale Semiconductor, ON Semiconductor, ROHM Semiconductor or STMicroelectronics, among others. You can easily refine your motor driver product search results by clicking your preferred motor driver brand below from our list of manufacturers. Here the motor driver used is L23d9.

D. CHASIS

It is basically a mounting or supporting arrangement made which gives us flexibility to fix wheels and Arduino boards on the upper side of it. They can be either readily brought or can be also made from piece of a wood or a cardboard.

E. ANDROID PHONE

An android phone with an app installed from google play can help us to act as a proper remote control to guide the car or the robot to find its way. The phones' Bluetooth will act as a transmitter and the Bluetooth module placed at the bot will be acting as a receiver.

V. OBSERVATION

As far as the experiment is concerns; we were successful in building this project in a very low cost and efficient way. We were able to controlled the car from an mobile app and were not only successful in moving the car but we had also controlled the direction and horn of the car.

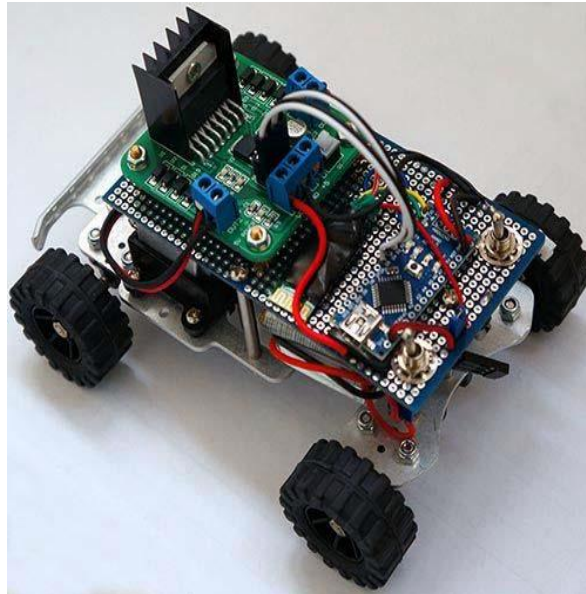


Fig. 3 The controlled robot

VI. CONCLUSION

The objective of the paper is to realise the smart living, more specifically the home lighting control system using Bluetooth Technology. Robot and smartphones are a perfect match, specially mobile robots. As phones and mobile devices are each time more powerful, using them as robot for building robot with advanced feature such as voice recognition. Android bluetooth-enable phones and Bluetooth module via HC-06 and communication among bluetooth devices. It is concluded that smart living will gradually turn into a reality that consumer can control their home remotely and wirelessly.

Wireless control is one of the most important basic needs for all living beings. But unfortunately due to a huge amount of data and communication overheads the technology is not fully utilized.

1 Many of the wireless-controlled robots use RF modules. But this project make use of Android mobile phone for robotic control which is very cheap and easily available. The control commands available are more than RF modules. For this the android mobile user has to install an application on her/his mobile. Then user needs to turn on the Bluetooth in the mobile. The wireless communication techniques used to control the robot is Bluetooth technology. User can use various commands like move forward, reverse, move left, move right using these commands which are sent from the Android mobile. Robot has a Bluetooth receiver unit which receives the commands and give it to the microcontroller circuit to control the motors. The microcontroller then transmits the signal to the motor driver IC's to operate the motors The objective of the paper is to realise the smart living , more specifically the home lighting control system using Bluetooth Technology. Robot and smart phones are a perfect match, specially mobile robots. As phones and mobile devices are each time more powerful, using them as robot for building robot with advanced feature such as voice recognition. Android bluetooth-enable phones and bluetooth module via HC-06 and communication among Bluetooth devices. It is concluded that smart living will gradually turn into a reality that consumer can control their home remotely and wirelessly.

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