Robot Control using Android Smartphone

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Abstract

An open-source platform Android has been widely used in smart phones. Android has complete software package consisting of an operating system, middle ware layer and core applications. Android application, Smart phones are becoming each time more powerful and equipped with several accessories that are useful for robots. The purpose of our project is to provide powerful computational android platforms with simpler robot's hardware architecture. This project describes how to control a robot using mobile through Bluetooth communication, some features about Bluetooth technology, components of the mobile and robot. For project we developed two android applications, in that first application sends instruction to the other application which is placed in another smart phone on robot. We are developing the remote buttons in the second android app by which we can control the robot motion, direction with them and also use mobiles basic features like camera, video. We use Bluetooth communication to interface controller and android. We derived simple solutions to provide a framework for building robots with very low cost but with high computation and sensing capabilities provided by the smart phone that is used as a control device.

Keywords: *Android, smart phones, robots, architecture, video*

INTRODUCTION

The project aims in planning a golem which will be operated exploitation robot trans portable. The dominant of the golem is finished wirelessly through robot sensible phone exploitation the Bluetooth feature gift in it. Here, within the project the robot sensible phone is employed as a distant management for operational the golem.

The dominant device of the entire system could be a Microcontroller. Bluetooth module, DC motors square measure interfaced to the Microcontroller. The information received by the Bluetooth module from robot sensible phone is fed as input to the controller. The controller acts consequently on the DC motors of the golem. In achieving the task the

controller is loaded with program written exploitation Embedded 'C' language [1].

INFORMATION ABOUT THE SYSTEM

There are many mechanism and controllers that can control a robot and other remote controlled devices.

But we have to create extra space for remote's and other controlling devices. In this system only two android applications can manage whole things. First app can sends text to second app which is in the smart phone. It can take the input as a distance and according to that it can give inputs to the controller for work. Sensors can manage the avoiding of obstacles which are present in the goal path [2, 3].

OVERVIEW OF THE SYSTEM

Our system aims to achieve the target to design a system that can provide following functionality. a. develops android applications that will act as an remote of a robot.

b. Develop a robot which will be helpful for travelling, survey, military area.

c. Here, the focus is on the latest technology of android and robot also called as mobot. An android smartphone [4].

d. and the technology of android is vast and can be used to interact with embedded system. Mobile, robot and Bluetooth are the on-going technologies which can be used for the benefit of mankind.

The system will consist of following four parts:

a. Bluetooth Technology,

b. Android Smartphone

c. Microcontroller and

d. DC Motor.

e. Sensor.

Android smartphone will act as remote of the system, Bluetooth will act as the connection link between robot and android smartphone, microcontroller will act as the brain of the robot, and DC motor will help us to move the robot and sensors use for avoiding and measure distance of obstacles.

FUNCTIONALITY PROVIDED BY THE SYSTEM

Robot control design using a smartphone is the direct usage of a simple device that is as simple as our easy to carry, the mobile phones to drive a robot which is considered quiet complex when comparisons are made to the mobile phones. Here in this system the mobile phone will carry out the controlling of robot with the help of a smartphone

application. The smartphone application will be developed in such a way that it is compatible to all the current versions of Android. The smartphone application will communicate to the robot with the help of Bluetooth module which is fitted on the Robot. The robot is mechanically modified in order to fit the Bluetooth module, sensor and microcontroller. It can also take sensor values from sensor and move according to build-in program. The microcontroller will read the instructions from the smartphone application with the help of Bluetooth and gradually will control the Robot with the help of DC motor.

SYSTEM INTERFACES, INPUTS AND OUTPUTS

The system interface consists of following entities-Smartphone device, Android Applications, Robot, Microcontroller, sensor and DC Motor. The Smartphone device acts as the base hardware on which the Android Application plays the role of an interface. The input is given to the robot through the application which is fed to the skateboard through Bluetooth module which transfers the instructions passed by the smartphone application to the skateboard. The DC motor is also in synchronization

with the microcontroller which makes the robot perform the required kinds of motion.

EXPECTED OUTCOMES

The robot should be used for travelling, survey, military as a basic outcome with minimal energy usage. Since the motors used are completely environment friendly, the travelling for shorter distances could be made feasible.

WORKING OF THE PROPOSED SYSTEM

Our proposed system consists of following components:

a) Android Smartphone
b) Bluetooth Module
c) Microcontroller
d) DC Power Supply
e) Motor Driver
f) DC Motor
g) Sensor

An Android smartphone will act as remote controlled device for movement of the robot. An Android application will be developed for the same. The application will support only the 2.2 and above versions of Android Operating System. The Bluetooth module will act as an interface between Smartphone and microcontroller. We will be using HC-05

Bluetooth module for the system, which can be used as either master or slave. Generally our master will be smartphone and slave will be Bluetooth module. Bluetooth module will give the commands given by smartphone to the microcontroller. Microcontroller will act as the brain of the robot. The robot movement will be decided by the microcontroller. In this system we will be using microcontroller named Arduino Uno which contains Atmega 328p microcontroller chip. The microcontroller will be programmed with the help of the Embedded C programming. Arduino has its own programming environment through which the microcontroller can be programed. As our system is for travelling purpose we will be using a DC motor. It will generate high amount of power and torque which will be sufficient to drive a human being. A motor driver will be used to control the DC motor, will we connected to the microcontroller and the Bluetooth module will be connected to the same. In this proposed system we will be using any rechargeable battery to supply power to the electronic components of the system. Mainly the microcontroller and DC motor will be in need of power supply. The model represents a general idea how our robot will look like and it is interfacing with the android smartphone.

Our robot will be made up of following components:

a. Skateboard
b. DC Motor
c. Motor Driver
d. Microcontroller
e. Bluetooth Module
f. Battery
f. Sensor

All of the above mentioned components will be mounted on the skateboard. And as mentioned in the system architecture the working will be processed.
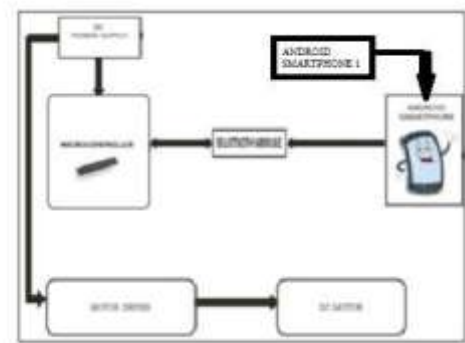

Fig. 1: DC motor is 100 rpm which will be able

to drive about 10–30 gm weight. Motor driver is used to control DC motor. The microcontroller is the Brain of the robot and is used to connect the smartphone through the Bluetooth module. The motor belt driver is used to connect the wheels of the skateboard and the dc motor through driving cog. The entire electronic

component except the motor and belt will be kept in Electronic component case.

The android smartphone will act as a remote control for the robot.Acceleration and de-acceleration of the robot can be done with the help of the android smartphone. All Electronic and mechanical component will be mounted on the skateboard. To provide mechanical strength to the board for bearing extra weight an elastic property using aluminum covering over the joined with resin will be provided. This will increase the physical strength of the robot.

CONCLUSION

The proposed system shows how the android smartphone can be used as remote controller for robot and various embedded technologies with the help of the Bluetooth technology. The proposed system also shows that how a robot can be used for travel, servey, confidential purpose. The operating system of smartphone is Android, and it can develop effective remote control program and by using Bluetooth component, the communication between smartphone and robot can be realized, which makes it simple and convenient to control robot.

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