VOICE CONTROLLED ROBOT

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Abstract - *Robotic assistants reduces the manual efforts being put by humans in their day-to-day tasks. In this paper, we develop a voice-controlled personal assistant robot. The human voice commands are taken by the robot by it's own inbuilt microphone. This robot not only takes the commands and execute them, but also gives an acknowledgement through speech output. This robot can perform different movements, turns, wakeup/shutdown operations, relocate an object from one place to another and can also develop a conversation with human. The voice commands are processed in real-time, using an offline server. The speech signal commands are directly communicated to the server using a USB cable. The personal assistant robot is developed on a microcontroller based platform. Performance evaluation is carried out with encouraging results of the initial experiments. Possible improvements are also discussed towards potential applications in home, hospitals, car systems and industries.*

Key Words: **personal assistant and industries.**

1. INTRODUCTION

A robot is a machine especially one programmable by a computer .the robot is capable of carrying out a complex series of actions automatically. They are guided by an external control device. The branch of technology that deals with the design, construction, operation, and application of robots, as well as computer systems for their control, sensory feedback, and information processing is robotics. Robots have replaced humans in performing repetitive and dangerous tasks. An internet is an interconnected network providing a variety of information and communication facilities. The main advantage of internet is that it helps us to send messages quickly between computers around the world. The Internet of Things (IOT) is a concept in which surrounding objects are interconnected through wired and wireless networks without user intervention. The smart RA developed here will perform its operations according to both gesture and voice commands. The operations performed are move forward, backward, left and right. The RA can pick and release objects too. This will help the elderly people very much. A 3d printed arm, an Arduino module and Wi-Fi module is used. A total of 4 dc motors are used 2 for movement of RA, 1 for up and down movement and 1 for picking and releasing object. Rechargeable lithium battery is used for carrying out these functions.

1.1 PROPOSED SYSTEM

In this paper, we discuss about a smart robotic assistant that operates on human voice and gesture commands, given remotely by using an Android platform based smart IOT device.. The speech command signal converted to text form is then communicated to the robotic assistant over a Wi-Fi network.
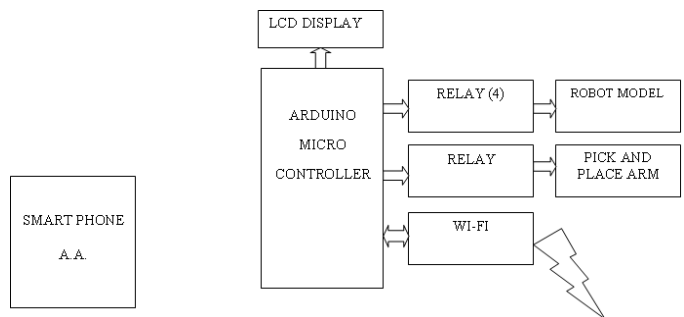

Fig-1 : proposed diagram

2. MATERIALS AND METHODS

Here we used hardware components like Arduino UNO, LCD display, Relay, DC motors, Battery, Motor driver, Pick and place arm.

2.1 ARDUINO UNO

Arduino Uno is a microcontroller board based on the ATmega328P . It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. Some boards look a bit different from the one below, but most Arduino have the majority of these components in common.

Fig-2: Arduino UNO.

2.2 DC MOTOR

Geared DC motors can be defined as an extension of DC motor which already had its Insight details demystified here. A geared DC Motor has a gear assembly attached to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and is termed as RPM .The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable figure. This concept where gears reduce the speed of the vehicle but increase its torque is known as gear reduction. This Insight will explore all the minor and major details that make the gear head and hence the working of geared DC motor.
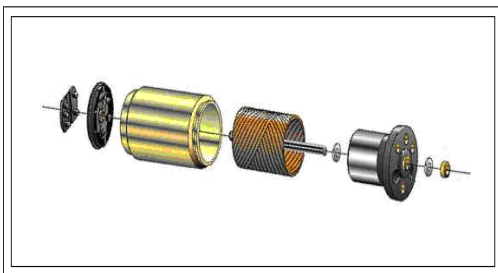

Fig-3: DC motor

2.3 LCD DISPLAY

Liquid crystal displays (LCDs) have materials which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal. An LCD consists of two glass panels, with the liquid crystal material sand witched in between them. The inner surface of the glass plates are coated with transparent electrodes which define the character, symbols or patterns to be displayed polymeric layers are present in between the electrodes and the liquid crystal, which makes

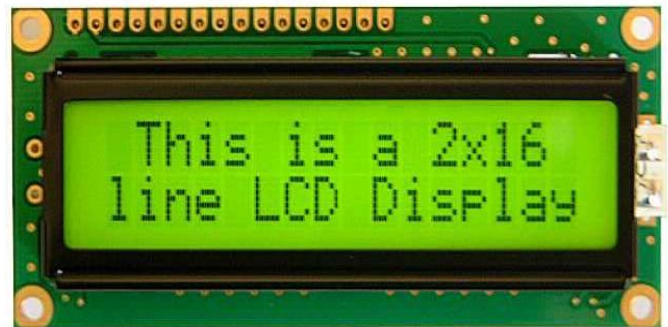the liquid crystal molecules to maintain a defined orientation angle.

Fig-4: LCD Display

2.4 RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical. The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Most ICs (chips) cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The maximum output current for the popular 555 timer IC is 200mA so these devices can supply relay coils directly without amplification.


Fig-5: Relays

2.5 MOTOR DRIVER

In electronics, a **driver** is an electrical circuit or other electronic component used to control another circuit or other component, such as a high-power transistor. The term is used, for example, for a specialized computer chip that controls the high-power transistors in AC-to-DC voltage

converters. An amplifier can also be considered the driver for loudspeakers, or a constant voltage circuit that keeps an attached component operating within a broad range of input voltages. The following circuit will allow you to drive a 12V relay using logic voltage (an input of 4V or greater will trip the relay). The circuit has its own 12V power supply making it self contained but the power supply portion can be left out if an external supply will be used. The 12V DC output is suitable for powering a few LEDs or low voltage lights but should not be used to power other electronic boards or motors.
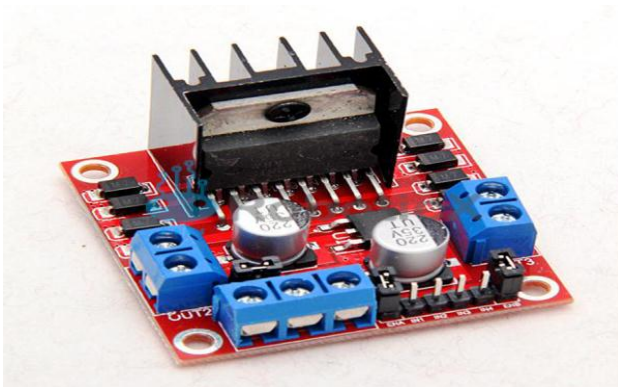

Fig-6: Motor driver

2.6 BATTERY

All lead acid batteries consist of flat lead plates immersed in a pool of electrolyte. Regular water addition is required for most types of lead acid batteries although low maintenance types come with excess electrolyte calculated to compensate for water loss during a normal lifetime. Lead acid batteries used in the RV and Marine Industries usually consist of two 6-volt batteries in series, or a single 12-volt battery. These batteries are constructed of several single cells connected in series each cell produces approximately 2.1 volts. A six-volt battery has three single cells, which when fully charged produce an output voltage of 6.3 volts. A twelve-volt battery has six single cells in series producing a fully charged output voltage of 12.6 volts. A battery cell consists of two lead plates a positive plate covered with a paste of lead dioxide and a negative made of sponge lead, with an insulating material (separator) in between.

2.7 WIFI

A Wi-Fi-enabled device, such as a personal computer, video game console, smart phone or digital audio player, can connect to the Internet when within range of a wireless network connected to the Internet. The coverage of one or more (interconnected)access points called hotspots comprises an area as small as a few rooms or as large as many square miles. Coverage in the larger area may depend on a group of access points with overlapping coverage. Wi-Fi technology has been used successfully in wireless mesh networks in London, UK.

3. SYSTEM IMPLEMENTATION

In this project key pad is consists of set of keys which specify the operation such as arm up and down. The key pad is interfaced to microcontroller through I/O port. Here the microcontroller is the flash type reprogrammable microcontroller in which we have already programmed. When the key is pressed, the microcontroller activates the driver circuit as per mentioned in the program. The driver circuit is constructed with transistor which acts as switch to control the relay. The relay output is directly connected to motor which is attached in the robot. For an example when arm down key is pressed, the signal from the key is given to microcontroller. So the microcontroller activates the corresponding relay thorough the driver circuit. Now the arm moves to down side. Through this way arm is controlled for pick and place application. The all above function are controlled by the wireless arrangement and it knows as transmitter and receiver. For an example when arm down key is pressed, the signal from the key is given to microcontroller. So the microcontroller activates the corresponding relay thorough the driver circuit. Now the arm moves to down side. Through this way arm is controlled for pick and place application.
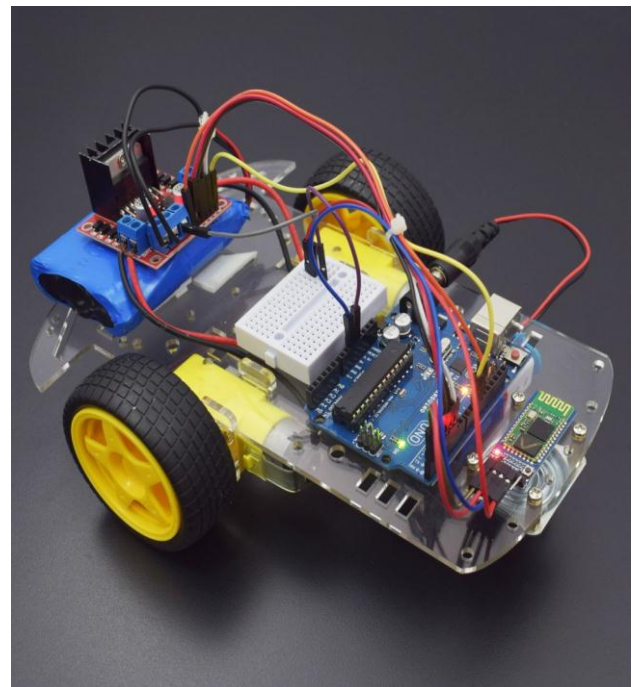
Fig-7: Top view of the Rover

4. CONCLUSION

Vehicle theft, although not as intrusive as violent crimes, causes greater loss to its victims in terms of monetary value and also in secondary economic effects. Proposed system provides vehicle safety and detects theft efficiently and effectively at very low cost. The principle of the development

of science is that "nothing is impossible". So we shall look forward to a bright & sophisticated world.

REFERENCES

[1] ROY CHOUDHURY D, SHAIL JAIN, "LINEAR INTEGRATED CIRCUIT", New Age International Publishers, New Delhi,2000

[2] "THE 8051 MICROCONTROLLER AND EMBEDDED SYSTEM" by Mohammad Ali Mazidi.

[3] A Voice-Controlled Personal Robot AssistantAnurag Mishra, Pooja Makula, Akshay Kumar, Krit Karan and V.K. Mittal, IIIT, Chittoor, A.P., India.

[4] H.Uehara,H. HigaandT.Soken,"A Mobile Robotic Armfor people with severe disabilities", International Conference on Biomedical Robotics and Biomechatronics (BioRob), 3rd IEEE RAS and EMBS , Tokyo, pp. 126- 129, September 2010, ISSN:2155-1774.

[5] David Orenstein, "People with paralysis control robotic arms using brain", https://news.brown.edu/articles/2012/05/braingate2 (Last viewed on October 23, 2014).

[6] Lin. H. C, Lee. S. T, Wu. C. T, Lee. W. Y and Lin. C. C, "Robotic Arm drilling surgical navigation system", International conference on Advanced Robotics and Intelligent Systems (ARIS), Taipei, pp. 144147, June 2014.

[7] Rong-Jyue Wang, Jun-Wei Zhang, Jia-Ming Xu and Hsin-Yu Liu, "The Multiple-function Intelligent Robotic Arms", IEEE International Conference on Fuzzy Systems, FUZZ-IEEE, Jeju Island, pp. 1995 - 2000, August 2009, ISSN:1098-7584.

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