VOICE CONTROLLED ROBOTIC VEHICLE USING ARTIFICIAL INTELLIGENCE

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Abstract: Our proposed project aims at a robotic vehicle operated by human speech commands. The system operates with the use of a android device which transmits voice commands to an 8051 microcontroller to achieve this functionality. The transmitter consists of the android phone Bluetooth device. The voice commands recognized by the module are transmitted by through the Bluetooth transmitter. These commands are detected by the robotic vehicle in order to move it in left, right, backwards and Front directions. The Bluetooth receiver mounted on top of the vehicle is used to recognize the transmitted commands and decode them. After decoding these commands are passed on to the 8051 microcontroller. The microcontroller then drives the vehicle motors to move it accordingly. This is done with the use of a drives IC used to control the motor movements. The Bluetooth technology used to transmit and receive data allows for remotely operating the system within a good range.

Keywords: Robotics, IoT, Bluetooth and 8051 Microcontroller .

I.   INTRODUCTION

The surprising raise in the utilizing of robots and automation offers various advantages as well as it has drawn the attention of both academic investigation and commercial programs . The analysis on numerous technique of controlling robot has accomplished quite a few success by introducing a number of innovative & unique methods of robot movement control. Verbal interaction intended for robot controlling is actually sort of an innovative process among many methods which are introduced regarding robotics control.Previous works on voice controlled robots shows that the design of those robot were complicated and none of them were able to interact with users. Robots are anticipated to socialize along with its user however it has not yet arrived at this kind of level. There are numbers of techniques to control robot using voice identification yet it is reasonably limited.

The surprising raise in the utilizing of robots and automation offers various advantages as well as it has drawn the attention of both academic investigation and commercial programs [1]. The analysis on numerous technique of controlling robot has accomplished quite a few success by introducing a number of innovative & unique methods of robot movement control. Verbal interaction intended for robot controlling is actually sort of an innovative process among many methods which are introduced regarding robotics control [1].Previous works on voice controlled robots [1]-[3] shows that the design of those robot were complicated and none of them were able to interact with users. Robots are anticipated to socialize along withits user however it has not yet arrived at this kind of level [2], [3]. There are numbers of techniques to control robot using voice identification yetit is reasonably limited [1].
The development of a voice controlled robot is demonstrated in this paper which has the ability to follow voice command from user and does communicate with user by using pre- recorded human voice sound.

Previously developed robot used ZigBee [10] which is a costly device. Another Voice Controlled Robotic Vehicle utilized computer with a sound card and a microphone which was not user friendly [11]. A technique to give voice command using android based smart phone using Bluetooth is presented to construct the robot based on microcontroller. The robot can accept instructions from users verbally and interact with user by speaking various sentences which will make it user friendly.

II.   LITERATURE SURVEY

Android is a Linux-based operating system designed primarily for touch screen mobile devices such as smart phones and tablet computers. Initially developed by Android, Inc., which Google backed financially and later bought in

2005, Android was unveiled in 2007 along with the founding of the Open Handset Alliance: a consortium of hardware, software, and telecommunication companies devoted to advancing open standards for mobiledevices.
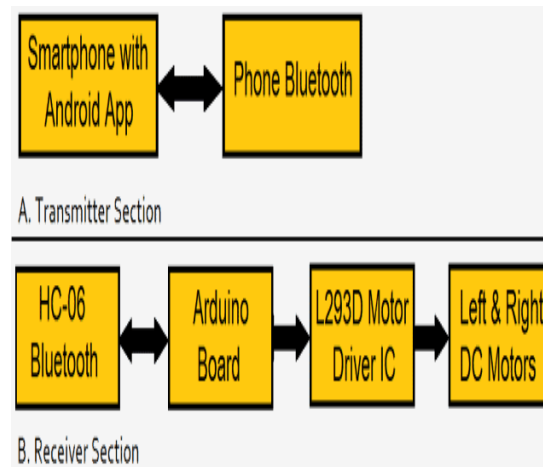
Factors that led android to become world's most popular OS:

Android is open source and Google releases the code under the Apache License. This open- source code and permissive licensing allows the software to be freely modified and distributed by device manufacturers, wireless carriers and enthusiast developers. Additionally, Android has a large community of developers writing applications ("apps") that extend the functionality of devices, written primarily in a customized version of the Java programming language. In October 2012, there were approximately 700,000 apps available for Android, and the estimated number of applications downloaded from Google Play, Android's primary app store, was 25 billion. A developer survey conducted in April–May 2013 found that Android is the most popular platform for developers, used by 71% of the mobile developer population.

These factors have contributed towards making Android the world's most widely used Smartphone platform, overtaking Symbian in the fourth quarter of 2010, and the software of choice for technology companies who require a low-cost, customizable, lightweight operating system for high tech devices without developing one from scratch. As a result, despite being primarily designed for phones and tablets, it has seen additional applications on televisions, games consoles, digital cameras and other electronics. Android's open nature has further encouraged a large community of developers and enthusiasts to use the open-source code as a foundation for community-driven projects, which add new features for advanced users or bring Android to devices which were officially, released running other operating systems.

Android's share of the global Smartphone market, led by Samsung products, was 64% in March 2013. In July 2013 there were 11,868 models of Android device, scores of screen sizes and eight OS versions simultaneously in use. The operating system's success has made it a target for patent litigation as part of the so-called "Smartphone" between technology companies. As of May 2013, 48 billion apps have been installed from the Google Play store, and as of September 3, 2013, 1 billion Android devices have been activated.

Market share of android based smart phones

Research Company Canalys estimated in the second quarter of 2009 that Android had a 2.8% share of worldwide Smartphone shipments. By the fourth quarter of 2010 this had grown to 33% of the market, becoming the top-selling Smartphone platform.[19] By the third quarter of 2011 Gartner estimated that more than half (52.5%) of the Smartphone market belongs to Android. By the third quarter of 2012 Android had a 75% share of the global Smartphone market according to the research firm IDC.

In July 2011, Google said that 550,000 new Android devices were being activated every day, upfrom 400,000 per day in May, and more than 100 million devices had been activated with 4.4% growth per week. In September 2012, 500 million devices had been activated with 1.3 million activations per day. In May 2013, at Google I/O, Sundar Pichai announced that 900 million Android devices had been activated.

Android market share varies by location. In July 2012, Android's market share in the United States was 52%, and rose to 90% in China. During the third quarter of 2012, Android's worldwide Smartphone market share was 75%, with 750 million devices activated in total and

1.5 million activations per day.

As of March 2013, Android's share of the global Smartphone market, led by Samsung products, was 64%. The Kantar

market research company reported that Google's platform accounted for over 70% of all Smartphone device sales in China during this period and that Samsung's loyaltyrate in Britain (59%) is second to that of Apple (79%).

ADVANTAGES OF ROBOTIC VEHICLE

-They cause a less number of accidents compared to human driven cars. Research shows that 93% of car accidents are caused by human errors. Robotic cars have a quicker reaction to emergencies averting any possible accident. In high speeds, robotic cars can handle the situationin a calm manner avoiding errors.
– Robotic cars cause non or less traffic . They eliminate the gap that mostly occur when humandrivers pause in traffic to run errands.
-In robotic cars, there is no scenario of distracted drivers. You can freely engage in fun activities like watching a movie, playing vedio games and even sleeping as self driven vehicleshandle the situation. Even the blind can drive!
-Robotic cars are programmed in such a way that they can't break the laws making them waysafer than human drivers. This creates a less dangerous environment for bikers , there may beopportunities to create even wider bicycle lanes.
-They save time. Picture this scenario, you have quite a workload to do on your laptop and you've to meet the deadline, with an automated car, you can easily seat back and work on it asthe vehicle beats traffic for you! Now you've saved some time
haven't you?
-They are equipped with high technology features like autonomous braking, self parking as wellas sensors that clue the driver to nearby obstacles enabling vehicles to ride closer together causing less traffic.
-They reduce fuel consumption as they are lighter and have few mechanical errors. They can beran on hydrogen , a gas that is environmental friendly.

Android application operated bluetooth

The Android platform includes support for the Bluetooth network stack, which allows a device to wirelessly exchange data with other Bluetooth devices. The application framework provides access to the Bluetooth functionality through the Android Bluetooth APIs. These APIs let applications wirelessly connect to other Bluetooth devices, enabling point-to-point and multipoint wireless features.
Using the Bluetooth APIs, an Android application can perform the following:
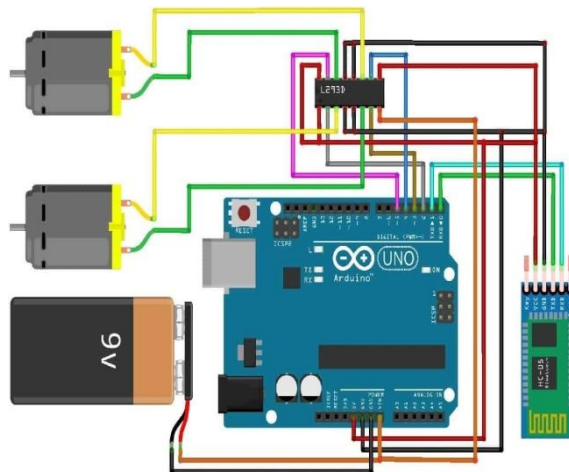
Scan for other Bluetooth devices, Query the local Bluetooth adapter for paired Bluetooth devices, Establish RFCOMM channels ,Connect to other devices through service discovery ,Transfer data to and from other devices ,Manage multiple connections

This document describes how to use Classic Bluetooth. Classic Bluetooth is the right choice formore battery-intensive operations such as streaming and communicating between Androiddevices. For Bluetooth devices with low power requirements, Android 4.3 (API Level 18)introduces API support for Bluetooth Low Energy. To learn more, see Bluetooth Low Energy. This document describes how to use the Android Bluetooth APIs to accomplish the four major tasks necessary to communicate using Bluetooth: setting up Bluetooth, finding devices that are either paired or available in the local area, connecting devices, and transferring data betweendevices.

A cross compiler is similar to the compilers but we write a program for the target processor (like 8051 and its derivatives) on the host processors (like computer of x86). It means being in one environment you are writing a code for
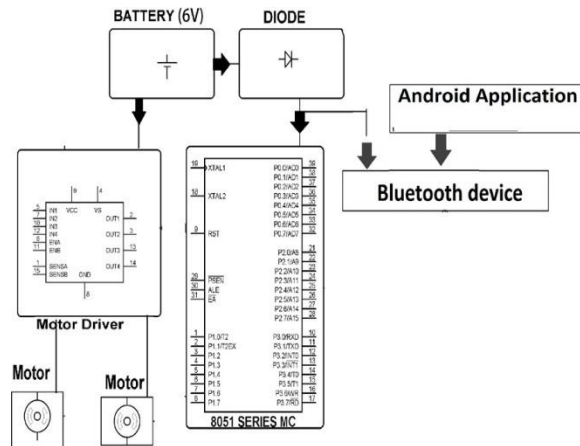
another environment is called cross development. And the compiler used for cross development is called cross compiler. So the definition of cross compiler is a compiler that runs on one computer but produces object code for a different type of computer. Keil is a German based Software development company. It provides several development tools like IDE (Integrated Development environment), Project Manager ,Simulator, Debugger, C Cross Compiler, Cross Assembler, Locator/Linker.

III. CONCLUSION

The "Voice Controlled Robotic Vehicle" project has many applications and in present and future. The project can be made more effective by adding features to it in the future. The project has applications in wide variety of areas such as military, home security, rescue missions, industries, medical assistance etc. We were successful in implementing a simple model of voice controlled robotic vehicle using the available resources. The implementation of this project is easy, so this robot is beneficial for human life. The Voice Control Robot is useful for disable people and monitoring purpose. It works on simple voice command, so it is easy to use. It is useful for those areas where humans can't reach. The size of this robot is small, so we can use this robot for spying purpose. It can be used for surveillance. We can implement web cam in this robot for security purpose. The voice recognition software has an accuracy and for identify a voice command and it is also highly sensitive to the surrounding noise.

In this project, a robot is controlled with the speech commands. Voice commands are taken by aBluetooth sensor. The features of the commands are extracted with MFCC algorithm. The commands are recognized using Neural Network. The recognized command converted to the form in which the robot can recognize. The final form of the commands is sent to the robot and the robot move accordingly. The system is tested with different command sets and both current user and other users. The results are quite satisfactory. Generally the system recognizes the commands with % 90 - % 100 success ratios for current user and %75 - %85 for other users.

REFERENCES

[1]. P. V. Rao et al., "IoT based Waste Management The 8051 Microcontroller and Embedded System By Muhammad Ali Mazidi and Janice Gillispie Mazidi , Pearson Education

[2] M.Bhanu chandu, Kirupa Ganapathy,2020, Voice Controlled Human Assistence Robot, International Conference on Advanced Computing & Communication Systems (ICACCS), 978-1-7281-5197-7/20.

[3] P. Mahesh Reddy, Suram Pavan Kalyan Reddy, G R Sai Karthik, Priya B.K,2020, Intuitive Voice Controlled Robot for Obstacle, Smoke and Fire Detection for Physically Challenged People, International Conference on Trends in Electronics and Informatics (ICOEI), ISBN: 978-1-7281-5518-0.

[4] Ms. M. Ramjan Begum, Mr. S. Chandramouli, Mr. T. Gowtham,2020, Design And Development Of Dual Axis Control Robot For Writing Robot Through Speech Recognition, International Research Journal of Modernization in Engineering Technology and Science, e- ISSN: 2582-5208.

[5] Linda John et al,2020, Voice Control Human Assistance Robot, National Conference on Technical Advancements for Social Upliftment, Proceedings of the 2 nd VNC; VNC-2020;

[6]   Anurag Mishra, Pooja Makula, Akshay Kumar, Krit karan, and V.K. Mittal, 2015, A voice controlled   personal assistant robot, International Conference on Industrial Instrumentation and Control (ICIC).

[7]   Dyah Ayu Anggreini Tuasikal, Hanif Fakhrurroja, Carmadi Machbub,2018, Voice Activation Using Speaker Recognition for Controlling Humanoid Robot", International Conference on System Engineering and Technology (ICSET).

[8]   T. Thivagar, A. Sriram,2020, Hand Gesture ,2020,Voice Controlled Smart Vehicle, International Journal of Modern Science and Technology, ISSN: 2456-0235.

[9]   Ass. Prof. Emad S. Othman, Senior Member IEEE - Region 8, 2017, Voice Controlled Personal Assistant Using Raspberry Pi, International Journal of Scientific & Engineering Research Vol 8, Issue 11, 1611, ISSN 2229-5518,pp1611-1615.

[10] Harshada Rajput, Karuna Sawant, Dipika Shetty, Punit Shukla, Prof. Amit Chougule, 2018, Voice- Based Home Automation System Using Raspberry Pi, International Research Journal of Engineering and Technology (IRJET), pp1154-1156.

[11] Megalingam R.K., Vadivel S.R.R., Yadav P.K., Nigam K., Geesala R.T., Chandra R.(2020), Implementation of Low-Cost Mobile Robot for Rescuing Challenge . In: In Ranganathan G., Chen J., Rocha Á. (eds) Inventive Communication and Computational Technologies. Lecture Notes in Networks and Systems, vol 89. Springer, Singapore.

[12] Svitlana Maksymova, Rami Matarneh, Vyacheslav V. Lyashenko,2017, Software for Voice Control Robot: Example of Implementation, Open Access Library Journal.

[13] Anjali Verma, Deepak Kumar, Hariom Maurya , Anuj Kumar, Mr. Prabhakant Dwivedi,2020, Voice Control Robot Using Arduino, International Research Journal of Modernization in Engineering Technology and Science, Vol 02/Issue:04, e-ISSN: 2582-5208.

[14] Abikshit Timsina, Dev Chandra Sharma, Nirmala Sharma, Allen Bhutia, Sujala Pardhan , 2020, Voice Command Robotics Car, International Research Journal of Modernization in Engineering Technology and Science ,Volume: 02/Issue:06/ e-ISSN: 2582-5208.