Automated Human Machine Interfacing with Arduino

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Abstract-*Today technology is changing day by day, so there is need of designing such systems which are more efficient, user friendly and those which reduces human efforts. In this survey, more importance is given to human machine or Robot which will provide services to the users using Arduino.*

Keywords-Arduino, Robot, Ultrasonic Sensor.

I. INTRODUCTION

A Robot is a electro-mechanical machine that is guided by computer program or electronic circuitry. Robots have replaced human assistance. Robotics is evolving technology. Robots are built and programmed to be job specific. Robots require combination of elements to be effective, intelligence, movement, mobility, navigation and purpose. Without risking human life Robots can replace human life in some hazardous duty service. It can work in all types of environment [2].

Arduino is a computer hardware and software company. In the world of digital device and interactive objects that can sense and control the physical world, project and user community designs and manufactures Arduino boards controlled Robots for many applications [2].

The aim of Arduino software is to provide flexible, easy to use hardware and software. The Arduino board plays an important role in many applications such as making wireless thermometer, Pick N Place Robot, fire fighting Robot vehicle, automatic wireless health monitoring in hospitals, Unique office communication systems. Arduino is used very well in home automation where houses are becoming smarter and well developed by using such kind of advanced technologies. Modern houses are gradually increasing the way of design by shifting to centralised control system with remote controlled switches instead of conventional switches [8].

II. IDENTITY, RESEARCH AND COLLECT IDEA

While searching for the project topics we had gone through some EFY magazines in our college library. From one of those magazines we got an idea of a robot for greeting people. We discussed about that amongst us and decided to make a robot which will help the people with guidance of the any government form.

For this we started collecting some information regarding Arduino, different sensors etc. We searched for some journal papers on Google like IEEE journal papers etc. Also we had attended a two day workshop of Arduino held in our college. From all those journal papers we collected some information of Arduino, Ultrasonic Sensor etc.

III. LITERATURE SURVEY

[1] This paper gives the study of making a robot using Arduino that will greet the people with its hand movements by scanning people using Ultrasonic sensor and implementing a robot which will turn its head by 180 degree. The concept of controlling various servo motors through Arduino Uno board is introduced in this paper. Altrasonic sensor also shows that Servo.h library of Arduino software is used for controlling movements of the robot and HCSR04 ultrasonic sensor uses sonar to determine distance of an object. It offers excellent non-contact range detection of 2cm to 400cm with high accuracy.

[2]This paper explains, why Arduino is more efficient as Arduino board are inexpensive compared to other system and Arduino software is published as open source tools. Arduino is an open source physical computing platform based on a simple microcontroller board. It shows that robot is a mechanical or virtual agent, usually an electromechanical machine that is guided by computer program or electronic circuitry. The voice playback IC provides with pre-recorded message that plays at predefined frequency rate and even the different messages can stored in this IC as per requirement. This paper shows that how using servo motors and Arduino the robotic movements are done for hand gesture.

[3]This system is operated on basis of voice so that the voice of any person can be used to control the elevator.

This acts as human machine communication system which could help handicaped people to travel one place to another. Speech recognition is the method by which elevator can be controlled using voice. Speech recognition is a technique is a technology in which system will understand the

words but not the meaning of the words. The paper also shows the use of microcontroller to control different devices and integrate each module like voice module, motor module and LCD. It shows the connection between voice module and microcontroller.

[4]VCR is a mobile robot whose motion can be controlled by the user by giving specific voice commands. The message is received through microphone and processed by voice module. Speech recognition is the process of converting speech to digital data. This process is used to verify a speaker's identity or determine an unknown speaker's identity. Speaker verification and speaker verification are both common type of voice recognition. Speaker verification is a process of using a person's voice to verify that they are who they say they are. Most commonly, speaker verification is applied to situations where security is needed. Speaker identification is the process of determining an unknown speaker's identity. This process can be used to identify criminal solely by their voice.

[5]This information is a survey of robot learning from demonstration (LfD), technique that develops policies for example state to action mapping. LfD has the attractive characteristics of being an intuitive communication medium for human teachers and of opening control algorithm development to non-robotics experts. LfD has been successfully applied to many robotic application.

[6]Speech recognition model is the technique by which the elevator can be controlled and by speech acknowledgement model we will inspire information to controlling the elevator. This paper shows the implementation of speech recognition system with hardware like microcontroller, stepper motor and regulator power supply. This system acts as a human machine communication system. Users can also control the electrical devices like fan, door with help of voice recognition system.

[7]Obstacle avoidance robotics is used for detecting obstacle and avoiding collision. Ultrasonic sensor is most suitable for obstacle detection and has high ranging capability. Arduino robot that can be controlled by an android mobile with the help of an android app that can be downloaded from the play store. The android application gets connected to the Bluetooth module and sends desired commands. This app controlled robot is capable to move in any direction. The robot can be used for pick and place the required object by giving directions to the robot and also can be used as mobile surveillance system.

[8]The robot can transmit real time information with the help of Arduino board connected to computer or any smart device. Arduino development board can sense the environment by receiving input from different sensors and affect its surroundings by controlling motors, light and other actuators. The microcontroller on the board is programmed using Arduino programming language. Arduino is used in home automation were Houses are becoming smarter and well developed by using such kind of advanced technologies. Arduino Uno board can be programmed to operate in the end users requirements creating smart world in the near future.

[9]The robot is design to build an obstacle avoidance robotic vehicle using ultrasonic sensor for its movement. An ultrasonic sensor is use to detect any obstacle ahead of it and send the command to microcontroller. A robot is a machine that can perform task automatically or with guidance. The implementation of obstacle avoidance for robot involves the writing and compilation of program using Arduino software.

[10]Voice controlled robotic system use at a place where human invension is at high risk. Arduino operates the motors in order to move the vehicle in four directions. The integration of controlled unit with Bluetooth device is achieved using a Bluetooth module to capture and read the voice commands. The robotic vehicle operates as per the command received by an Android device. The controlling device may be any smart phone having an Android OS. The Android device sends the command to move the vehicle in different direction. Arduino controls this movements of the vehicles. The communication between Android device and receiver is sent as serial communication data. It also uses obstacle detector to protect the system from obstacles on the way by using an ultrasonic sensor.

[11]To detect and avoid obstacles an Ultrasonic module is implemented. It uses the speech recognition technology which allows the processing of speech input to text and its speaker independent. The speech recognition platform is an Android smartphone which communicates with the robot using Bluetooth connectivity.

IV.CONCLUSION

From this literature survey we conclude that technology is upgrading day by day hence we have to look for those systems which are more efficient and systems which reduces human efforts and provide services to the user. So human machine Robot can provide all the services to the user. Hence we have to go for Robot controlled systems.

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