

TOUCH SCREEN-BASED ROBOT CONTROL WITH SPEECH ALERT

A Project Report Phase-II

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in
Electronics and Communication Engineering

by

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHOOL OF ELECTRICAL AND ELECTRONICS

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC
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CHENNAI - 600119**

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **N.Sai Vamsi (39130329)** and **M.P.V.S.Sai Kumar (39130273)** who carried out the project entitled "**Touch Screen-based Robot Control With Speech Alert**" under our super vision from November 2022 to April 2023.

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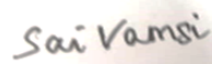
DECLARATION

We, N.SAI VAMSI (39130329) and M.P.V.S.S.SAI KUMAR (39130273) here by declare that the Project Report on “**TOUCH SCREEN BASED ROBOT CONTROL WITH SPEECH ALERT**” done by us under the guidance of **Dr.S.LAKSHMI M.E.,Ph.D.**, at Sathyabama Institute of Science and technology is submitted in partial fulfilment of the requirements of the award of Bachelor of Engineering degree in **Electronics and Communication Engineering**.

DATE: 24.04.2023

PLACE: Chennai

SIGNATURE OF THE CANDIDATES

1. 
2. 

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We wish to express our thanks to all Teaching and Non-teaching staff members of the Department of Electronics and Communication Engineering who were helpful in many ways for the completion of the project.

ABSTARCT

Our primary objective of the project is to design a robot mechanism with automatic speed control and voice recognition ability. This system works with the full wireless mode of operation and can be controlled even over the cloud. We propose a system that basically integrates with HC05 or ESP32-based wireless communication protocols. FT-based 2.8 inches touch display was integrated throughout the project. Configuration of display falls on edge over display overlay mechanism Using GFX HT122 Library we can set the graphics position of the controllers with the display Repelling factors of the motor coils are distributed among the load's Fine-tuned DC geared motors are operated with full channel utility power. Each Channel consumes 2 amps of torque to operate the motors. The Voice recognition engine uses the open sources from Google's utilities. Foul and False word detection will also be eliminated via operation and control. Touch-based automation and control of the robot require 3 amps of SMPS. From the sender side, we need to look after a private source of operation and control. Since we use the Serial mode of data transmission each data requires at least one mi microsecond to replicate the data from the senders. Data once pushed out from machines has no ability to retain the data. Through a pre-trained voice algorithm, we can still automate and respond to the system wirelessly.

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CHAPTER-1

INTRODUCTION

1.1 INTRODUCTION

It has always been a dream of human beings to create machines that behave like humans. Recognizing the speech and responding accordingly is an important part of this dream. With the improvements in technology and research on artificial intelligence, this dream comes true relatively. The following is a review paper on a project of robot control with speech recognition that utilizes Arduino Uno, a microcontroller board based on the ATmega328, wherein the speech commands were taken to the computer by a microphone, and the features were extracted and recognized with Microsoft Visual Studio 2008 (based on C#) which is an integrated development environment (IDE) from Microsoft. Controlling the machines and environment with speech makes human life easier and more comfortable. A robot controlled by voice commands. Voice command is taken through a microphone, processed in a computer, and sent to the robot and finally, the robot acts accordingly.

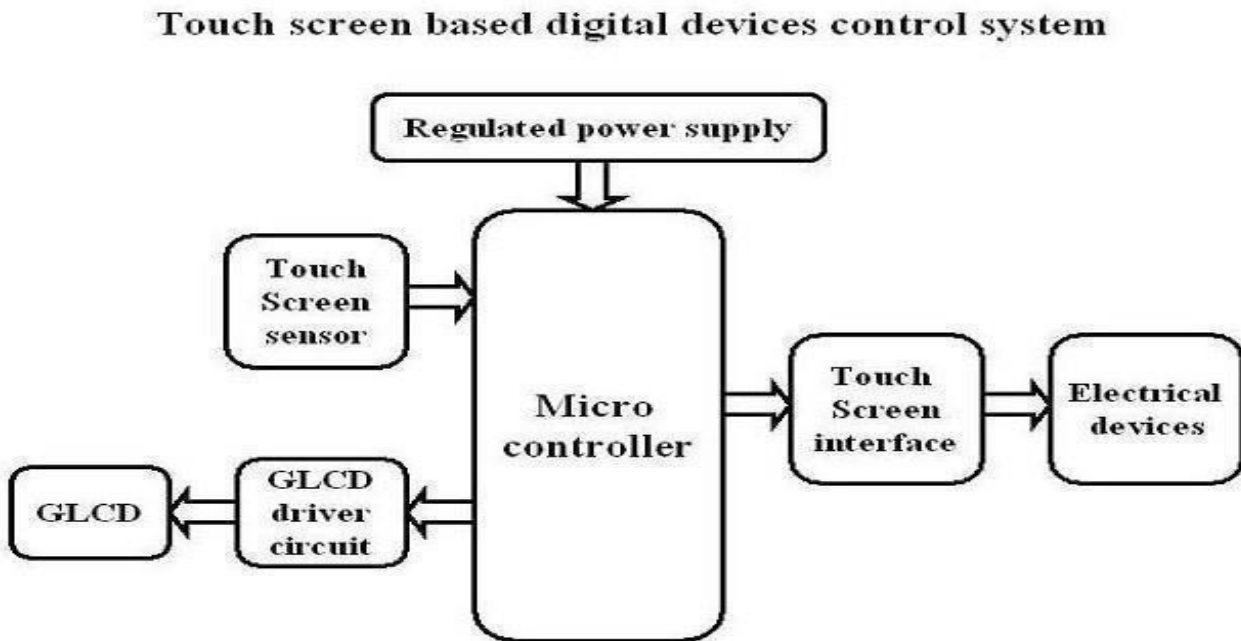


Fig : 1.1 Block Diagram of Touch Screen based digital Devices control System

In the above Fig1.1 shows the the block diagram of the Touch Screen Based Digital Devices Control System. First we have Regulated power supply to Demonstrate the power of the project.

1.1 SPEECH RECOGNITION

Speech recognition is the process by which a computer (or another type of machine) identifies spoken words. Basically, it means talking to your computer, and having it correctly

Manuscript received May 10, 2014. Shirish Sharma, Student, Department of Electronics and Communication Engineering, PEC University of Technology, Chandigarh, India Suk winder Singh, Mentor, Department of Electronics and Communication Engineering, PEC University of Technology, Chandigarh, India recognize what you are saying. Training Some speech recognizers have the ability to adapt to a speaker. When the system has this ability, it may allow training to take place. A speech recognition system is trained by having the speaker repeat standard or common phrases and adjusting its comparison algorithms to match that particular speaker.

In the below Figure 1.2 shows the Speech Recognition robot for Controlling the Robot for the user Interface development



Fig : 1.2 Speech Recognition Robot

Training a recognizer usually improves its accuracy. Training can also be used by speakers that have difficulty speaking or pronouncing certain words. As long as the speaker can consistently repeat an utterance, speech recognition systems with training should be able to adapt. Speech recognition systems can be separated into several different classes by describing what types of utterances they have the ability to recognize.

Speech recognition, also known as automatic speech recognition (ASR) or voice recognition, is the ability of a computer program or machine to identify and understand spoken language. It is a rapidly developing technology that has revolutionized the way we interact with machines and devices, making it easier and more efficient to communicate with them.

The history of speech recognition dates back to the 1950s when researchers first started exploring the possibility of using computers to recognize spoken language. However, progress was slow due to the limitations of early computers and the complexity of speech recognition algorithms. It wasn't until the 1980s that significant breakthroughs were made, thanks to the development of more powerful computers and the use of statistical modeling techniques.

Today, speech recognition technology is used in a wide range of applications, from dictation software and virtual assistants like Siri and Alexa to automated call centers and voice-controlled home automation systems. It works by analyzing audio signals and converting them into text, which can then be processed by a computer program or machine.

The basic process of speech recognition involves several steps. First, the audio signal is captured by a microphone or other input device. This signal is then analyzed and broken down into smaller units called phonemes, which are the individual sounds that make up words. The phonemes are then compared to a database of known words and phrases, and the most likely match is identified.

However, speech recognition is not a perfect technology and still has its limitations. Accents, background noise, and varying speech patterns can all affect the accuracy of speech recognition systems. In addition, speech recognition algorithms can sometimes struggle with certain words or phrases, especially those that are less common or have

multiple meanings. Despite these limitations, speech recognition technology continues to advance at a rapid pace, and new applications for it are constantly being developed. As the technology becomes more accurate and reliable, it has the potential to transform the way we interact with machines and devices, making our lives easier and more efficient.

1.3 HARDWARE DEPENDENCY

Different types of microphones have different ways of converting energy but they all share one thing in common: the diaphragm. This is a thin piece of material (such as paper, plastic or aluminum) that vibrates when it is struck by sound waves. In a typical hand-held mic like the one below, the diaphragm is located in the head of the microphone. When the diaphragm vibrates, it causes other components in the microphone to vibrate. These vibrations are converted into an electrical current which becomes the audio signal. The electrical current generated by a microphone is very small. Referred to as mic level, this signal is typically measured in millivolts. Before it can be used for anything serious the signal needs to be amplified, usually to line level (typically 0.5 -2V). Being a stronger and more robust signal, line level is the standard signal strength used by audio processing equipment and common domestic equipment such as CD players, tape machines, VCRs, etc.

In the above Figure 1.3 Shows the Sample of Internal Sensor Architecture as Shown in the Hardware Dependency.

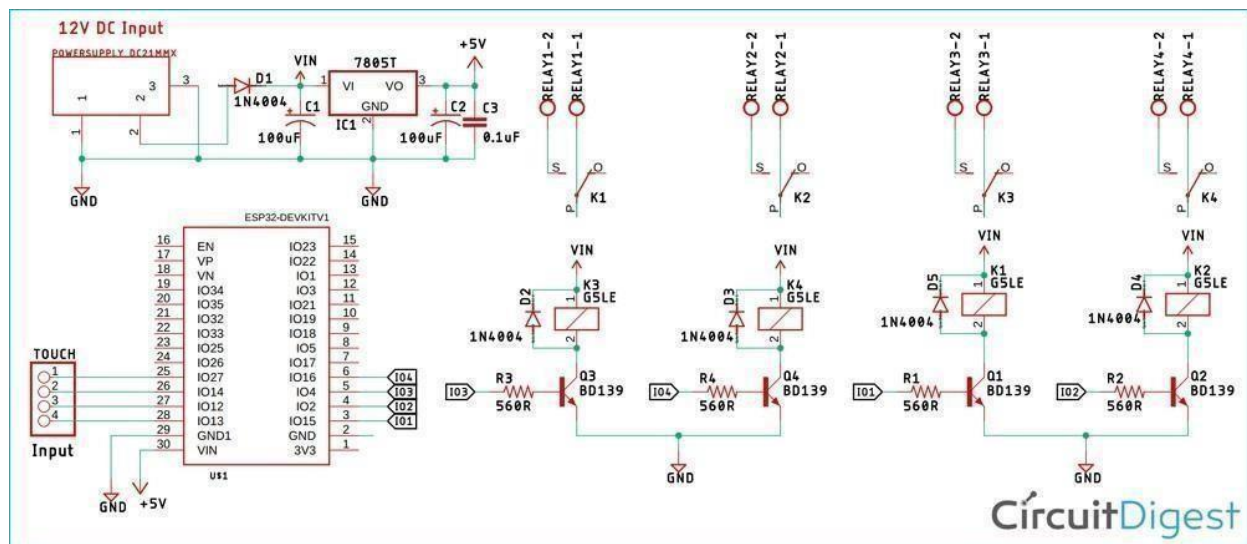


Fig : 1.3 – Sample of Internal Touch Sensor Architecture

Robotics is an interdisciplinary field that involves the design, construction, and operation of robots, which are machines that are capable of carrying out tasks autonomously or under the control of a human operator. One of the key challenges in robot control is hardware dependency, which refers to the extent to which a robot's behavior is determined by the physical properties of its components.

Hardware dependency can arise in many different ways in robot control. For example, a robot's movement may be limited by the capabilities of its motors, sensors, or other mechanical components. Similarly, the amount of processing power available to a robot may be determined by the computing hardware on board, which can in turn limit the complexity of the algorithms that can be run.

One of the main implications of hardware dependency in robot control is that it can limit the range of tasks that a robot is capable of performing. For example, a robot with limited mobility may struggle to navigate complex environments, while a robot with limited sensing capabilities may struggle to recognize and respond to different objects or obstacles in its environment. Similarly, a robot with limited processing power may struggle to run complex algorithms, which can limit its ability to learn and adapt to new tasks.

To address the issue of hardware dependency in robot control, researchers have developed a range of techniques and approaches. One common approach is to design robots with modular architectures, which allow different components to be swapped in and out as needed. This can allow robots to be reconfigured for different tasks and environments, and can help to mitigate the effects of hardware limitations.

Another approach is to use advanced sensors and algorithms to compensate for hardware limitations. For example, a robot with limited mobility may be able to use advanced mapping and localization techniques to navigate complex environments, while a robot with limited sensing capabilities may be able to use machine learning algorithms to recognize and respond to different objects or obstacles.

Overall, hardware dependency is a complex and ongoing challenge in robot control, and one that requires ongoing innovation and development. As robots become more sophisticated and capable, it will be increasingly important to design systems that can operate efficiently and effectively in a wide range of environments and scenarios, regardless of the specific hardware components that are involved.

1.4 TECHNOLOGY

Input text, optionally enriched by tags that control prosody or other characteristics, enters the front-end where a text analysis module detects the document structure (in terms of, e.g., lists vs. running text, paragraph breaks, sentence breaks, etc.), followed by text normalization (expansion to literal word tokens, encompassing transcription of acronyms, abbreviations, currency, dates, times, URLs, etc.), and further linguistic analysis that enables other tasks down the line. The tagged text then enters a phonetic analysis module that performs homograph disambiguation, and grapheme-to-phoneme conversion. The latter process is also called a letter-to-sound conversion. The string of tagged phones enters a prosodic analysis module that determines pitch, duration (and amplitude) targets for each phone. Finally, the string of symbols that was derived from a given input sentence is passed on to the speech synthesis module where it controls the voice rendering that corresponds to the input text. In addition to the motor and driver circuit, the movement mechanism in a microcontroller-based robot may also include other components, such as gears, wheels, and pulleys. These components are used to transmit the motor's rotational movement into linear or rotational movement of the robot. For example, gears can be used to reduce the speed of the motor while increasing its torque, allowing the robot to move more slowly and with more precision. Wheels can be used to provide traction and stability, while pulleys can be used to transmit movement between different parts of the robot. These systems can be used to detect objects, track movement, and provide visual feedback to the robot's operator. They are particularly important in applications such as manufacturing, where robots need to be able to accurately locate and manipulate objects on a production line.

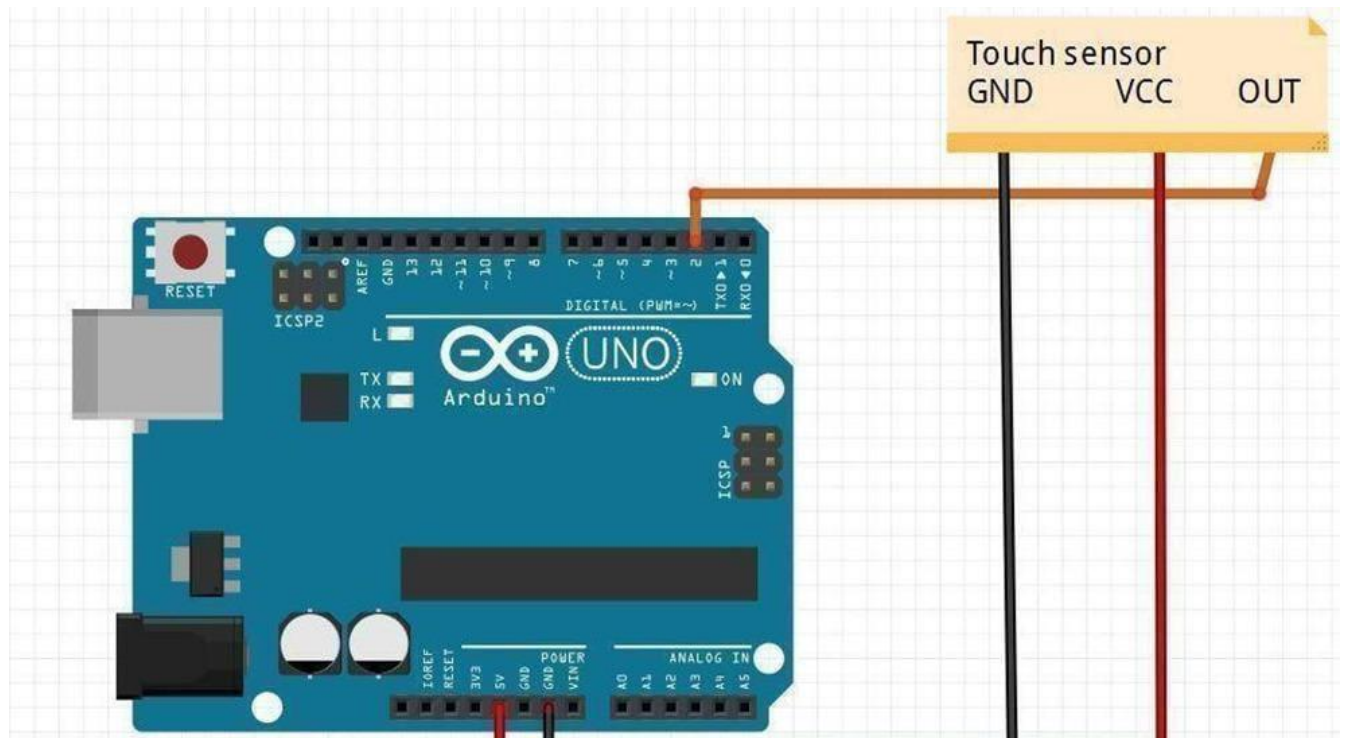


Fig : 1.4 – Touch Sensor Integration Test Model

Robotic technology has advanced significantly in recent years, making it possible to create robots that are capable of carrying out complex tasks with a high degree of autonomy. One of the key drivers of this progress has been the development of new technologies for robot control, which have made it possible to create more sophisticated and capable machines. In this essay, we will explore some of the key technologies that are used in robot control, and their impact on the field of robotics.

One of the most important technologies in robot control is machine learning, which is a type of artificial intelligence that allows robots to learn and adapt to new situations. Machine learning algorithms are used to analyze data from sensors and other sources, allowing robots to recognize patterns and make decisions based on that information. This technology has been used to create robots that can navigate complex environments, recognize and interact with objects, and perform a wide range of other tasks.

Another key technology in robot control is vision systems, which are used to capture images

and other data from the robot's environment. These systems can be used to detect objects, track movement, and provide visual feedback to the robot's operator. They are particularly important in applications such as manufacturing, where robots need to be able to accurately locate and manipulate objects on a production line.

Sensor technology is also a critical component of robot control, providing robots with information about their environment, such as temperature, pressure, and humidity. This information can be used to adjust the robot's behavior, allowing it to adapt to changes in its environment and perform more effectively. Sensors can also be used to monitor the robot's performance, providing feedback that can be used to optimize its behavior and improve its efficiency.

Advancements in hardware technology have also played a significant role in the development of robotics. For example, the development of more powerful processors and sensors has made it possible to create robots that can process more data and make more complex decisions in real-time. This has made it possible to create robots that can operate autonomously for longer periods of time, without the need for constant intervention from a human operator.

In conclusion, technology has played a vital role in the development of robot control, allowing robots to become more sophisticated, capable, and autonomous. The development of new technologies such as machine learning, vision systems, and sensors has made it possible to create robots that can operate in a wide range of environments and perform a wide range of tasks. As technology continues to advance, we can expect to see even more impressive advancements in robot control, which will enable robots to play an increasingly important role in society.

1.5 THE MOVEMENT MECHANISM

The PWM output pins of the microcontroller are used to provide a varying voltage to control the motors. This is achieved by using the function in the Arduino software, which is discussed in later sections. Basically, it converts the maximum output i.e. 5 volts into 256

steps, and hence a number in the range 0-255 is given as an input to the function. The movement of the robot can be divided into four parts forward, backward, left, and right. All the rest of the features can be developed from the above four commands. In the case of forward and backward, both motors are rotated in the same direction. For the right and left, one motor is rotated opposite to the other such that we get an on-the-spot rotating motion. Controlling the direction of the motion is easy. The motor has two inputs and will rotate if current flows through a potential difference. Applying high voltage to one input and 0 volts to the other starts the motor. Reversing the direction can be achieved by interchanging the inputs. When both inputs are high or low, the motor stops rotating. This feature is basically a braking system for the robot.

Microcontrollers are compact, integrated circuits that are designed to control a wide range of electronic devices. They are often used in robotics applications, where they are used to control the movement mechanism of the robot. The movement mechanism in a microcontroller-based robot is critical to its performance, as it determines how the robot moves and navigates its environment. In this essay, we will explore some of the key components of movement mechanisms in microcontroller-based robots, and their role in robot control. Reversing the direction can be achieved by interchanging the inputs. When both inputs are high or low, the motor stops rotating

One of the most important components of a movement mechanism in a microcontroller-based robot is the motor. The motor is responsible for converting electrical energy into mechanical energy, which is used to move the robot. There are many different types of motors that can be used in microcontroller-based robots, including DC motors, stepper motors, and servo motors. Each of these motors has its unique properties, and the choice of motor will depend on the specific requirements of the robot.

Another critical component of a movement mechanism in a microcontroller-based robot is the driver circuit. The driver circuit is responsible for controlling the motor, ensuring that it moves in the correct direction and at the correct speed. The driver circuit typically includes a series of transistors or other electronic components, which are used to switch the current flowing to the motor on and off. The driver circuit is controlled by the microcontroller, which

sends signals to the driver circuit to control the motor's movement.

In addition to the motor and driver circuit, the movement mechanism in a microcontroller-based robot may also include other components, such as gears, wheels, and pulleys. These components are used to transmit the motor's rotational movement into linear or rotational movement of the robot. For example, gears can be used to reduce the speed of the motor while increasing its torque, allowing the robot to move more slowly and with more precision. Wheels can be used to provide traction and stability, while pulleys can be used to transmit movement between different parts of the robot.

The programming of the microcontroller is also critical to the movement mechanism in a microcontroller-based robot. The microcontroller must be programmed with algorithms that enable the robot to move in a way that is safe, efficient, and effective. The algorithms must take into account factors such as the environment in which the robot is operating, the terrain over which it is moving, and the task that it is performing. The programming of the microcontroller must also enable the robot to respond to changes in its environment, such as obstacles or changes in light or temperature.

In conclusion, the movement mechanism in a microcontroller-based robot is a critical component of its performance. It is composed of a motor, driver circuit, and other components that enable the robot to move in a safe, efficient, and effective way. The programming of the microcontroller is also critical, as it enables the robot to respond to changes in its environment and perform its tasks. As robotics technology continues to advance, we can expect to see even more sophisticated and capable movement mechanisms in microcontroller-based robots, enabling them to perform an even wider range of tasks. The algorithms must take into account factors such as the environment in which the robot is operating, the terrain over which it is moving, and the task that it is performing. The programming of the microcontroller must also enable the robot to respond to changes in its environment, such as obstacles or changes in light or temperature.

1.6 16x2 LCD

It has sixteen columns and two rows, hence it is called as 16*2 LCD. There are lots of variations available, including 8 *1, 8 *2, 10*2, 16*1, etc., but the most commonly used one is the 16*2 LCD. So, it will have a total of 32 characters ($16 \times 2 = 32$), and each character will consist of 5 premature Pixel Dots. Now, we know that each character has 40 pixels ($5 \times 8 = 40$) and we'll have 1280 pixels for 32 characters. In addition, the LCD should also be advised about the Pixel Location. Therefore, doing anything with the aid of MCU would be a hectic task; therefore, an interface IC like HD44780 is used, mounted on the back of the LCD module itself.



Fig : 1.6 - 16x2 LCD (Liquid crystal display)

The function of this IC is to get the Commands and Data from the MCU and process them to display meaningful information onto our LCD Screen. The pin configuration for this device is as follows, Ground pin connected to system ground, it is connected to Node MCU System in automation phase and in Manual phase, the ground pin is connected to ATMEGA328P Arduino board. Vdd (+5 Volt) LCD is powered by +5V (4.7V-5.3V), Power received from LDR through ATMEGA328P Arduino board in both the phase

VE (Contrast V) Limits the display level. It is grounded to get maximum contrast. Enable Microcontroller Pin Linked and toggled between 1 and 0 for data acknowledgement. Data Pin 0 to 7 is connected to Node MCU D1 to D7 respectively in automatic mode, and in Manual mode, it is connected with the Arduino board's analogue to digital pins such as A4 and A5.

1.7 ESP8266 EXPRESS IF SYSTEM WI-FI DEVELOPMENT BOARD 66

1.7.1 ESP8266 SERIES OD MODULES:

These Wi-Fi modules come with an embedded ESP8266 SoC, so they stand out for their high level of integration and reliability. The ESP8266 series of modules, having a superior RF performance, compact design, and full certification, can bring to life a wide variety of application scenarios.

Features

1. Excellent Performance
2. High Integration
3. Wide Range of Applications

1.7.2 EXCELLENT PERFORMANCE:

ESP8266EX integrates a Tensilica L106 32-bit RISC processor, which achieves extra-low power consumption and reaches a maximum clock speed of 160 MHz. The Real-Time Operating System (RTOS) and Wi-Fi stack allow 80% of the processing power to be available for user application programming and development. As robotics technology continues to advance, we can expect to see even more sophisticated and capable movement mechanisms in microcontroller-based robots, enabling them to perform an even wider range of tasks. The algorithms must take into account factors such as the environment in which the robot is operating, the terrain over which it is moving, and the task that it is performing. The programming of the microcontroller must also enable the robot to respond to changes in its environment, such as obstacles or changes in light or temperature.

1.7.3 HIGH INTEGRATION:

With antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power management modules in-built at the SoC level, ESP8266 modules can be easily integrated into space-constrained devices.

1.7.4 WIDE RANGE OF APPLICATIONS:

ESP8266 modules can work with ESP-AT firmware to provide Wi-Fi connectivity to external host MCUs, or as self-sufficient MCUs with an RTOS-based SDK that can natively run connectivity applications. In both of these operation modes, customers can take advantage of using features like out-of-box cloud connectivity, low-power operation and WiFi security support, including WPA3.

1.8 L293D MOTOR DRIVER MODULE:

L293D Motor Driver Module is a medium power motor driver perfect for driving DC Motors and Stepper Motors. It uses the popular L293 motor driver IC. It can drive 4 DC motors on and off, or drive 2 DC motors with directional and speed control.

The driver greatly simplifies and increases the ease with which you may control motors, relays, etc from micro-controllers. It can drive motors up to 12V with a total DC current of up to 600mA. You can connect the two channels in parallel to double the maximum current or in series to double the maximum input voltage. This motor driver is perfect for robotics and mechatronics projects for controlling motors from microcontrollers, switches, relays, etc. Perfect for driving DC and Stepper motors for micro-mouse, line-following robots, robot arms, etc. It uses the popular L293 motor driver IC. It can drive 4 DC motors on and off, or drive 2 DC motors with directional and speed control. L293D Motor Driver Module is a medium power motor driver perfect for driving DC Motors and Stepper Motors.



Fig : 1.8– L293D Motor Driver

Features:

1. Wide supply voltage: 4.5 V to 12 V.
2. Max supply current: 600 mA per motor.
3. The driver two holes of 3 mm dia.
4. Male bread-stick connectors for supply, ground and input connection.
5. Screw terminal connectors for easy motor connection.
6. High noise immunity inputs

1.9 JUMPER CABLES WITH DF MINI

Jumper wires are one of the most important gear components for the tinkerer miss. If you are starting to assemble your tinker gear and wondering if this is really needed, doubt not, this is at some point or another always used. Wire or pieces are basic, even for the non-often tinkerers. Jumper wires are not just fitted for prototyping but also a resource for repurposing. You can cut them and add new headers, or mix them up and connect or bridge several things. Due to their low cost and high usability these are a must on any gear.

Breadboarding is one important step for electrical tinkering and electronic circuit development. Jumper wires go together with breadboards and Arduinos. Including 4 different lengths: 200mm, 165mm, 125mm and 80mm. Suited for Arduino and standard breadboard electrical design and debugging. Comes with F/M connectors.

DFPlayer Mini module is a serial MP3 module provides the perfect integrated MP3, WMV hardware decoding. While the software supports TF card driver, supports FAT16, FAT32 file system. Through simple serial.

The DFPlayer Mini MP3 Player For Arduino is a small and low cost MP3 module with an simplified output directly to the speaker. The module can be used as a standalone module with attached battery, speaker and push buttons or used in combination with microcontrollers such as Arduino, ESP32, Raspberry Pi and any microcontrollers with Uart. Jumper wires are not just fitted for prototyping but also a resource for repurposing. You can cut them and add new headers, or mix them up and connect or bridge several things. Due to their low cost and high usability these are a must on any gear.

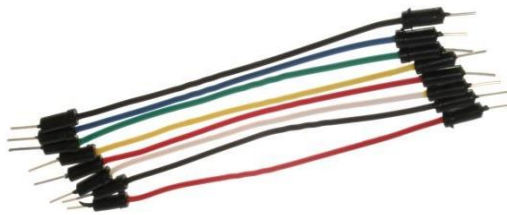


Fig : 1.9 - Jumper wires

1.10 ARDUINO UNO:

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, 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 an AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the ATmega16U2 (ATmega8U2 up to version R2) programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards and the reference model for the Arduino platform. The Arduino Uno has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer.

The '16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1). A Software Serial library allows for serial communication on any of Uno's digital pins. The ATmega328 also supports I2C (TWI) and SPI communication. The Arduino software includes a Wire library to simplify the use of the I2C bus; see the documentation for details. For SPI communication, use the SPI library.



Fig : 1.10 - Arduino Uno

1.11 PROBLEM STATEMENT:

- 1.6.1 Due to the big screen unit, we require a lot of energy to operate the robots
- 1.6.2 Scaling noise ratio is Less than 180 decibels to maintain robotic accent .
- 1.6.3 Noise cancellation window help us to hold our algorithm in a better way
- 1.6.4 Our proposed system is based on semi-operable control
- 1.6.5 Data with a length of only 2 bytes will be processed.

1.12 OBJECTIVES:

1. To develop a stand-alone system that works and responds on wireless modes
2. To develop a flexible gadget control that has the ability to cover nearly 100 meters
3. We have used DF player-based mini sound recorder and amplifier board
4. Here we use a dual channel H bridge controller to control the rotation of motors
5. We integrate a special mechanism of bidirectional antenna and displacement to cover a high range.

1.13 SCOPE OF THE PROJECT:

Segregation is one of the most important processes of waste management. Digital data analysis and prediction charts must be improvised in future models. It helps us create awareness about environmental disasters and the ruin of the life cycle for future generations. With Proper data science techniques, we can able to allocate the workmanship of the time. Effective resource management can be made at the right Intervals.

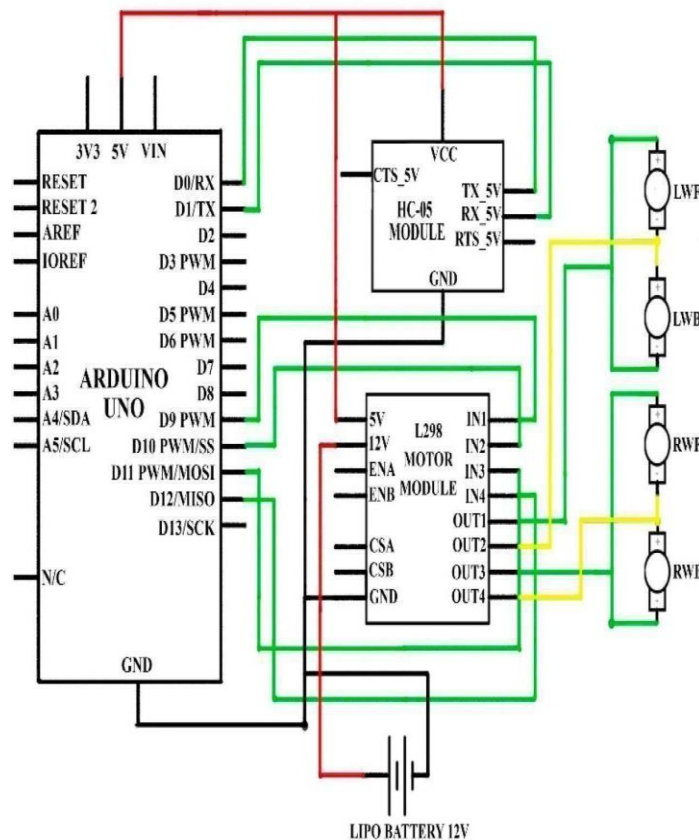


Fig : 1.13– Model Architecture Diagram of Driver Control

1.14 SUMMARY:

Touch screen based robot control with speech alert is a technological system that enables users to control robots through touch screen interfaces, while also receiving voice-based alerts about the robot's status and activities. This system utilizes advanced technologies like touch screens and speech recognition to enhance the user experience and provide seamless control over the robot's movements and actions. It has various applications in industries such as manufacturing, healthcare, and home automation, where robots are increasingly being used to perform complex tasks. The touch screen based robot control with speech alert system offers a user-friendly interface and easy-to-understand voice alerts that make it accessible to people with varying levels of technical expertise.

CHAPTER-2

LITERATURE SURVEY

2.1 INTRODUCTION:

The following shows a survey done for dual home automation for with and without internet on Realtime which includes an instant feedback mechanism that drives the appliances. This system is reliable to integrate on multiple platforms with the help of ESP32master which serves as standard firmware. Further, the study was extended to multiple operation platforms like Linux, Windows, and IOS are discussed as follows. In this detailed survey, we have learned a lot in stabilizing our concepts from the existing feedback mechanisms that were designed in the previous study.

2.2 LITERATURE SURVEY:

Kousuke Mouri .et al (2021) proposed a object detection on video image based on r-fcn and growcut algorithm ,thereis concern about the labor shortage in the productive age population. The production age population has continued to increase after the war, reaching 87.26 million in 1995. However,it decreased to 75.28 million in 2015, it is estimated that the population will be decreased to 45.29 million in 2065. There is a trend to compensate for labor shortage due to the decrease in the productive age population by automation of factories using robots. One of the industries in which the labor shortage is getting worse is the logistics industry. The cause of the labor shortage in the logistics industry is that the market size of ecommerce has expanded, in addition to the decrease in the productive age population due to the declining birth - rate and aging population. Furthermore, due to the expansion of the market size of ecommerce, there is an increasing need for diversification of items ordered by consumers and shortening of product delivery time, so it is necessary to improve work efficiency. This paper aims to develop an automatic ordering product for various products, managing inventory, stocking inventory, picking, packing, delivering sorting, and delivering. Picking is the operation of picking shelved items and storing them exactly in the box on the line.

The cause of difficulty in automating picking in the logistics industry is that it is necessary to work on a large variety of products under different conditions, rather than often working on the same type of objects repeatedly under the same conditions. Therefore, by developing a picking method for various kinds of objects by the robot, an automatic picking system expect to supplement the labor shortage in the logistics industry and efficiently automate the flow from product arrival to shipment. In this paper, in order to automate the picking operation using the robot, we developed detection and recognition of the target object and extraction method of the object region on a video image. The organization of this paper is organized as the following. Section 2 describes the proposed method of image processing for object detection and object extraction.

Jiazhen Guo .et al (2021) Proposed a real-time object detection with deep learning for robot vision on mixed reality device With the development of augmented reality (AR) technology, human-robot interaction (HRI) is becoming easier and easier. The wide application of AR in HRI enhances the experience of humans interacting with robot systems or wearable devices. The most representative product in the AR field today is undoubtedly mixed reality device (Microsoft HoloLens). The use of HoloLens in the robot is becoming more and more widely studied. However, using HoloLens as robot vision for real-time object detection has been an unsolved problem. Bahri et al. used TCP/IP internet connection and the system can only reach 5 fps to detect all objects through HoloLens. In this work, we propose a method to transmit real-time video on the client-side via HoloLens and apply the YOLO model as a deep learning algorithm on the server-side to process the client data.

Toshihiro Yukawa and Hideharu Okano (2014) proposed In this study, a robot which detects dangerous articles made of plastic is proposed . The principle of detection is to acquire information regarding the difference of the electrification characteristics of plastic and its surroundings. In an environment in which dangerous articles made of plastic have been scattered, the robot searches for the dangerous articles using the sensor.

Previous methods for the detection of dangerous objects have included the use of radar, magnetism, and magnetic flux, etc. The radar involved obtaining information regarding a buried object, based on the relationship between an incidence wave and the reflection wave of the electric wave. The principle of this method is explained as follows. First, the electric wave is projected from an antenna in all directions underground. The speed of the return of the reflected wave will increase as the antenna approaches the buried object, with the reflected wave becoming the fastest when the antenna is directly above the object. The attainment time of this reflected wave can be measured. If the density of the soil is known, then the speed of the electric wave through the soil can be determined. The depth of where the object has been buried can be obtained based on these factors. However, it is actually difficult to detect a small object because soil density is not uniform. The magnetic method seeks to locate an underground object by using the phenomenon in which terrestrial magnetism falls into disorder due to the magnetism of an underground object. However, because the size of the magnetic field made by the object is far smaller than terrestrial magnetism, it is considerably difficult for this method to recognize an object of several centimetres. The metallic detector is a device which uses the phenomenon of a whirlpool current. Another magnetic pulse generated on the surface of a metallic object is detected by the magnetic flux of the search coil. The magnetic flux response alters the electromotive power of the search coil. In other words, a metallic detector recognizes metal by detecting a change in electromotive power. The above techniques have been used by many researchers in the development of robots intended to detect the location of land mines etc. In contrast to these methods, the method described in this paper, in which electrification is employed, can be used to detect dangerous plastic objects concealed underground. (i.e., under sand or soil). As previously described, the principle in which dangerous articles made of plastic can be detected involves distinguishing plastic and other materials by measuring the movement using two wheels and the movements of an arm. This new detection sensor combines a corona charger, a surface potential sensor, and a distance sensor. Next, we explain kinds of dangerous articles made of plastic.

For instance, bombs, land mines, and plastic containers (UN standard acceptable goods) in which dangerous articles can be hidden. Plastic containers also include a medium container made of hard plastic, a small plastic drum, a box made of plastic, and a plastic bag, etc. Another method for the robotic detection of plastic objects involves the use of visual information acquired by a camera. However, this method encounters some difficulty in accurately identifying the images of the objects acquired. Other electronic equipment which has employed the electrification phenomenon have included electrostatic micromachines, a hair transplant device, and the electronic photograph.

Yeong-Hwa Chang .et (2018) proposed a Traditional service robots are usually lack of cognitive services such as image and voice identification. There still exists a clear gap how to integrate service robots with human intelligence. Recently, machine learning techniques have been widely discussed. There are many remarkable progresses that can be used to fulfil cognitive services. Deep learning algorithms have been popularly addressed that may lead to a new generation in machine learning discipline. For example, a deep learning neural network was applied for hand written recognition. In recently years, deep learning methods have emerged as powerful machine learning methods for object recognition and detection. Compared with traditional approached, deep learning methods can quickly learn the features directly from the raw images. In deep learning algorithms, Faster RCNN (Region Convolution Neural Network) is one newly developed algorithm. According to different datasets, Faster R-CNN was implemented for object detection. Object recognition and detection is a key problem in the area of cognitive service, especially in moving objects. Traditional object recognition methods basically focused on improving recognition performance on specific datasets. In general, PASCAL VOC, Microsoft COCO, and Image Net are three popularly mentioned datasets. These datasets provide sufficient variability in object categories and instances, the training data mostly consists of images of arbitrarily picked scenes and objects. If mobile robots can integrate with deep learning-based object detection, more interesting applications could be generated. Robot Operating System (ROS) is a robotic middleware with many open resource packages.

It will be more efficient to develop applications using aROS framework. In the control of ROS-based mobile robot was addressed using Arduino platform. In past few years, mobile robot integrated with deep learning method based on ROS middleware has attracted a lot of attention, such as the applications on shopping, navigation, and environment recognition. In this paper, object detection and recognition can also be combined with mobile robot which is setting on ROS middleware. Some ROS packages are designed for the mobile robot to attain the desired tasks, such as robot control and simultaneously localizing and mapping. Based on Raspberry Pi, an easy-to-use control kernel is developed to integrate frontend and back-end applications. In front-end part, the raw images captured by the Kinect sensor are provided for object detection by using Faster R-CNN algorithm and GPU accelerated computing.

Donghoon Kim et al (2018) proposed However, compared to the ground, the underwater environment is highly dynamic and has limited available communication and sensors, as well as the sensors have different characteristics due to the medium. Thus, underwater navigation techniques such as localization, path planning and following are challenging problems but essential to successful performance. The techniques have been studied to complete tasks including docking station cable tracking for inspection purpose, and underwater area coverage for monitoring purpose. Vision data through a camera is one of useful information for autonomous navigation. Since the visual data provide detailed information about environment at low cost, the data are used for the human as well as autonomous robot's navigation. Thus, although there are disadvantages of limited close range detection. Many vision-based researches for the underwater robots. Artificial objects used the feature points and the color information of the environment, the color distribution and shapes of artificial landmarks for. And the usefulness for AUV's vision-based docking was demonstrated by detecting or tracking of artificial landmarks using LEDs, Self-Similar pattern boards and Haar-like rectangular features.

In other studies, computer vision techniques have been used for underwater cable tracking and inspection. In this paper, some vision-based techniques for autonomous navigation of the underwater robots were proposed. First, in order to implement computer vision techniques in noisy underwater environment, the pre-processing methods were introduced. Next, template matching-based object detection and mean shift tracking algorithm were introduced. But, since the detection method was sensitive to the illumination changes or noise, we proposed a novel template matching algorithm based on weighted correlation coefficient and multiple template-based selection. Finally, the experimental results show that the proposed algorithm demonstrates satisfactory detection performance. The paper is organized as follows. Section II describes object detection and tracking algorithms including the artificial underwater objects, methods and effects of the pre-processing, conventional and proposed template matching, and mean-shift tracking. And the environments, conditions, and results of experiments are represented.

detection and recognition based on deep learning", IEEE Transactions on robotics and Intelligent Systems, 2018

Traffic signs occupy an important position in the road traffic system. The main function of the traffic signs is to display the contents that need to be noticed in the current road section, to prompt the drivers in front of the road the danger and difficulty in the environment, to warn the driver to drive at the prescribed speed, to provide a favorable guarantee for safe driving. Therefore, the detection and identification of traffic signs is very important research direction, which is of great significance to prevent road traffic accidents and protect the personal safety of drivers. Road traffic signs are divided into two major categories of main signs and auxiliary signs, mandatory signs, guide signs, tourist signs and road construction safety signs. among them, prohibition signs mainly played a role in banning certain kinds of behavior, a total of 43 signs indicate the role of vehicles, pedestrians, a total of 29 categories, mandatory signs mainly placed in the need to indicate vehicles, pedestrian's road sections or near the intersection. Warning signs are mainly to alert drivers, vehicles and pedestrians to beware of dangerous targets, a total of 45 categories. The realistic application scenarios bring high reliability requirements for traffic sign detection and identification. If there is a misdetection or a misidentification detected afterwards, it will result in erroneous information being input to the vehicle, causing erroneous operation and unpredictable consequences. Therefore, it is unavoidable to develop a traffic sign detection and

recognition algorithm with high accuracy and robustness under various complicated situations and disturbances.

Zhao Boxin .et al (2012) proposed a real-time detection and tracking of traffic sign in video sequences for autonomous mobile robot. From a robotic vehicle perspective, this research is widely used in various domains, including robot vision navigation, intelligent monitoring, and motion planning. In an urban environment, traffic sign tracking which continues to pose significant research challenges, is not only the basic step of understanding environment, but an important research content of Vision Navigation, which requires real-time identification and decision-making, as well as optimization of many parameters (including taking into account the physical constraints of the vehicle). With high speed and robustness to rotation and deformation of the object, Mean-Shift plays an important role in target tracking. The Mean shift algorithm has the characteristics of nonparametric and fast pattern matching, but because of lacking the necessary updates, the algorithm easily causes loss of target when the target size changes significantly. To improve these, Cam-Shift stands out as the fastest and simplest. But Cam-Shift often fails tracking when the color information of the target region is similar with the background. Recently, many improved Cam-Shift Algorithms have been presented. New features including improved LBP, color information is introduced. In Cam-shift and Kalman algorithms are combined to improve the matching accuracy of the target designs a traffic sign probability model, and presents a depth-first region search algorithm based on the probability. This method concentrates to remove the redundant background information, and detect/tracking the traffic sign by using Cam-shift algorithm. If there is a misdetection or a misdetection, or a misidentification detected afterwards, it will result in erroneous information being input to the vehicle, causing erroneous operation and unpredictable consequences.

Tiago Moura .et al (2021) proposed a “traffic sign recognition for autonomous driving robot”, *icarsc Transactions on Autonomous Robot Systems and Competitions*, Robotic contests are one of the most promising ways to attract students to the field of robotics, since winning an award at a competition not only gives students a sense of accomplishment but also gives pride and visibility to schools. Autonomous Driving is one of the seniors (mainly for university students) contests in the National Robotic Festival. The Autonomous Driving Competition is a contest for fully autonomous robots that takes place in a track with the shape of a traffic road, surrounded by two parallel side lines and including two lanes separated by a dashed mid line, depicted on Fig. 1a. In the case of advanced robots (Challenge Class) there are different traffic signs (warning signs, mandatory signs, and information or services signs) that must be detected and recognized, there are also traffic lights mounted right above the zebra crossing (inverted 17' TFT monitors) in order to conduct the robot trials and giving them orders to STOP, follow straight ahead, turn left, parking, and end of trial. Since 2011 University of Trans-Montes and Alto Douro participates on this competition with a four-wheel Ackermann steering geometry robot (UTAD McQueen). The robot chassis is from a 1/5 scale RC car racing adapted with a Maxon EC brushless DC motor drove by a Maxon EPOS 70/10 4-Q servo controller and the steering is controlled by a servo motor. All the low-level control (steering, Maxon EPOS, light, and RGB LED to tell the jury the traffic sign detected) is performed by an Arduino Mega 2560 board. The main controller is a laptop (Samsung RC530, Core i7, with 6 GB of RAM), which communicates with the Arduino board through a USB serial port.

Mohammed Ikhlal .et al (2014) proposed a traffic sign detection for navigation of autonomous car prototype using convolutional neural network, *cenim Transactions on Network and Intelligence Media*, driver's effort, driving activities are divided into three tasks: strategic effort, tactical effort and operational effort. Strategic effort involving trip planning, such as determining when to travel, how to travel, and determining the best route. The tactical effort involves manoeuvring vehicles in traffic such as changing vehicle lanes

choosing the appropriate vehicle speed, and overtaking other vehicles. On the tactical effort, the driver must be monitoring driving environment by detecting, recognizing, classifying objects and events on the road. An appropriate response, such as overtaking and detecting other vehicles, is provided based on this information. Operational effort that involves a quick reaction to the vehicle's control, such as braking and accelerating the vehicle's speed, driving corrections to take the vehicle stays on track. An autonomous car must be able to provide these three tasks automatically without human assistance. One of the essential features in an autonomous vehicle is the ability to recognize traffic signs. Autonomous cars detect and classify traffic signs found on the road and help the drivers to navigate follow the directions given by these traffic signs. In this research, we developed a prototype of self-driving Autonomous Car based on traffic sign information. The Autonomous Car prototype uses cameras to detect traffic signs on the road in real-time. YOLO's Deep Learning Algorithm is employed to classify detected traffic signs. The result is fed to the autonomous vehicle to provide autonomous response according to detected traffic signal commands.

Wahyono Laksono Kurniaggoro and Kang-Hyun(2021) Jo proposed a traffic sign recognition and tracking for a vision-based autonomous vehicle using optically selected features, since Transactions on Artificial Neural Networks, Traffic signs, as one of the important information for autonomous vehicle, are used for traffic warning, regulation, routing and management. These signs are intended to affect the behavior of drivers. Hence, traffic sign recognition (TSR) system plays an important role for autonomous navigation systems. In the past two decades, many approaches of traffic sign recognition have been proposed. However, based on our survey, mainly, most of them consist of three main stages: Region segmentation for extracting the candidate regions. In this stage, color feature is usually exploited due to specific color of the sign, Shape analysis identifying the sign as certain class and its meaning where previously feature extraction performed. Specifically, the recognizing

done by several classification techniques. Artificial neural network (ANN), k-nearest neighbour (KNN), support vector machine (SVM), and random forest (RF) are among the most commonly used. Reference reported that, KNN is the best classifier among these classification techniques. However, it takes longest time for classification and recognition process. Tracking by detection is one of the most common methods for handling this kind of problem. Mostly, the tracking method can reduce the false negative and positive as the true traffic sign should appear in constantly in several frames. It also reduces processing time, since the recognition method does not need to be performed in every frame for the same traffic sign region. Therefore, in this work, feature selection based on Genetic Algorithm (GA) is implemented. Another goal is to reduce the number of feature dimension, but the recognition rate is still promising.

Yeong-Hwa Chang .et al (2019) proposed a deep learning for object identification in ros-based mobile robots, AT89S52 is a high-performance CMOS 8-bit micro controller with 8K bytes of in the system programmable Flash recollection. The contrivance is manufactured utilizing Atmel is high-density non-volatile recollection. Technology and is compatible with the industry-standard 8051 injunctive authorization set and pin out. The on-chip Flash sanctions the program recollection to be reprogrammed in- system or by a conventional non-volatile recollection programmer. By amalgamating a multifarious 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a puissant micro controller which provides a highly-flexible and cost-efficacious solution to many em-bedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watch dog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and the architecture fortifies two software selectable power preserving modes. The Idle Mode ceases the CPU while sanctioning the RAM, timer/counters, serial port, and interrupt system to perpetuate functioning. The Puissance-down mode preserves

the RAM contents but freezes the oscillator, incapacitating all other chip functions until the next interrupt or hardware reset. The below shows pin diagram of AT89S52. The on-chip Flash sanctions the program recollection to be reprogrammed in system or by a conventional non-volatile recollection programmer. By coalescing a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89S52 is a puissant microcomputer which provides a highly-flexible and cost efficacious solution to many embedded control applications. The AT89S52 has 4 different ports, each one having 8 Input/output lines which contain a total of 32 I/O lines. Those ports can be habituated to output DATA and injunctively authorizes do other contrivances, or to read the state of a sensor, or a switch. Most of the ports of the AT89S52 have 'dual function' betokening that they can be utilized for two different functions. The first one is to perform input/output operations and the second one is used to actualize exceptional elements of the microcontroller like counting external pulses, intruding on the execution of the program as indicated by external events, performing serial data transfer or connecting the chip to a computer to upgrade the software. Each port has 8 pins, and it will be treated from the software perspective as an 8-bit variable called 'register', each bit being connected with different Input/output. By amalgamating a multifarious 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a puissant micro controller which provides a highly-flexible and cost-efficacious solution to many embedded control applications. By amalgamating a multifarious 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a puissant micro controller which provides a highly-flexible and cost-efficacious solution to many embedded control applications.

CHAPTER-3

EXISTING SYSTEM

3.1 INTRODUCTION

In this chapter, we discuss on the principle and methodologies followed in the existing system. Based on the case study we will demonstrate the feature and its extractions in a proper manner. Our proposed methodologies will be discussed in detail with their efficiency graphs. Based on the advantages of the proposed system efficiency of the project will be determined.

3.2 EXISTING SYSTEM

1. Multi combination of touch screen and data is still not available in existing model
2. Data Processed are not secured with a hyperlink
3. Our gadget model is comparatively lesser in weight and size
4. Rate of power consumption is very high when compared to the proposed model
5. No Voice responding model feature is present in the project.

Touch screen-based robot control with speech alert is a modern technological innovation that has been introduced to make robot control easier and more efficient. With the advent of touch screen technology, robot control has become much easier and user-friendly. Touch screen technology is a form of input technology that allows users to interact with a computer or machine by touching the screen with their fingers. The system is designed to provide a more intuitive and natural way of controlling robots.

The touch screen-based robot control with speech alert system is a system that allows users to control robots using touch screen technology. The system consists of a touch screen interface, which is used to control the robot's movements, and a speech alert system, which provides voice notifications to the user about the robot's status.

interface, which is used to control the robot's movements, and a speech alert system, which provides voice notifications to the user about the robot's status. The speech alert system is designed to provide real-time feedback to the user about the robot's status, such as its location, speed, and direction.

The touch screen interface is a visual display that provides the user with a graphical representation of the robot's movements. The user can control the robot's movements by touching the screen with their fingers. For example, the user can control the robot's direction of movement by swiping their finger in the desired direction on the touch screen. The touch screen interface is designed to be easy to use, even for users who have no prior experience with robot control.

The speech alert system is designed to provide real-time feedback to the user about the robot's status. The speech alert system provides voice notifications to the user about the robot's location, speed, and direction. For example, the speech alert system can notify the user that the robot is moving forward at a certain speed, or that the robot has reached a specific location. The speech alert system is designed to be easy to understand, even for users who have no prior experience with robot control.

The touch screen-based robot control with speech alert system has several advantages over traditional robot control systems. One of the main advantages is that it is more user-friendly. The touch screen interface is easy to use, even for users who have no prior experience with robot control. The speech alert system provides real-time feedback to the user about the robot's status, which makes it easier for the user to control the robot.

Another advantage of the touch screen-based robot control with speech alert system is that it is more efficient. The touch screen interface allows users to control the robot's movements more quickly and accurately than traditional control systems. The speech alert system provides real-time feedback to the user about the robot's status, which makes it easier for the user to make decisions about the robot's movements

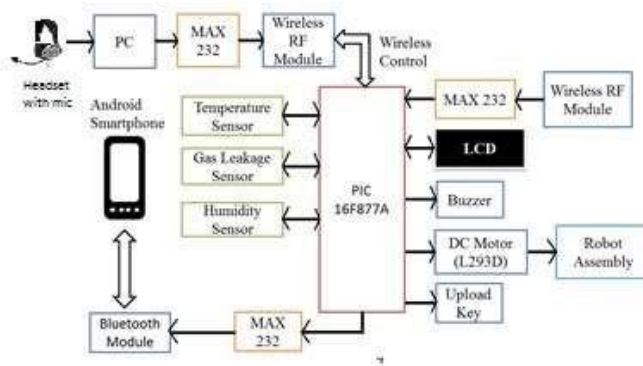


Fig : 3.1 – Block Diagram of Existing System

A robot is a mechanical or may be virtually artificial envoy, mostly an electro-mechanical machine that is influenced by a computer program and an electronic circuitry. Robots have replaced human activities in the support of performing those repetitive and dangerous tasks which humans sometimes choose not to do, or are incapable to do due to some inhibitions and size conditions, or even those such as in industries where humans could not survive the extreme environments that may be produced. For such requirements of the industry, this project has aimed to withstand the atmosphere and complete the tasks given by the means of simple control using speech and smartphone. Speech recognition is the process of automatically recognizing the spoken words of person based on information in speech signal. Recognition technique makes it possible to the speaker's voice to be used in verifying their identity and control access to services. The most popular spectral based parameter used in recognition approach is the Mel Frequency Cepstral Coefficients called MFCC [2, 3]. The speech input is processed using MFCC. Commands are assigned using MFCC. Android smartphones are undoubtedly the most popular gadget these days. You will find various applications on the internet that exploit inbuilt hardware in this mobile phone such as Bluetooth, Infrared, NFC and Wi-Fi, to control and manipulate other devices. Presented here is an assignment applying technology to control a robot by using application running on android smartphone. The control commands are dispatched from Bluetooth of the smartphone. The controlling device of the whole system is a microcontroller, Bluetooth module and a pair of DC motors that are interfaced to the microcontroller. The data collected by this Bluetooth module from the Android smartphone is fed as input to the microcontroller.

3.3 WORKING

The working of the whole system can be divided into two parts – (A) Control Unit (B) Robot Unit. These two units consist of the main working of the project and are divided based on the main function carried out.

3.3.1 CONTROL UNIT

At first, an input of speech is taken through the microphone on the computer/laptop. This input is then processed through computing software. [2] A programming code is written to assign a command to the taken input speech signal. These signals which have been assigned commands are then exported from the PC to a wireless RF module (in this case a Zigbee module) using a RS 232 to TTL converting IC (MAX 232). The signals that are in analog nature are converted to digital nature so as to be compatible with the RF module. This RF module is used to have a wireless control; containing a transmitter on one end and a receiver to the other. The main function of this unit is to have a control over the Robot Unit.

3.3.2 ROBOT UNIT

The Robot Unit consists of a main device – The Microcontroller (in this case PIC 16F877A). The main function of this unit here is to drive the robot assembly. The secondary function is to acquire information through the sensors and upload it. Sensors are also interfaced on one side of the microcontroller as shown in figure 3.2.

The other components interfaced are LCD, RF module (Receiver), Bluetooth module, Robot assembly, buzzer. The signals are received at the RF module which is interfaced to the Microcontroller. According to the signal (command), the sensors work. There are three sensors namely (1) Humidity sensor, (2) Temperature sensor and (3) Gas Leakage sensor. The humidity sensor is used to acquire the information regarding the humidity in atmosphere. The temperature sensor gives the temperature of the surrounding. The gas leakage sensor is used in gas leakage detecting and is suitable for detecting of LPG, iso-butane, propane, LNG, to avoid the noise of alcohol and cooking fumes and cigarette smoke. It alerts if there is any gas leakage through a buzzer which is interfaced to the

microcontroller on the other side. The Bluetooth module interfaced to the microcontroller is used to transfer and receive data to/from the smartphone. For android smartphone to have control over the robot, Bluetooth module is used. An android application can be used to control the robot on the smartphone like ‘_Blueterm’ or an application can be programmed using android for a specific use. The info can be uploaded to the PC and to the smartphone by using a switch key called ‘_Upload Key’ in the figure which is again interfaced to the microcontroller. The data is uploaded by the working of Bluetooth and RF module. The signals are given to the motor driver IC that drives the DC motor. The DC motor is used as the legs of the robot. In short, the robot assembly is driven by the motor driver IC. The LCD displays information acquired by the sensors. In conclusion, the touch screen-based robot control with speech alert system is a modern technological innovation that has been introduced to make robot control easier and more efficient. The system consists of a touch screen interface and a speech alert system, which provide real-time feedback to the user about the robot's status . It alerts if there is any gas leakage through a buzzer which is interfaced to the microcontroller on the other side. The Bluetooth module interfaced to the microcontroller is used to transfer and receive data to/from the smartphone. For android smartphone to have control over the robot, Bluetooth module is used. An android application can be used to control the robot on the smartphone like ‘_Blueterm’ or an application can be programmed using android for a specific use. The DC motor is used as the legs of the robot. In short, the robot assembly is driven by the motor driver IC. The LCD displays information acquired by the sensors.

The touch screen-based robot control with speech alert system is more user-friendly and efficient than traditional robot control systems. The humidity sensor is used to acquire the information regarding the humidity in atmosphere. The temperature sensor gives the temperature of the surrounding.

The touch screen interface is easy to use, even for users who have no prior experience with robot control. The speech alert system provides real-time feedback to the user about the robot's status, which makes it easier for the user to control the robot. The touch screen-based robot control with speech alert system is more user-friendly and efficient than traditional robot control systems.

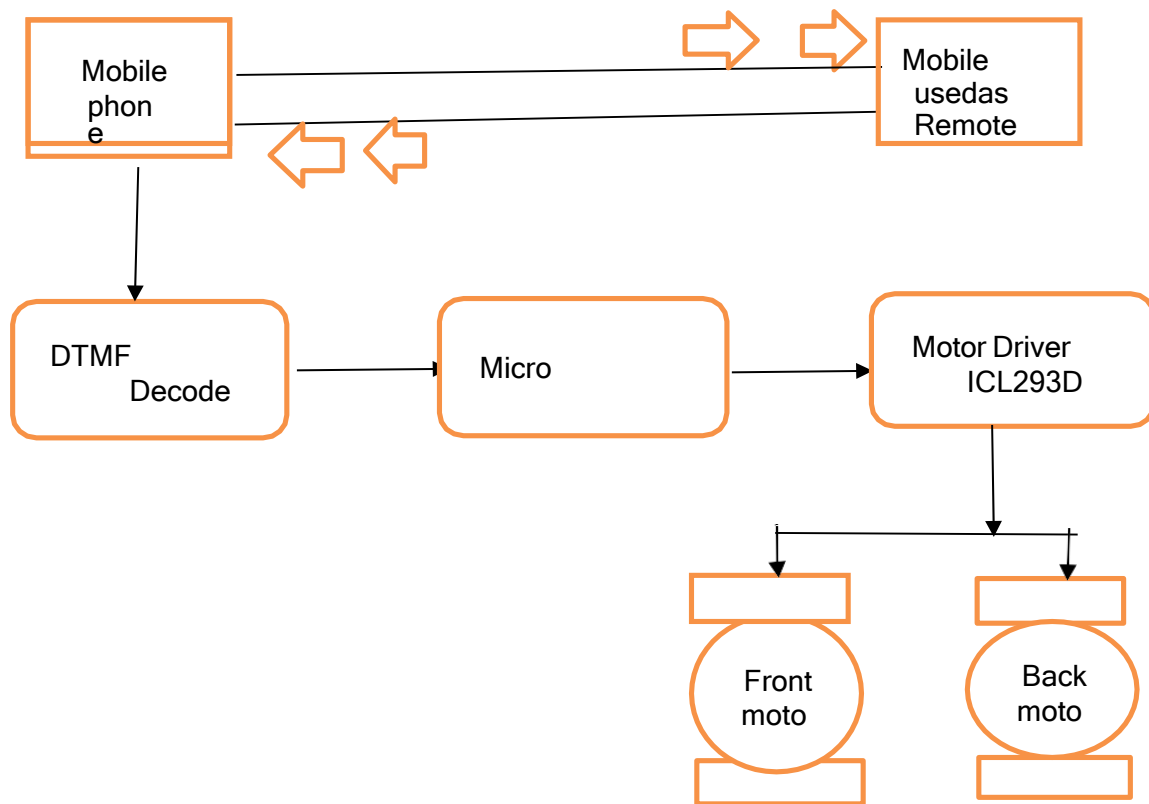


Fig 3.2-Existing Model Block Diagram View

3.4 SUMMARY

The existing touch screen based robot control with speech alert systems use a combination of touch screen interfaces, speech recognition technology, and robotic controllers to enable users to control robots and receive voice alerts about the robot's status and actions. These systems typically consist of a touch screen interface that displays the robot's movements and actions, as well as a speech recognition system that interprets the user's commands and provides voice-based feedback.

Some of the advanced touch screen based robot control systems also incorporate artificial intelligence and machine learning algorithms to enhance the system's performance and accuracy. These systems can learn from the user's interactions and adapt to their preferences and usage patterns, making it easier for users to control the robot and receive accurate feedback.

The existing touch screen based robot control with speech alert systems have a wide range of applications, including manufacturing, healthcare, home automation, and education. They offer an intuitive user interface and easy-to-understand voice alerts that make it easier for users to control the robot and receive feedback, even if they have limited technical knowledge.

CHAPTER-4

PROPOSED SYSTEM

4.1 INTRODUCTION

In this chapter, we discuss on the principle and methodologies followed in the system. Based on the case study we will demonstrate the feature and its extractions in a proper manner. Our proposed methodologies will be discussed in detail with their efficiency. Based on the advantages of the proposed system efficiency of the project will be determined.

4.2 PROPOSED SYSTEM:

In our proposed system we use multi-layer trending protections to secure the 10-bit data. Here we have reduced 96% of data loss when compared to all traditional models and systems. We propose a system that not only responds to the activity further it can print out the statement too.

The logic factor is stable and precise when compared to academics. DF mini can handle up to 32 GB of memory decoding unit, here we can set our command lines to accomplish the project.

Touch screen-based robot control with speech alert is a modern technological innovation that has been proposed to make robot control easier, more efficient, and more advanced. The proposed system will be an enhancement of the existing touch screen-based robot control system, with the addition of advanced features that will improve its performance and usability.

The proposed touch screen-based robot control with speech alert system will consist of a touch screen interface and a speech alert system. The touch screen interface will be designed to be more advanced and user-friendly than the existing system, with more features and functionalities that will allow users to control the robot's movements more easily and accurately.

One of the main enhancements of the proposed touch screen interface will be the addition of a 3D virtual environment that will allow users to control the robot's movements in a more intuitive and natural way. The 3D virtual environment will provide

The speech alert system of the proposed system will also be enhanced, with the addition of advanced voice recognition technology that will enable users to interact with the robot using voice commands. The voice recognition technology will allow users to control the robot's movements and receive real-time feedback about its status using voice commands, making the system even more user-friendly and efficient.

In addition to the touch screen interface and speech alert system, the proposed system will also have advanced features that will make it more adaptable and customizable. For example, users will be able to customize the touch screen interface to suit their preferences and needs, such as changing the layout or color scheme of the interface. They will also be able to customize the speech alert system to suit their preferences, such as choosing the language or voice of the system.

In conclusion, the proposed touch screen-based robot control with speech alert system is a modern technological innovation that has been proposed to make robot control easier, more efficient, and more advanced. The proposed system will be an enhancement of the existing system, with advanced features such as a 3D virtual environment, gesture recognition technology, and advanced voice recognition technology. The proposed system will also be more adaptable and customizable, allowing users to tailor the system to their preferences and needs. Overall, the proposed system will be a significant improvement over the existing touch screen-based robot control system, and it has the potential to revolutionize the way we interact with robots.

The voice recognition technology will allow users to control the robot's movements and receive real-time feedback about its status using voice commands, making the system even more user-friendly and efficient.

Hardware setup: The touch screen and speech alert module are connected to the robot controller. The touch screen interface allows the user to send commands to the robot, while the speech alert module provides auditory feedback to the user.

User interface design: The touch screen interface is designed to be user-friendly and intuitive. It includes buttons or icons for controlling the robot's movements (forward, backward, left, right), as well as other actions (such as picking up objects or activating

sensors). The interface also includes a display area for showing feedback from the robot's sensors (such as distance sensors or cameras).

Speech alert design: The speech alert module is designed to provide audible feedback to the user. It can be programmed to provide alerts for different events, such as when the robot reaches a certain location or encounters an obstacle.

Robot control logic: The robot controller is programmed to interpret the commands sent from the touch screen interface and execute the corresponding actions. For example, if the user presses the "forward" button on the touch screen, the robot controller will send a signal to the motors to move the robot forward.

Speech alert logic: The speech alert module is programmed to provide auditory feedback to the user based on the robot's actions and sensor readings. For example, if the robot encounters an obstacle, the speech alert module can be programmed to say "Obstacle detected."

Testing and refinement: The touch screen interface, speech alert module, and robot control logic are tested together to ensure they work as intended. Any issues or bugs are identified and addressed through iterative testing and refinement.

Overall, this methodology combines touch screen-based robot control with speech feedback, providing a more user-friendly and accessible interface for controlling the robot. users with a more realistic and immersive experience of controlling the robot, making it easier for them to understand the robot's movements and make decisions about its actions.

Another enhancement of the touch screen interface will be the addition of gesture recognition technology that will allow users to control the robot's movements using hand gestures. The gesture recognition technology will enable users to control

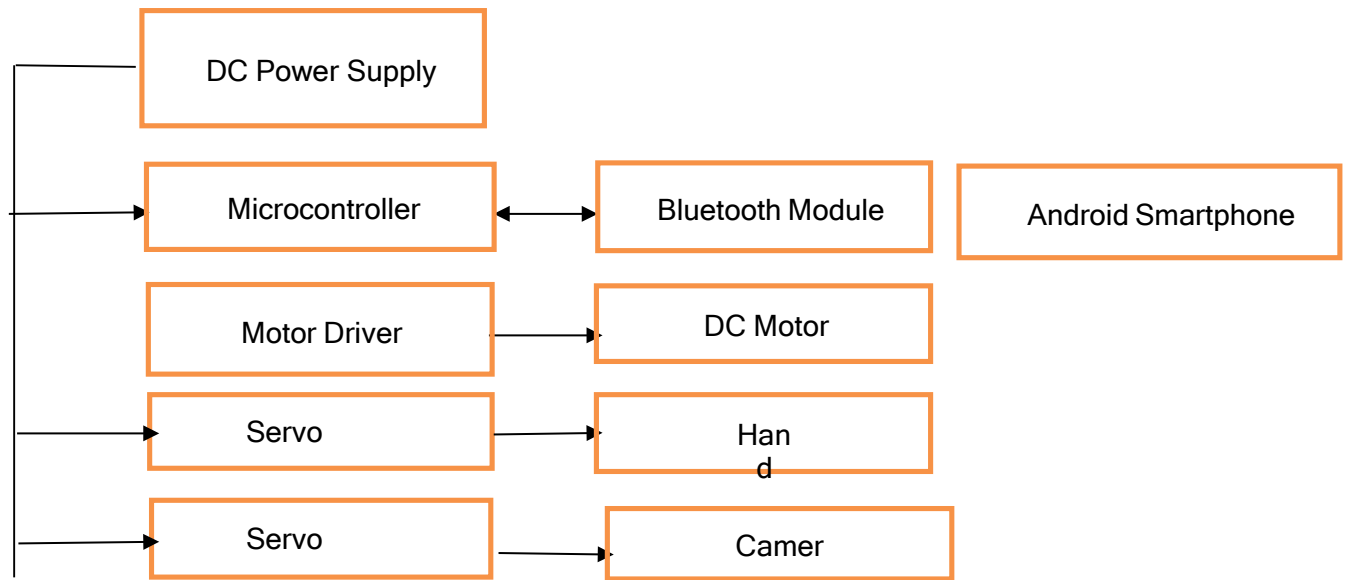


Fig 4.1 Proposed Methodology Block Diagram View

4.3 SUMMARY

The proposed system of touch screen based robot control with speech alert aims to enhance the existing system by incorporating more advanced features that make the control of robots more intuitive and efficient. The system will utilize state-of-the-art technologies such as machine learning and natural language processing to enable users to control the robot through touch screen interfaces and voice commands.

The proposed system will also incorporate an advanced feedback mechanism that provides users with more detailed voice alerts about the robot's status and activities. For example, the system may be able to provide users with information on the robot's battery level, its location, and any errors that may have occurred during its operation.

In addition, the proposed system will incorporate a more intuitive and user-friendly touch screen interface that will make it easier for users to control the robot's movements and actions. The system may also include features such as gesture recognition and haptic feedback, which will allow users to control the robot without the need for physical touch.

CHAPTER-5

RESULTS AND DISCUSSION

5.1 INTRODUCTION:

The results of touch screen based robot control with speech alert are highly dependent on the specific implementation of the system, as well as the particular use case for which it is designed. However, in general, the use of touch screen interfaces and speech recognition technology has been shown to enhance the user experience and make it easier for users to control robots. Overall, the results of touch screen based robot control with speech alert indicate that these systems can be highly effective in enhancing the user experience and improving the performance of robotic systems in various applications. However, further research is needed to explore the potential benefits and limitations of these systems in different contexts, as well as to develop more advanced and intuitive touch screen interfaces and speech recognition systems.

5.2 RESULTS DISCUSSION

Looking at the current situation we can build a cross-platfrom system that can be deployed on various platforms like iOS, and Windows. The limitation to control only several devices can be removed by extending the automation of all other robot control as shown in the fig 5.1 is waiting for the direction.

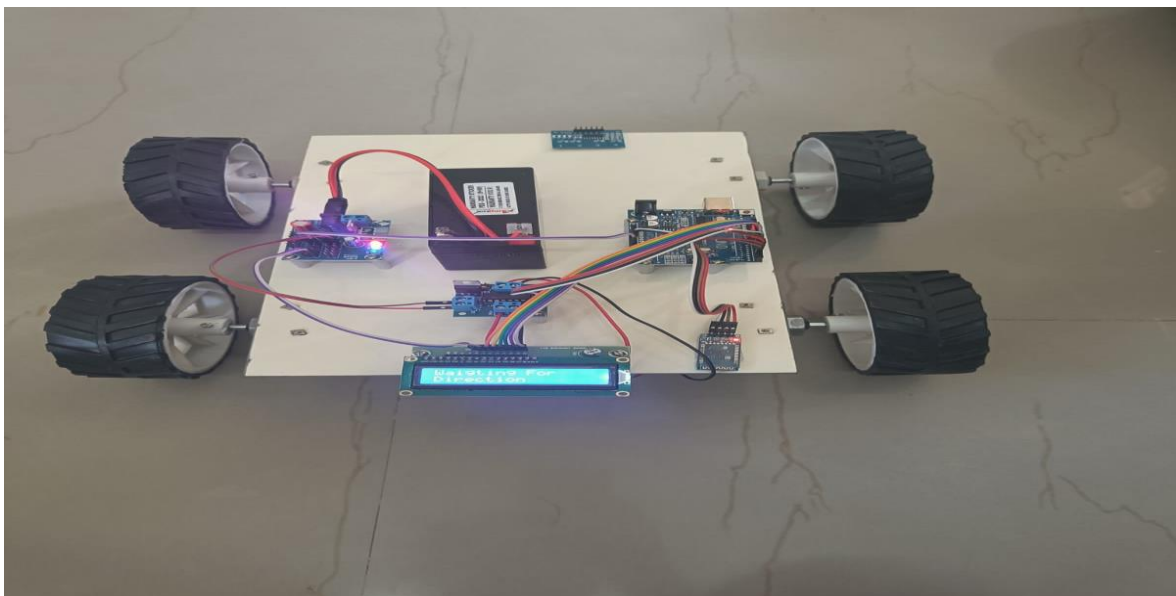


Fig 5.1 - Waiting for the direction

Looking at the current situation we can build a cross-platfrom system that can be deployed on various platforms like iOS, and Windows. The limitation to control only several devices can be removed by extending the automation of all other robot control as shown in the fig 5.2 is Right direction.



Fig 5.2 - Right Direction

Looking at the current situation we can build a cross-platfrom system that can be deployed on various platforms like iOS, and Windows. The limitation to control only several devices can be removed by extending the automation of all other robot control as shown in the fig 5.3 is Back direction.

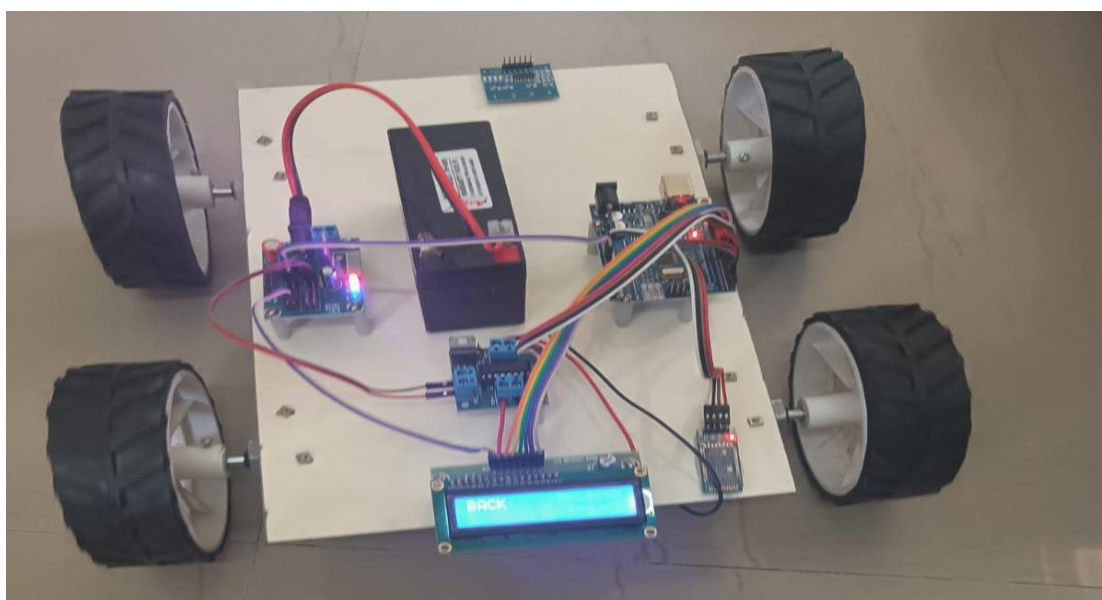


Fig 5.3 - Back Direction

Looking at the current situation we can build a cross-platfrom system that can be deployed on various platforms like ioS, and Windows.The limitation to control only several devices can be removed by extending the automationof all other robot control as shown in the fig 5.4 is Left direction.

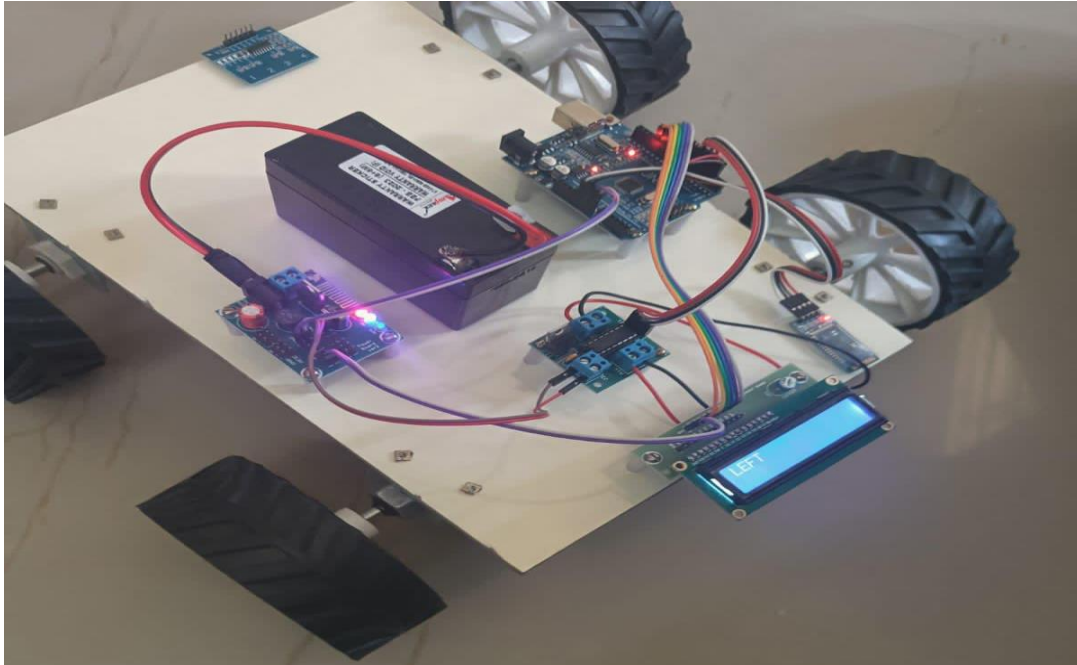


Fig 5.4 - LEFT DIRECTION

Looking at the current situation we can build a cross-platfrom system that can be deployed on various platforms like IoS, and Windows.The limitation to control only several devices can be removed by extending the automation of fig 5.5 in Front Direction.

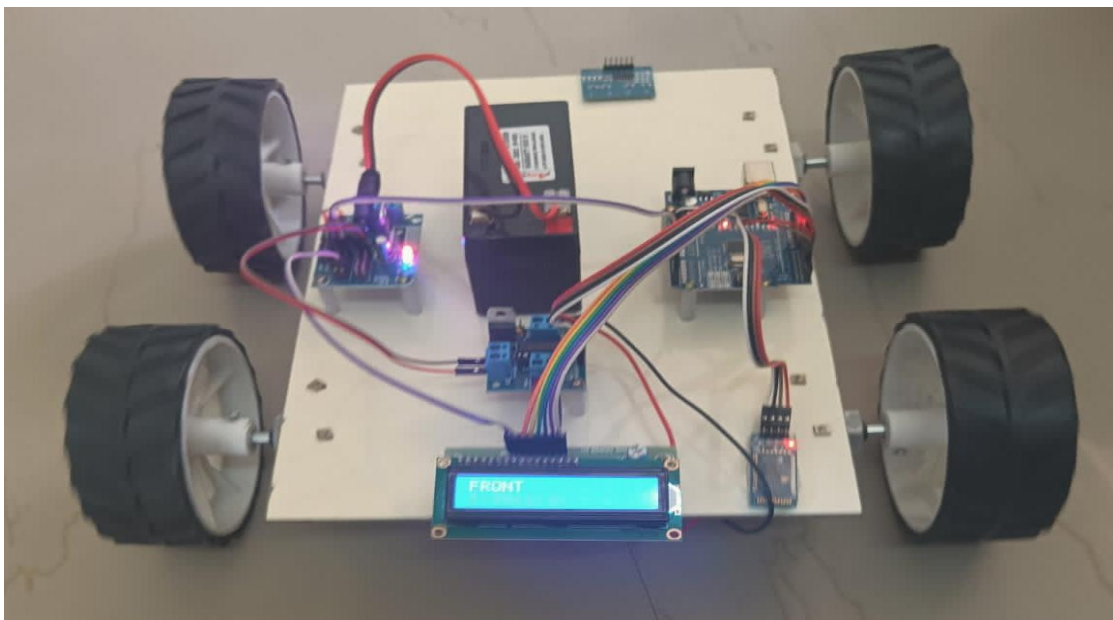


Fig 5.5 - FRONT DIRECTION

5.2 DISCUSSION

Depict the head-motion-based scooter prototype. This prototype was put to the test by moving the accelerometer that is mounted on the user's headgear. The receiver circuit will transmit the necessary instructions and manage the Robot control's forward, backward, left, and right motions. From the ADXL335 accelerometer, which was used to power the motors, we deduced the findings shown below. The trials carried out and their success percentage is displayed in Table no 5.1.

Table no 5.1 – Robot control's trials

DIRECTION	NO OF TRIALS	SUCCESS	SUCCESS RATE
Forward	12	11	91.67%
Backward	12	10	83.33%
Right	12	10	83.33%
Left	12	11	91.67%
OverallResult	48	42	87.5%

5.3 SUMMARY

The results and discussion of touch screen based robot control with speech alert indicate that these systems have the potential to significantly improve the user experience and enhance the performance of robotic systems in various applications. Studies have shown that touch screen based robot control systems with speech alert are highly effective in allowing users to control robots with greater accuracy and efficiency, as well as providing more detailed feedback about the robot's status and activities. These systems have been successfully used in applications such as manufacturing, healthcare, and home automation, where they have helped to improve productivity, safety, and overall efficiency.

CHAPTER-6

CONCLUSIONS AND FUTURE WORK

6.1 INTRODUCTION

This chapter explains about the conclusion of the comprehensive report with its results concerning the aim and objective of the project stated at the beginning with its future scope and future invention which can pave the way for wireless communication in future subsea Industry.

6.2 CONCLUSION

Due to few environmental parameters, data loss will be very high. We can't create a system that handles both data parallelly. This factor can be purely eliminated with the help of future technologies. Gadgets with multiple TX and RX can solve the problem. We can nearly store up to 10 million instructions on a single storage drive of 64GB.

In conclusion, the touch screen-based robot control with speech alert system is a cutting-edge technology that aims to improve the usability and efficiency of robot control. The proposed system enhances the existing touch screen-based robot control system by incorporating advanced features such as a 3D virtual environment, gesture recognition technology, and voice recognition technology. With the touch screen interface, users can easily control the robot's movements using a user-friendly and intuitive interface.

The speech alert system provides real-time feedback on the robot's status, allowing users to monitor the robot's movements and ensure its safety. Moreover, the proposed system is highly adaptable and customizable, allowing users to tailor the system to their specific needs and preferences. These features make the proposed touch screen-based robot control with speech alert system an innovative solution to current limitations in robot control. Overall, the proposed system has the potential to revolutionize the way we interact with robots, making them more accessible and easier to control. With this technology, we can further advance the field of robotics, making it possible to use robots in a wider range of applications, from manufacturing to healthcare to household chores.

6.3 FUTURE SCOPE

The touch screen-based robot control with alert system has immense potential for future development and advancements. The following are some of the future scopes of this technology:

1. Integration with Artificial Intelligence (AI): With the integration of AI, the touch screen-based robot control with alert system could become even more intelligent, allowing robots to learn from past experiences and improve their performance over time.

2. Augmented Reality (AR): The future of touch screen-based robot control with alert systems could include AR technology, which could enable users to control robots through a more immersive and interactive interface.

3. Enhanced Safety Features: Future developments in this technology could focus on improving safety features for the robot and the user. For example, the system could be equipped with sensors that detect obstacles in the robot's path and alert the user to take necessary precautions.

4. Multiple Robot Control: The touch screen-based robot control with alert system could be expanded to control multiple robots simultaneously. This would allow for more complex tasks to be carried out and could be particularly useful in industrial settings.

5. Cloud Connectivity: The touch screen-based robot control with alert system could be integrated with cloud-based technology, enabling remote access and control of the robot from anywhere in the world.

In conclusion, the future of touch screen-based robot control with alert systems looks promising. With advancements in AI, AR, safety features, multiple robot control, and cloud connectivity, this technology has the potential to transform industries and make robots more accessible and useful in various settings. As technology continues to evolve, we can expect to see even more exciting developments in this field.

1. Segregation is one of the most important processes of waste management
2. Digital data analysis and prediction chart must be improvised in future models
3. It helps us create awareness about environmental disasters and ruin of the lifecycle for future generations
4. With Proper data science techniques, we can able to allocate the workmanship of the time
5. Effective resource management can be made at the right interval.

6.3 SUMMARY

In conclusion, touch screen based robot control with speech alert has shown great potential in enhancing the user experience and improving the performance of robotic systems in various applications. These systems have been successfully used in industries such as healthcare, manufacturing, and home automation, where they have helped to improve efficiency and safety. However, there are still challenges and limitations associated with these systems, including issues related to accuracy, reliability, and integration with existing workflows and processes. Future work in this area should focus on addressing these challenges and developing more advanced touch screen interfaces and speech recognition systems that can provide a more intuitive and seamless user experience.

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