

IOT POWERED ANDROID CONTROLLED RC CAR

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ABSTRACT

The Android controlled RC car is controlled by a Smartphone running on an Android application. It is developed to autonomously avoid obstacles that are not visible to the user driver. The RC car is equipped with an ultrasonic sensor, a Bluetooth module, and an Arduino UNO microcontroller board. This is a very simple and easy type of remote control car, where the ordinary controller has been replaced by Arduino that controls the propulsion and direction of the car. Arduino has played a major role in the robotic section and has made it easier to convert digital and analog signal to physical movements and it is a self-constructed car which is controlled by DC motor. The Android application uses the embedded orientation sensor on the Smartphone to determine the four directions (forward, backward, left and right) intended by the user. The received command from the android application results in corresponding propulsion of the RC car. The control commands are transmitted to the RC car through the Bluetooth communication. The remote for the car can be any android phone and this project can be made in large scale for real time vehicles.

I. INTRODUCTION

Internet of Things (IoT) which is outcome of merged field of computer science and electronics. The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. The IoT is the network of combined sources such as physical devices, vehicles, home appliances and other items embedded with electronics, sensors software to connect and exchange data.

II. RELATED WORK

The world is at the dawn of a smart phone era where everything in our day to day life is, and can be controlled via a smart phone. 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. But through the years, with dramatic increase in smart phone Users, Bluetooth has turned them into all-purpose portable devices by redefining the world of data exchange and transferring wired devices into wireless devices; capable of efficient communication and the fact that host Bluetooth device is capable of communicating with as many as seven Bluetooth modules simultaneously through one link is proof enough

In this paper, we present a review of current robots, which are controlled by mobile phones and tablets. Specifically speaking, robots which on receiving the commands can perform simple actions like moving in all four directions, by an Android application. Hence, the mobile device harboring the Android application acts as the car's remote control. Bluetooth is the basis of communication between the controller and Android, using the USART protocol. A vision-based obstacle avoidance algorithm

is also implemented for small indoor mobile car built from low-cost and off-the-shelf electronics where vision-based obstacle detection algorithm is fast and works with very low resolution images. Ultrasonic sensor (US) is widely used sensor in mobile applications for distance measurements which helps in obstacle detection. Using both the sensors that is Ultrasonic sensor (US) and Infrared (IR) sensors is also implemented that system is intended to be use by the elderly and people with vision impairment.

III. PROPOSED METHOD

The remote in this project is an android device which has an inbuilt Bluetooth module. The main part in controlling the car is played by the Arduino UNO which houses the micro-controller Arduino. Microcontroller ATMEGA328 can be interfaced to the Bluetooth module through UART protocol and code is written in embedded C language. As per the commands received from android app the vehicle motion can be controlled. The output motion of a vehicle is accurate and repeatable. The microcontroller is controlled by the android application. The connection between the android application and the microcontroller is established by the Bluetooth module. The Android application acts as the UI between the user and the system. the architecture of hardware and software is as shown below.

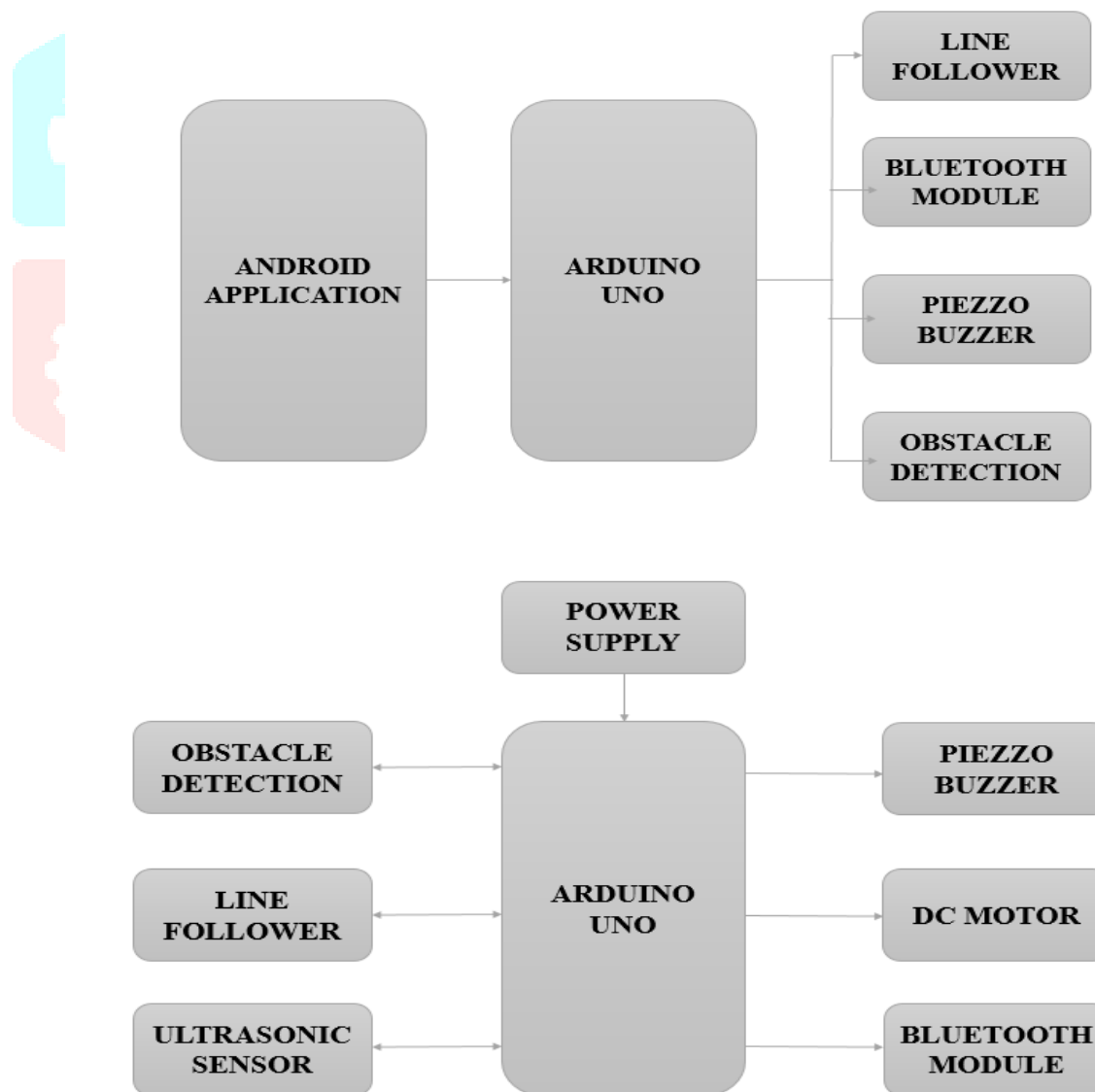


FIG SYSTEM ARCHITECTURE
IV. TEST RESULT ANALYSIS

TEST CASE ID	TEST CASE	INPUT DATA	EXCEPTED OUTPUT	ACTUAL OUTPUT	STATUS
T1	Bluetooth Connectivity	Device Pairing	Connection Established	Connection Established	Pass
T2	Forward Movement	Command F, Forward Movement Button	Forward Movement	Forward Movement	Pass
T3	Backward Movement	Command B, Backward Movement Button	Backward Movement	Backward Movement	Pass
T4	RightSide Movement	Command R, Right Analog Button.	RightSide Movement	RightSide Movement	Pass
T5	Left Side Movement	Command L, Left Analog Button.	LeftSide Movement	LeftSide Movement	Pass
T6	Stop	Command S, Stop Button	Stops The Car	Stops The Car	Pass
T7	Line Following Mode	Command Z	Follows The Track	Follows The Track	Pass

V.CONCLUSION AND FUTURE WORK

By analyzing, the result shows that the system works well. As the user can authenticate via Smartphone using Bluetooth connection. The microcontroller has been successfully coded and it is in working condition. The Bluetooth connectivity and car navigation system is incorporated at this level. All the sensors have been coded. The code is successfully updated to the arduino uno board using the arduino IDE.

The advancement of this technology will lead to a revolution in the field of automobile and technology. It also reduces the risk of crashing the car. Physically challenged people can drive the car using this technology. The important functionality in future will be added such as make use of more different sensors, control RC unit design using Smart-watch and implement artificial intelligence to autonomously search for people.

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