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Human Following Robot

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ABSTRACT

In Robotic industry has evolved so much and has been a revolutionary in helping human being to complete certain task. Without the help of industrial robotics to produce car, cell phone or a computer, productions will suffer as time is a very important factor for businesses. Researchers around the world understand this, and there is already an artificial intelligent robot being produced. Each year, there will be new findings to create a robot that may one day behave similarly like a human being. However, this project deals with only a human following robot which makes use of a metal and an RFID to distinguish the owner of the robot and follow the person. In an environment such as hospitals, schools, and shopping malls. Having a robot assistant surely seems like a dream for most of us. A robot that can help us carry items, accompany us at shopping malls, or during a jogging session at the park. A robot that can help nurses at hospital or bringing the medical supplies during war to injured soldiers. There are so many advantages of having such robot, that in the future, it will most likely be the trends. There are a lot of research surrounding this topic. Person detection and tracking using diverse image features and classifications method. Most of this research use a fixed camera, because when using a moving camera, there is a problem with background/foreground separation. Metal detectors and RFID tags are commonly used for person detection and tracking for this type of robots. The RFID tag is used to tag the owner of the robot and follow the person without getting mis leaded by any other person. The human following robot can be provided with sensors like Ultra sonic and IR sensor for obstacle detection. It can be connected through RFID to receive the commands.

Keywords— *Arduino, Human Following Robot, RFID, Robot, Ultrasonic sensor*

1. INTRODUCTION

The projects aim in designing a Robot that can be operated using Android mobile phone. The controlling of the Robot is done wirelessly through. 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, 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. In addition, Android includes a full set of tools that have been built from the ground up alongside the platform providing developers with high productivity and deep insight into their applications. Specification for a radio frequency (RF)-based, short- range connectivity technology that promises to change the face of computing and wireless communication. It is designed to be an inexpensive, wireless networking system for all classes of portable devices, such as laptops, PDAs (personal digital assistants), and mobile phones. It also will enable wireless connections for desktop computers, making connections between monitors, printers, keyboards, and the CPU cable-free. The controlling device of the whole system is a Microcontroller. RFID module, DC motors are interfaced to the Microcontroller. The data received by the module from Android smart phone is fed as input to the controller. The controller acts accordingly on the DC motors of the Robot. The robot in the project can be made to move in all the four directions using the Android phone this task will be done using an app and voice commands. In achieving this task, the controller is loaded with a program written using Embedded 'C' language.

In this approach combine all your researched information in form of a journal or research paper. In this researcher can take the reference of already accomplished work as a starting building block of its paper.

2. IMPORTANCE, RESEARCH AND IDEA

The purpose of research is to provide simpler robotic hardware architecture but with powerful computational platforms so that robot's designer can focus on their research and tests. This simple architecture is also useful for educational robotics, because students can build their own robots with low cost and use them as platform for experiments in several courses. The main purpose of this project is to develop a physical user interface to control a robot via a wireless technology. There is a need to communicate with the robot physically 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. Sensor communication will enable us to control the robot up to 5 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. This research can further be implemented in commercial cars in order to reduce the pollution level as it is an electronic car which comes with rechargeable battery. As this robot is semi-automatic and works on physical commands its some of the features can be added to wheel chairs for physically handicapped and old people in order to help them in movement on their own.

Human_FollowingRobot.ino

3. USE OF SIMULATION SOFTWARE

The Arduino integrated development environment (IDE) is a cross- platform application (for Windows, mac OS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

The source code for the IDE is released under the GNU General Public License, version 2. Arduino IDE supports the languages C and C++ using special rules of code structuring.[4] The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main () into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution.[5] The Arduino IDE employs the program avr dude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

4. SYSTEM SPECIFICATIONS

A human following robot. The robot uses Radio frequency identification technology. By the use of RFID, it decides whether to follow the human or not. It depends upon the UID we write in the program. When the identification number that is unique to user that is, the UID embedded in the RFID tag carried by the owner matches with that which is stored in the code. The robot is accessed to go on to the next section of the program. After recognizing the user, the robot makes use of the ultrasonic sensor and the infrared sensor to guide behind the user. Here, the sensors work in coordination and give inputs to the Arduino Uno which acts as a Central Processing Unit for the whole model. The Arduino then gives the instructions to the motor shield. The L293D motor driver shield gives commands to the respective motors (4 motors on either side of motor) as HIGH or LOW to drive it in the right direction.

Step to connect:

1. Connect the wiring, power up, while the device is not connected, the RFID module board
2. At PC search for the respective port to dump the code into.
3. Upload the code required to check the UID of RFID tags and perform execution.
4. Note down the UID which you want to give access to.
5. Write the specific UID in the condition and compile the program.
6. Export the program to the Arduino board.

First make sure that you check for the RFID tag UID you want to give access to. Write it down correctly. Place that number correctly with respective spaces in between so that the experiment goes on in a flawless manner. After compiling and Uploading, the robot moves forward when the person in front id detected by the Ultrasonic sensor. It moves right when the right Infrared sensor senses the man. It moves to the left if the Infrared sensor on the left indicates a person ahead of it. All the 4 DC motors work in coordination to make the robot move in the accurate direction. The motors on the left move forward to make the robot turn right. The motors on the right move forward to make the robot turn left. All the four motors turn forward to move the vehicle to the front and if no person is sensed in front of it all of them come to a stable condition.

5. WORKING OF THE PROJECT

This project mainly uses ultrasonic sensors and Infrared sensors for following the human. The Radio frequency identification technology is used for authentication purposes. So that the robot correctly follows the person owning it and not anyone else.

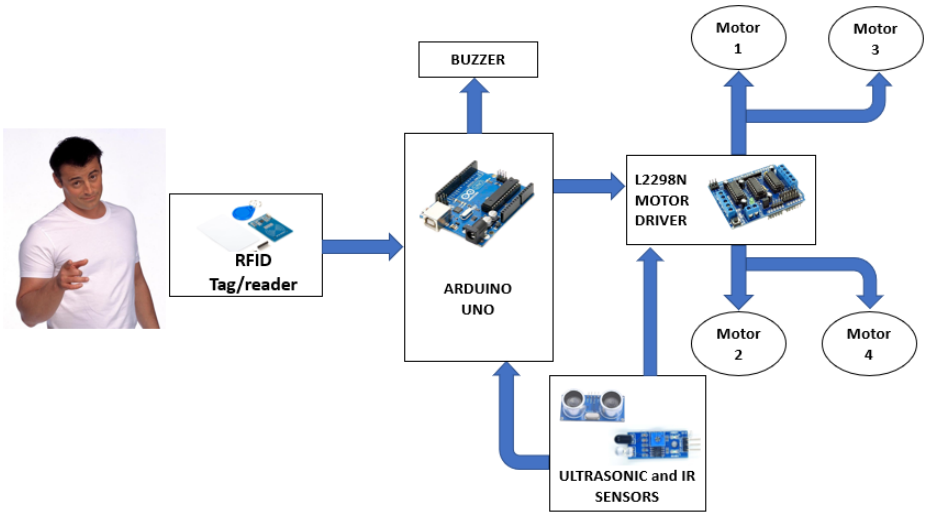
Stage 1: The RFID tag works as a key to the robot. In technical terms, the unique identification number of the RFID tag is used as an allowing condition for the robot to follow the subject. The loops for and if are used to condition whether to access the code that prompts the robot to follow the human by accessing the ultrasonic sensor and infrared sensor. If the UID matches with the one that is fed in the program the servo motor rotates 90 degrees and back as an indication to the access. If the UID does not match with the one that is written in the code then the robot will stay idle meaning the access is denied.

Stage 2: After the correct UID (correct tag) has been identified, the code to follow the human starts executing. Firstly, the Ultra sonic sensor checks whether the subject to be followed is in the front. The two IR sensors check whether the subject is at either side of the robot to guide it towards that particular direction. During this process, both the IR sensors and the ultrasonic sensor work in coordination. They sense the human using ultrasonic technology and infrared technologies respectively and give the input to the Arduino. The Arduino acts a processor and gives the output to the motor driver. Now, the motor driver prompts in ways as follows:

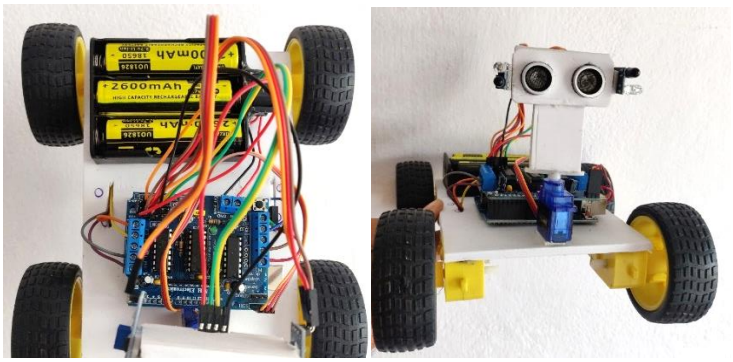
Outputs given to dc motors according to the input by:

(a) ULTRASONIC SENSOR- all motors move forward, making the robot to move ahead.
(b) Right IR SENSOR – The motors to the left side move forward, making the robot to travel in right direction.
(c) LEFT IR SENSOR- The motors to the right move forward, making the robot to travel in the left direction.
(d) If no object is sensed by either of the sensors then the robot will come to a stable condition.

6. METHOD OF IMPLEMENTATION



PROJECT IMAGES



7. CONCLUSION

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.

Many of the wireless-controlled robots use RF modules. But this project makes 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 in the mobile. The wireless communication techniques used to control the robot is RFID technology. User can use various commands like move forward, reverse, move left, move right using these commands which are sent from the Person mobile. Robot has a ri 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 ICs to operate the motors the objective of the paper is to realize the smart living, more specifically the home lighting control system using RFID Technology. Robot and smart phones are a perfect match, especially 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 ID-enable phones and RFID module via MRFC-522 and communication among RFID devices. It is concluded that smart living will gradually turn into a reality that consumer can control their home remotely and wirelessly.

8. REFERENCES

[1] http://www.scribd.com
[2] http://www.morldtechgossips.com simple way of understand
[3] http://www.elprocus.com/solar-panel-facts/

[4] http://org.ntnu.no/solarcells/pages/introduction.php
[5] http://www.facstaff.bucknell.edu
[6] http://hyperphysics.phy-astr.gsu.edu/hbase/electronic/leds.html
[7] www.national.com
[8] www.atmel.com

