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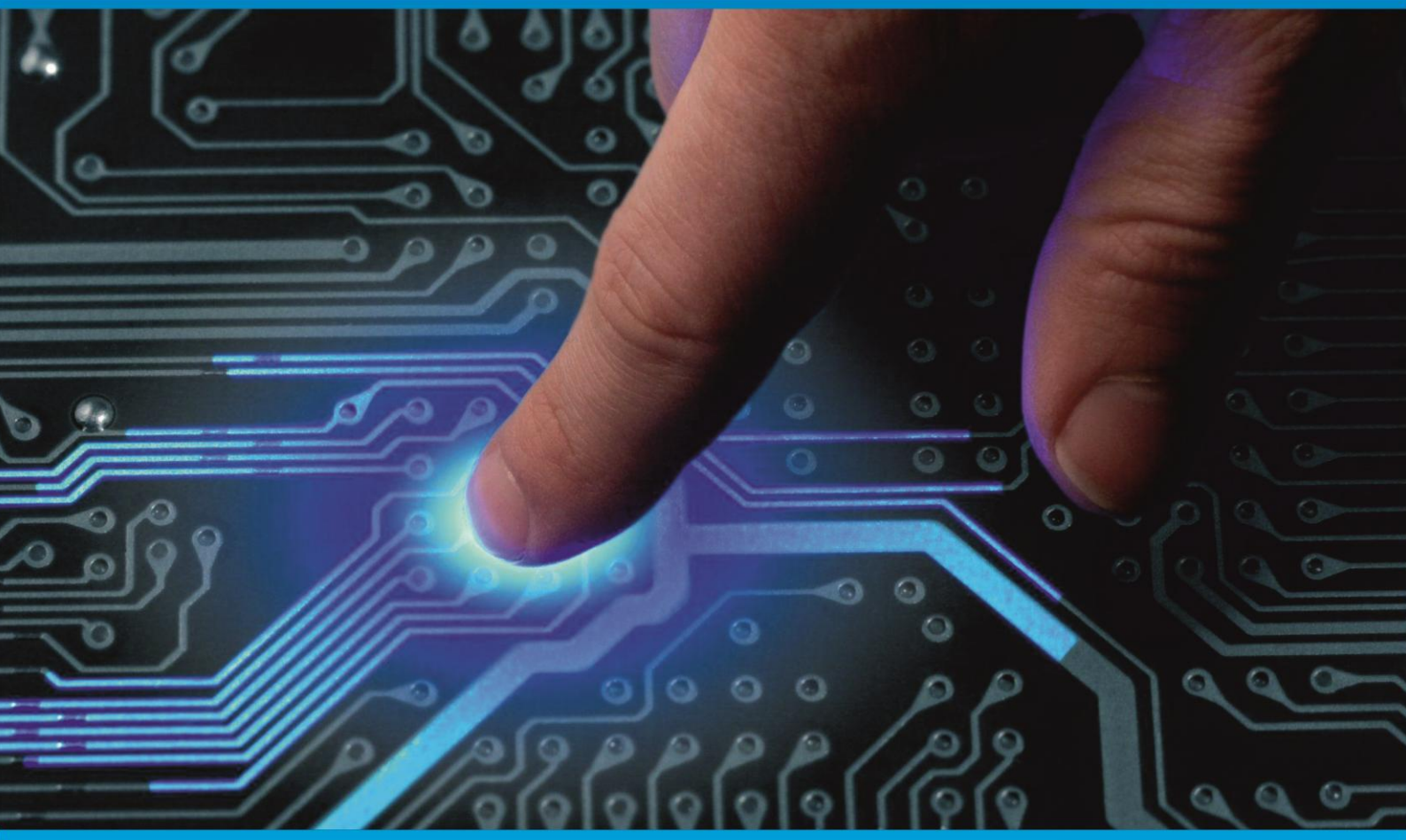

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Voice Controlled Car Based On Arduino Uno

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ABSTRACT: A robot is a mechanical device that is controlled by computer and electronic programming. Many manufacturing robots have been developed and can be used in factories all over the world. Designing the most recent inverted ROBOT that can be controlled via an Android app. And in which we use Bluetooth to link an Arduino UNO to an Android device. The UART protocol can be used to link the Arduino to the Bluetooth module. The robot's motion can be controlled using commands obtained from Android. A robotic system's performance consistency, accuracy, and repeatability are unrivalled. These robots can be reprogrammed and interchanged to serve a variety of purposes.

KEYWORDS: Internet of Things, voice-controlled home car, Arduino uno, Bluetooth based voice-controlled car.

I. INTRODUCTION

Traditional methods of human-machine interaction have been drastically altered by smartphones. Smartphones have become an integral part of people's lives. Android is a mobile device software framework that consists of an operating system, middleware, and main applications. Android is a highly stable and protected operating system. All of its necessary resources are bundled together in a piece of software known as SDK (Software Development Kit). All manual operations have been replaced by automated mechanical operations, as we all know. Our main goal in writing this paper is to monitor the robot by using a Bluetooth app to sense the temperature of the room, display the position of the car using the mobile camera, and locate the robot. Bluetooth is used because it has a number of benefits over other wireless technologies. The hardware technology used in smart phones has also advanced significantly. As a result, we can predict that Android smartphones will profit automotive, commercial, and other general-purpose applications significantly.

Because of their high potency, noise-free operation, compactness, dependability, and low maintenance and expense, DC motors are commonly used for providing variable speed drive systems in industrial applications such as automation, electrical traction, military instrumentality, and fixed disc drives. GSM, GPRS, Wi-Fi, WLANs, and Bluetooth are only a few of the current connection technologies. Each technique has its own unique set of characteristics and applications. Bluetooth and Wi-Fi technology are typically needed for these wireless connections. A controller with a Bluetooth communication module makes up the device hardware. It will be attached to the robotic car's motors and other components. When the robot app is switched on and connected to the current device through Bluetooth, the car is controlled by wireless commands from the app, which are pre-programmed in the app. The vehicle can drive in all four directions that have been specified: left, right, front, and back. For forward motion, both motors will travel in the same direction, and for backward motion, both motors will move in the opposite direction. Any of the motors will rotate for left and right movements, and both motors will pause for stopping. The user gives instructions to the motors via the mobile app.

II. PROJECT AIM

The project's goal is to create a voice-controlled car that can turn left, right, or in any direction using an ARDUINO, voice dialing on a tablet, or a Bluetooth-based android app.

III. PROJECT OBJECTIVE

The objective of this project is to build a low-cost, dependable, and modular voice-driven car that could be operated centrally solely by voice commands using an ARDUINO UNO, a low-cost short messaging platform, and voice tuning from any phone to toggle the switch state.

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IV. PROJECT SCOPE

This project culminates in the control of the vehicle, both manually and automatically, by turning left or right or in some other direction, using a voice-based device control android application to switch on and off smart home devices.

V. REVIEW OF LITERATURE

This is one of the most important Arduino projects. The Device Control app helps users to track any electrical device from their Android smartphone using the Arduino-based home automation with Bluetooth project. The Android software uses Bluetooth wireless networking to transmit commands to the Arduino controller. The Arduino is connected to the main PCB, which has four relays, as seen in the block diagram below. These relays may be connected to a variety of electronic devices. According to the block diagram, Device 1 is a bedroom lamp, Device 2 is a hall light, Device 3 is a bedroom fan, and Device 4 is a hall fan. When blaze or gas sensors detect a fire or gas leak in the house, the buzzer is activated and buzzes loudly in an emergency.

VI. HARDWARE REQUIREMENTS

1. ARDUINO UNO:

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. The board features a variety of optical and analogueinput/output pins for connecting to expansion boards and other circuits. The board has 14 optical and 6 analogue I/O pins, and it can be programmed with

the Arduino IDE and a USB type B cable.

FIG 1: - Arduino Uno

2. BLUETOOTH HC-05:

The HC-05 is an intriguing module that lets you add two-way (full-duplex) wireless features to your projects. This module can be used to connect two microcontrollers, such as an Arduino, or any Bluetooth-enabled device, like a phone or laptop.

FIG 2: - Bluetooth HC-05

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3. CHANNEL RELAYS:

It is a 4-channel isolated 5V 10A relay module that can be powered by Arduino, AVR, PIC, ARM, and other microcontrollers. It can also fuel a variety of high-current appliances and computers.

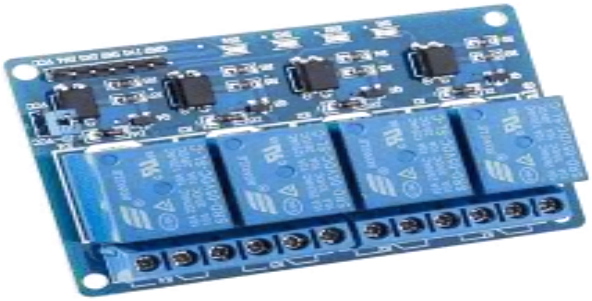

FIG 3: - Channel Relays

4. ANDROID PHONE:

In this venture, we will power the robot with an Android phone and an app downloaded from the Android Play Store. We can shift the robot in four directions after loading the application: forward, reverse, left, and right.

5. BATTERY:

Batteries are made up of one or more cells whose chemical reactions produce an electron flow in a circuit. A battery has three basic components: an anode (the '-' side), a cathode (the '+' side), and some kind of dielectric fluid (a substance that chemically reacts with both, the anode and the cathode).

FIG 4: - Battery

6. DC MOTORS:

About any mechanical movement we see around us is driven by an electric motor. Electric instruments are power converters. Motors are devices that transform electrical energy into mechanical energy. Electric motors power hundreds of computers we use on a regular basis. Small motor uses include motors used in automobiles, robotics, hand control devices, and food blenders. Micro-machines are electric machines with parts the size of red blood cells that have many medical applications.

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FIG 5: - DC Motors

VII. SOFTWARE DESCRIPTION

The Arduino Uno smart microcontroller device can be configured using the Arduino app; there is no need to install any other software other than Arduino. To begin, choose "Arduino Uno" from the Tools, Board menu (according to the microcontroller on your board). The ATmega328 IC used in the Arduino Uno comes pre-programmed with a boot loader, allowing you to upload new code to it without the use of an external hardware programmer. The original STK500 protocol is used for communication (reference, C header files). We may also use the ICSP (In Circuit Serial Programming) header to programmed the microcontroller without using the boot loader. The firmware source code for the ATmega16U2 (or 8U2 in the rev1 and rev2 boards) is available. The ATmega16U2/8U2 has a DFU boot loader that can be triggered by attaching the solder jumper on the back of the board (near the map of Italy) and then resetting the 8U2. On Rev2 and later boards, a resistor pulls the 8U2/16U2 HWB line to ground, making it simpler to enter DFU mode. The Arduino Uno is one of the most recent smart microcontroller units, with a variety of communication options with a computer, another Arduino, or other microcontrollers. The ATmega328 supports serial communication through UART TTL at (5V), which is available on digital pins 0 - - (RX) for receiving data and pin no.1 (TX) for transmitting data. The serial connectivity is channeled over USB by an ATmega16U2 on the surface, which appears as a virtual com port to applications on the device.

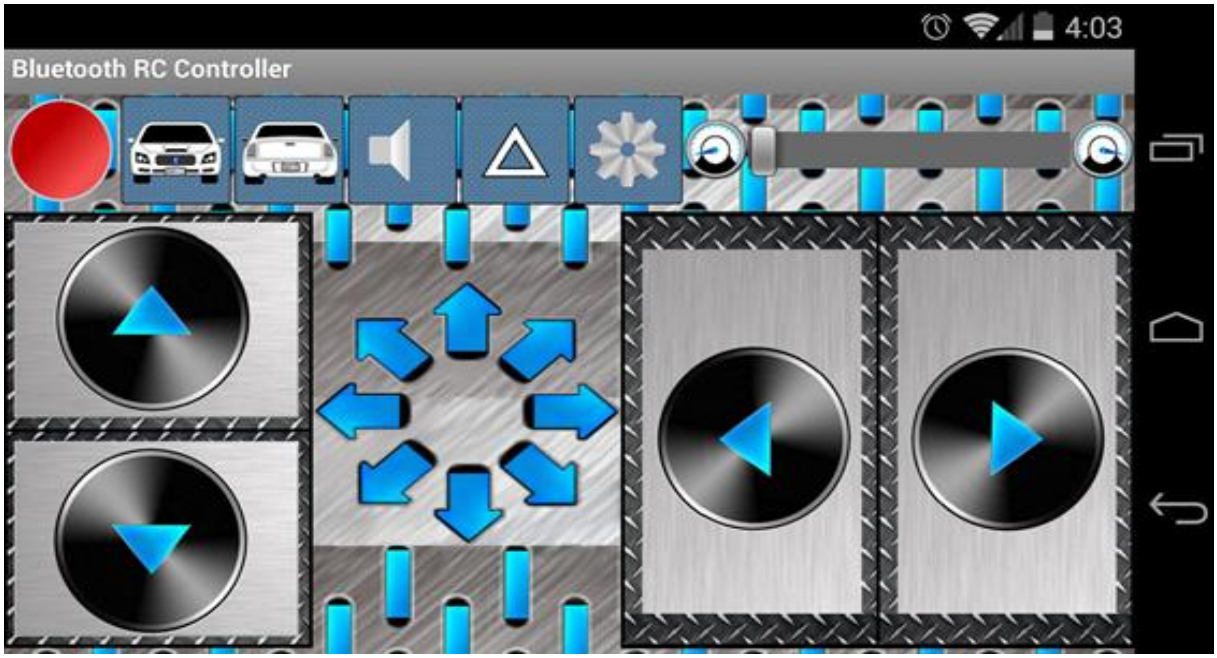

FIG 6: - Application Interface

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VIII. DESIGN AND IMPLEMENTATION

Previously, they used a handheld interface to control the robotic vehicle. A remote controller car is a separate computer that can be used to monitor the car from both wired and wireless connections. A camera interface is used to fix in the vehicle and display in the system. It will make use of the car's multiple monitoring systems. It can also be used for different alerting systems.

Robots may be used to construct various types of target motors on both their front and back sides. The front side motor is used to steer the engine, which means turning left or right. And the rear side engine is used to drive the car forward and backward when handling the smartphone application. The Air Droidprogrammed is used to attach the cell camera computer to the car's PC device. The Air Droidprogrammed is used to attach the handheld camera computer to the PC system in order to display the car movements.

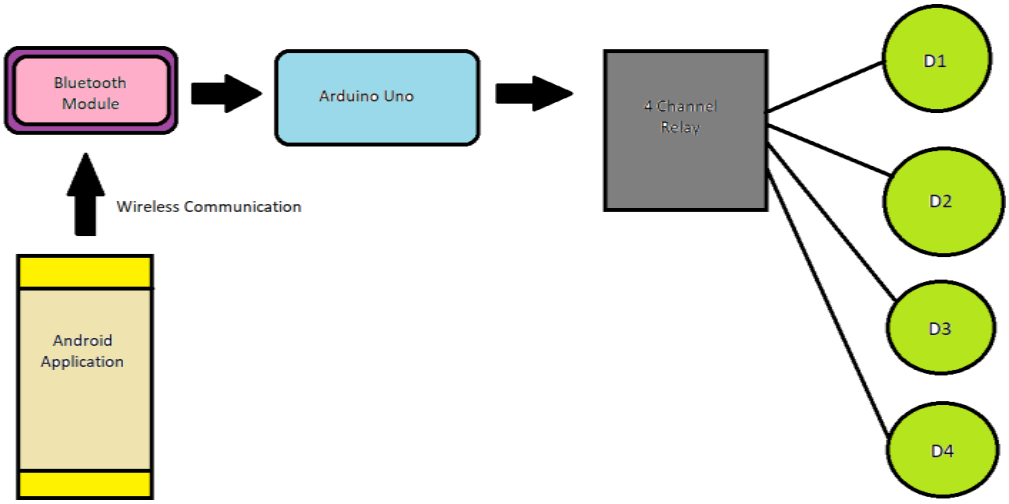

FIG 7: - System Architecture

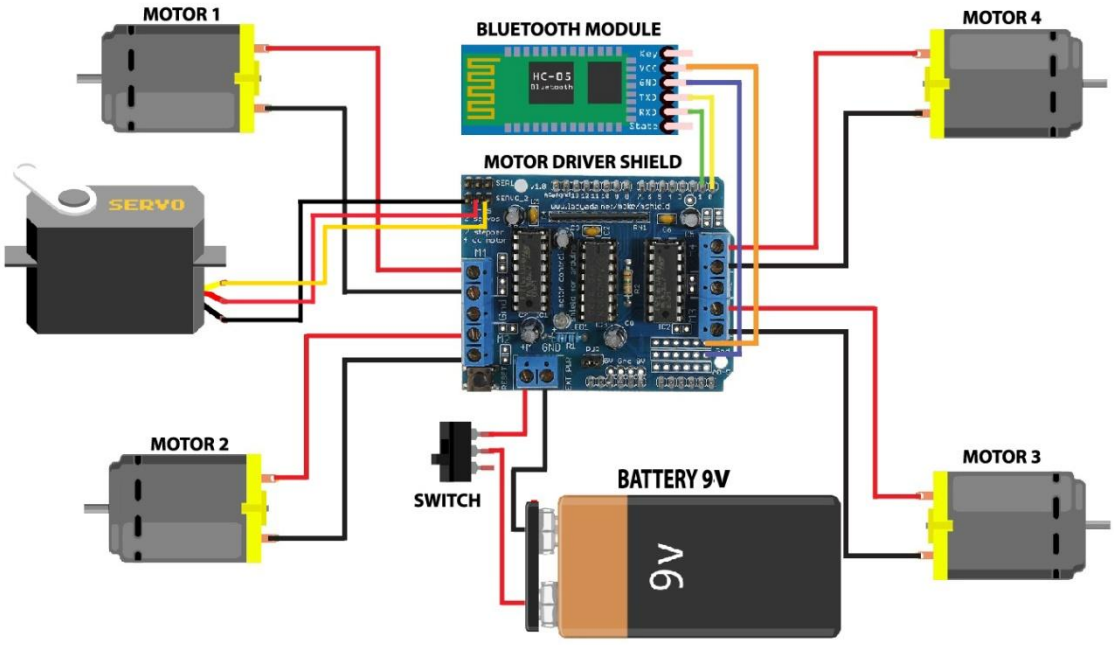

FIG 8: - System Representation

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IX. CONCLUSION

Wireless control is one of the most essential fundamental needs for everyone on the planet. However, owing to massive data and connectivity overheads, the system is not being completely used. RF modules are commonly used in wirelessly operated robots. However, our robotic control project makes use of an Android phone, which is inexpensive and widely available. There are more control commands available than RF Modules. To accomplish this, the Android smartphone user must install a specially built application on her/his device. Then he or she must activate Bluetooth on their mobile device. Bluetooth technology is used to monitor the robot's wireless communication techniques. Using the Android smartphone, the user can use many commands such as move backward, forward, move left, and move right.
The robot has a Bluetooth receiver device that accepts commands from the Android smartphone and uses them to switch left and right by sending them to the Arduino circuit, which controls the motors. The Arduino UNO then sends the signal to the motor driver ICs, which causes the motors to turn on.

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