SELF CONTROLLED E-VEHICLE FOR DEAF AND DUMB PEOPLE

A PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRICAL AND ELECTRONICS ENGINEERING

K.RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

SAMAYAPURAM – 621 112

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K.RAMAKRISHNAN COLLEGE OF TECHNOLOGY
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BONAFIDE CERTIFICATE

Certified that this project report titled **" SELF CONTROLLED E-VEHICLE FOR DEAF AND DUMB PEOPLE "** is the bonafide work of **ABI JULIET J (811718105001), AKSHAYA M (811718105007), HARSHINI R (811718105021), KEERTHANA K (811718105025), LAVANYA J(811718105027) ,** who carried out the project under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

We jointly declare that the project report on **"SELF CONTROLLED E-VEHICLE FOR DEAF AND DUMB PEOPLE"** is the result of original work done by us and best of our knowledge, similar work has not been submitted to **"ANNA UNIVERSITY CHENNAI"** for the requirement of Degree of **BACHELOR OF ENGINEERING**. This project report is submitted on the partial fulfilment of the requirement of the award of Degree of **BACHELOR OF ENGINEERING**.

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ABSTRACT

E-Vehicle are vehicles that are either partially or fully powered on electric power. Electric vehicles have low running costs as they have less moving parts for maintaining and also very environmentally friendly as they use little or no fossil fuels (petrol or diesel). While some EVs used lead acid or nickel metal hydride batteries, the standard for modern battery electric vehicles is now considered to be lithium ion batteries as they have a greater longevity and are excellent at retaining energy. E-Vehicles are increasingly operating in indoor environments designed for and shared with people. Many modern indoor environments are designed with wheelchair accessibility in mind. This presents an opportunity for wheeled e-vehicles to navigate through public buildings like school, court, college areas where we have more number of blocks that is very hard to find this project was initiated to provide an aid to mobility for deaf and dumb people who find it difficult or impossible to drive a conventional powered wheelchair. A Line Following which is able to follow either a black line that is drawn on the surface consisting of a contrasting colour. It is designed to move automatically and follow the line. The vehicle uses arrays of optical sensors to identify the line, thus assisting the e-vehicle to stay on the track.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 ELECTRIC VEHICLE

In present world around 650 million people are physically challenged. Hence it is highly essential to build a system in order to make their lives happy and more flexible. People have disabilities with their hands, foot and lower extremities because of which they are unable to perform regular tasks. Many technologies are available to overcome this problem. To overcome this problem, there are several applications in the market which help handicapped people to perform their tasks. New technologies in communication and e-vehicles have had a substantial influence on our daily lifestyle of which transportation is no exception. These technologies have given rise to the prospect of autonomous vehicle (AV) technology which aims to reduce crashes, energy consumption, pollution, and congestion while at the same time increasing transport accessibility. Although the idea of driverless vehicles has been around for decades, the exorbitant costs have hindered large-scale production. Nevertheless, there has been an acceleration in the research and development efforts in the last decade to bring the idea of the driver less vehicle. For example, the advent of the Google car brought AVs to the spotlight. Moreover, the automotive industry spends around €77 billion worldwide on R&D in order to nurture innovation and to stay competitive. There are various kinds of vehicles to meet the various needs of their users. Several studies have concluded that for independent

mobility to all the disabled human beings powered wheel chair, manual wheelchair and walker access the benefit. Independent mobility increases many educational opportunities, promotes feelings of self-reliance and reduces dependency on others. As per the “World Report on Disability” there are 70 million people who are handicapped. Unfortunately, day by day the number of handicapped people is increasing due to road accidents and disease like paralysis, Quadriplegics, etc. Among all the disabilities percentage of physically handicapped people. In India 120 million people are disabled out of which 41.23% are physically disabled. The lack of ability to explore and control can often result in deprivation and lack of motivation that leads to helplessness. For elderly, independent movement is an important aspect of self-esteem. Mobility difficulties leads to theproblem of activities of daily living because of the need to move around to accomplish many activities. The impaired mobility often results in reduced opportunities, which leads tosocial isolation, and many mental problems. While the needs of many people with physical disabilities can be satisfied with traditional manual or self-automated wheelchairs, a portion of the disabled community finds it difficult impossible to use wheelchairs independently. People with Quadriplegics, Multiplesclerosis have severe disabilities and hence cannot drive joystick operated traditional Wheelchairs. Hence we propose a Renewableenergy source based Driverless vehicle for physically challengedpeoples to navigate in the indoor places. This makes them to continue their daily activities without the help of other human beings

1.2 OBJECTIVE

- The main objective of our project is to create a prototype of self controlled vehicle for physically challenged people.
- A Self-driving car (sometimes called an autonomous car or driverless car) is a vehicle that uses a combination of sensors and actuaters to travel between destinations without a human operator.
- To reduce the pollution created by the energy of non-renewable methods by measuring it.
- By using LDR sensor , it can absorb the light in the dark surface and emits the light in the white surface.
- IR sensor is used to detect the obstacles from the way of path .
- By charging the battery through Solar Panels.

CHAPTER 2

LITERATURE REVIEW

2.1 TITLE : PID Controller Based Two Wheeled Self Balancing E-vehicle

AUTHOR : Nikita T; Prajwal K T

YEAR : June 2021

DESCRIPTION : Wheeled type e-vehicles are gaining popularity than the humanoid e-vehicles because of their faster and better mobility in confined spaces, these wheeled e-vehicles uses the inverted pendulum technology for balancing and mobility of the wheels. In this paper gyroscope sensor output is used with a microcontroller to balance the e-vehicle using conventional control theory.

2.2 TITLE : Hybrid Self-Balancing and object Tracking E-vehicle Using Artificial Intelligence and Machine Vision

AUTHOR : Santiago Ramos Garces; Mayra Yucely Bebet

YEAR : June 2021

DESCRIPTION : The proposed e-vehicle consists of a two-wheeled chassis equipped with an ultrasonic sensor, camera, gyroscope and accelerometer allowing a multi-directional navigation of the e-vehicle tracker. Additionally, the Internet of Things (IOT) framework has been used for remote control and monitoring via wireless interface. The

Fuzzy Logic Controller is designed considering all the realistic hindrances in order to achieve high performance and meet robust stability. To approximate the position of an object about the e-vehicle, vision system and ultrasonic sensor coupled with a camera are used.

2.3 TITLE : Self-balancing E-vehicle Autonomous Control System

AUTHOR : A.V. Putov; E.V. Ilatovskaya et

YEAR : June 2021

DESCRIPTION : This paper describes the design of the body, controlalgorithm and performance results of such two-wheeled vertically self-balancing e-vehicle. The e-vehicle was designed and assembled in Saint Petersburg Electro technical University “LETI” at the automaticcontrol systems

2.4 EXISTING SYSTEM

- The existing system is to develop a wheelchair which will move as per the user's commands.
- This system works on voice commands given by the wheelchair user. The system is fully independent as the user do not need any other person to help him to move the wheelchair.
- This system consists of two major modules namely Voice recognition module and motor driving module. The voice recognition is done through voice recognition module. The output of this module is directed to Arduino which uses a motor driver IC to drive the motors.

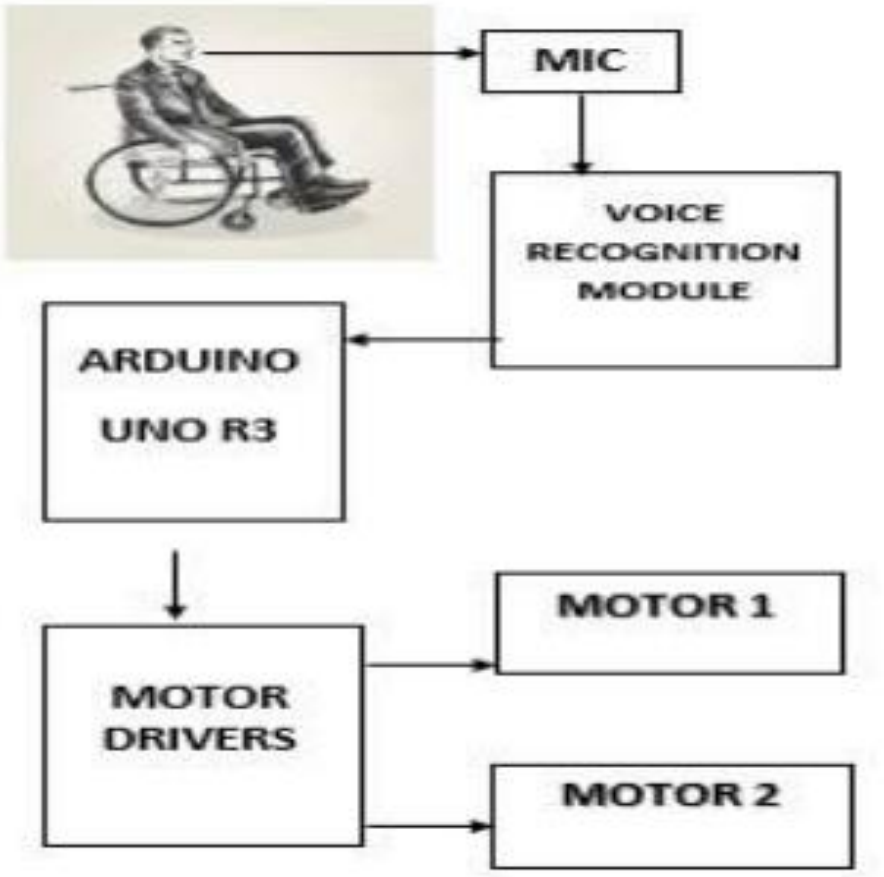

FIG 1.1 EXISTING SYSTEM

CHAPTER 3

METHODS AND MATERIALS

3.1 METHODOLOGY

- The proposed block diagram consists of micro controller, keypad, Vehicle unit setup, LCD display, IR sensor, RFID module and also voice board.
- Initially the stand alone vehicle module stands in particular place in areas like court, schools, colleges, institution etc. If suppose a person need to move from one place to another place, in such areas where they find difficult themselves to migrate they can use this kind of vehicle for easy navigation.
- Control unit setup will be with the physically challenged people. If they want to move somewhere inside the infrastructure, they want to select their destination using the keys in the control unit.
- The data from the control unit will be sent to the vehicle unit using wireless RF communication technology. Once the data received in the robot unit then the robot will move towards the direction from where the data is received by following the line.
- Once the vehicle reached then the person wants to get into the vehicle and want to select the destination where the vehicle wants to move using the keypad in the vehicle unit. Their selected destination will be displayed in the LCD and also played in the voice board.
- Once the person entered the vehicle they want to show their card that was read by RFID reader in the vehicle unit and press the keypad (In the vehicle module, the available blocks the vehicle can navigate will be displayed for each key of the keypad) the vehicle will start moving in the line according to the key selected by the person.
- A self-controlled is an autonomous robot which is able to follow either a black or white line that is drawn on the surface consisting of a contrasting color. Our vehicle is designed to move automatically and follow the plotted line.
- IR sensor present with vehicle is used to find the object present while it's navigation. On detection of object the vehicle will change its path according to the instruction given in the controller.

3..1.1 Concepts of Line Follower

Line Follower Robot is able to track a line with the help of an IR sensor. This sensor has a IR Transmitter and IR receiver. The IR transmitter (IR LED) transmits the light and the Receiver (Photodiode) waits for the transmitted light to return back. An IR light will return back only if it is reflect by a surface. Whereas, all surfaces do not reflect an IR light, only white the colour surface can completely reflect them and black colour surface will completely observe them as shown in the figure below.

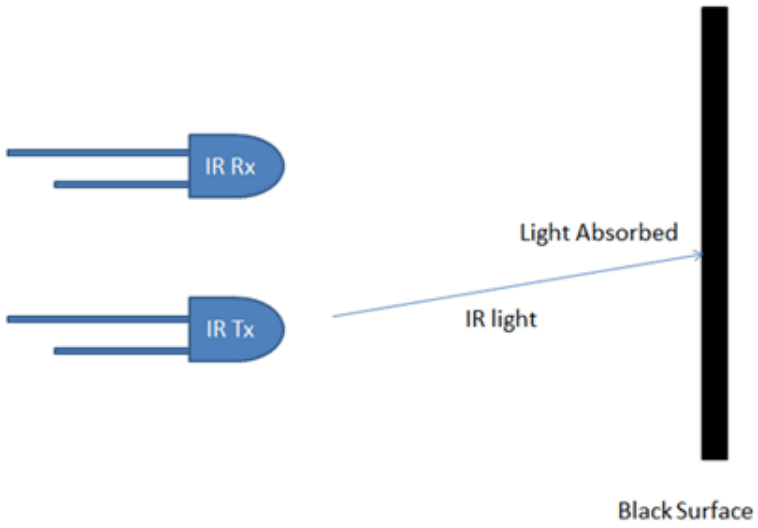

FIG 1.2 IR SENSOR WORKING - ABSORBED

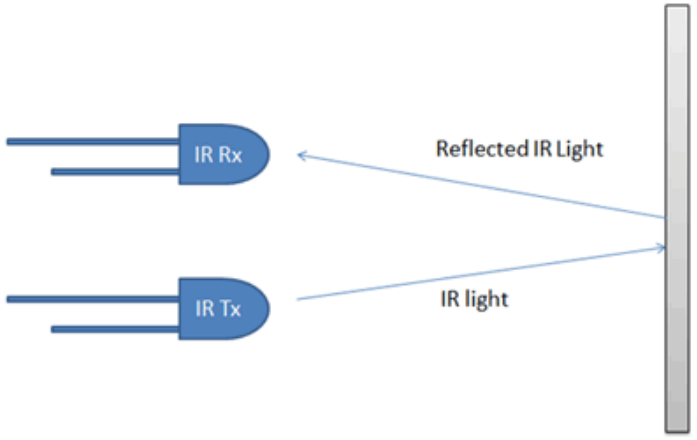

FIG 1.3 IR SENSOR WORKING - REFLECTED

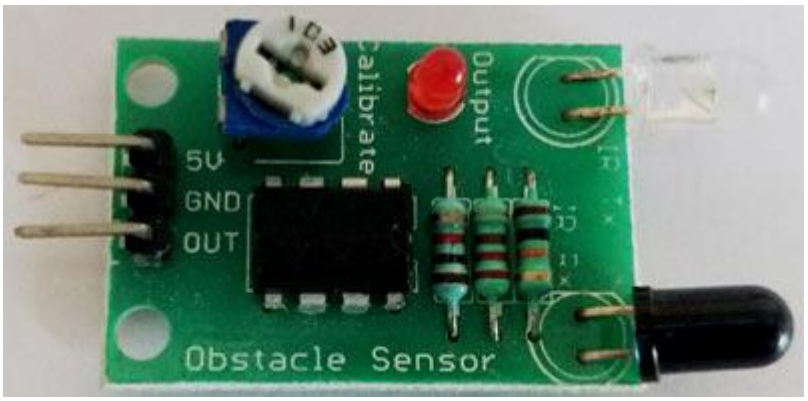

FIG 1.4 OBSTACLE SENSOR

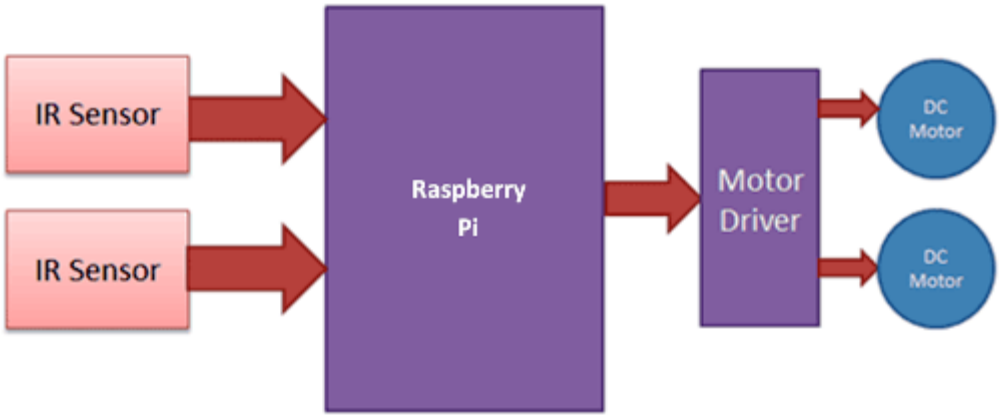

FIG 1.5 MATERIAL ARRANGEMENTS

Now we will use **two IR sensors** to check if the robot is in track with the line and two motors to correct the robot if its moves out of the track. These motors require high current and should be bi-directional; hence we use a motor driver module like L293D. We will also need a Microcontroller

like **PIC** to instruct the motors based on the values from the IR sensor. A simplified block diagram of the same is shown below.

These two IR sensors will be placed one on either side of the line. If none of the sensors are detecting a black line them they PIC microcontroller instructs the motors to move forward as shown below

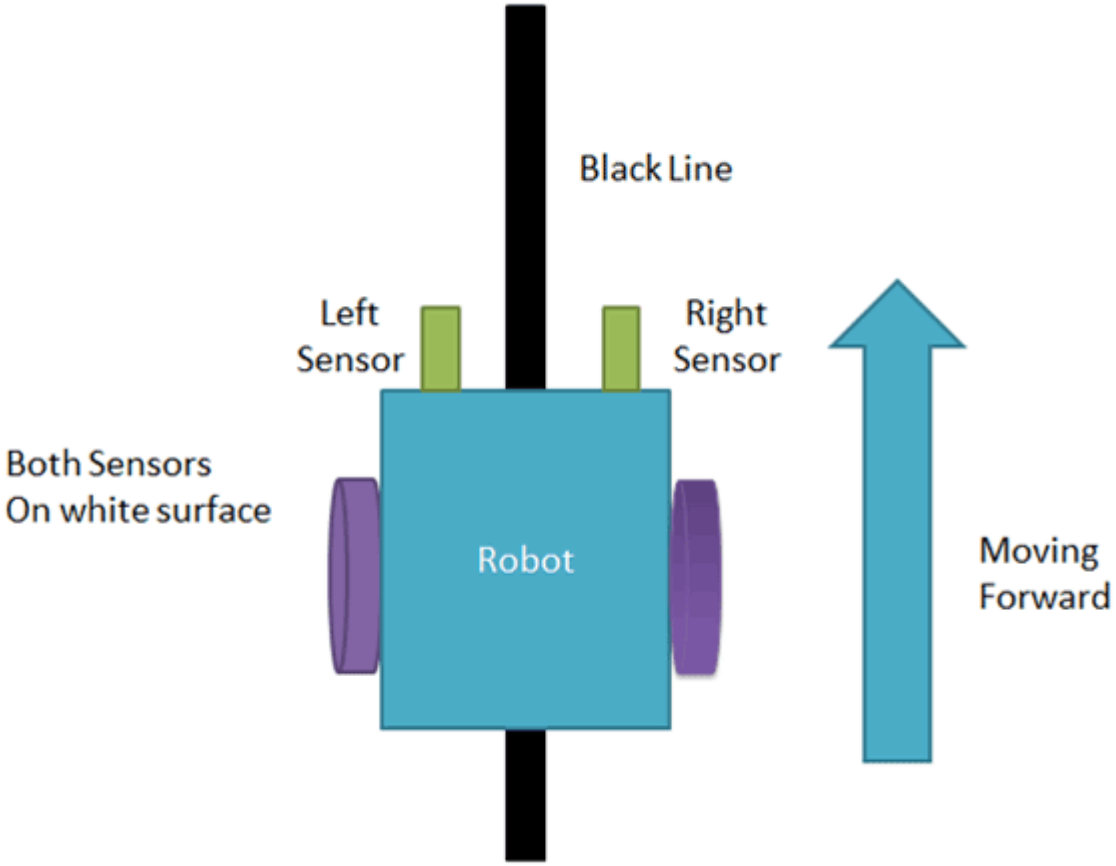

FIG 1.6 MOVING FORWARD

If left sensor comes on black line then the microcontroller instructs the robot to turn left by rotating the right wheel alone.

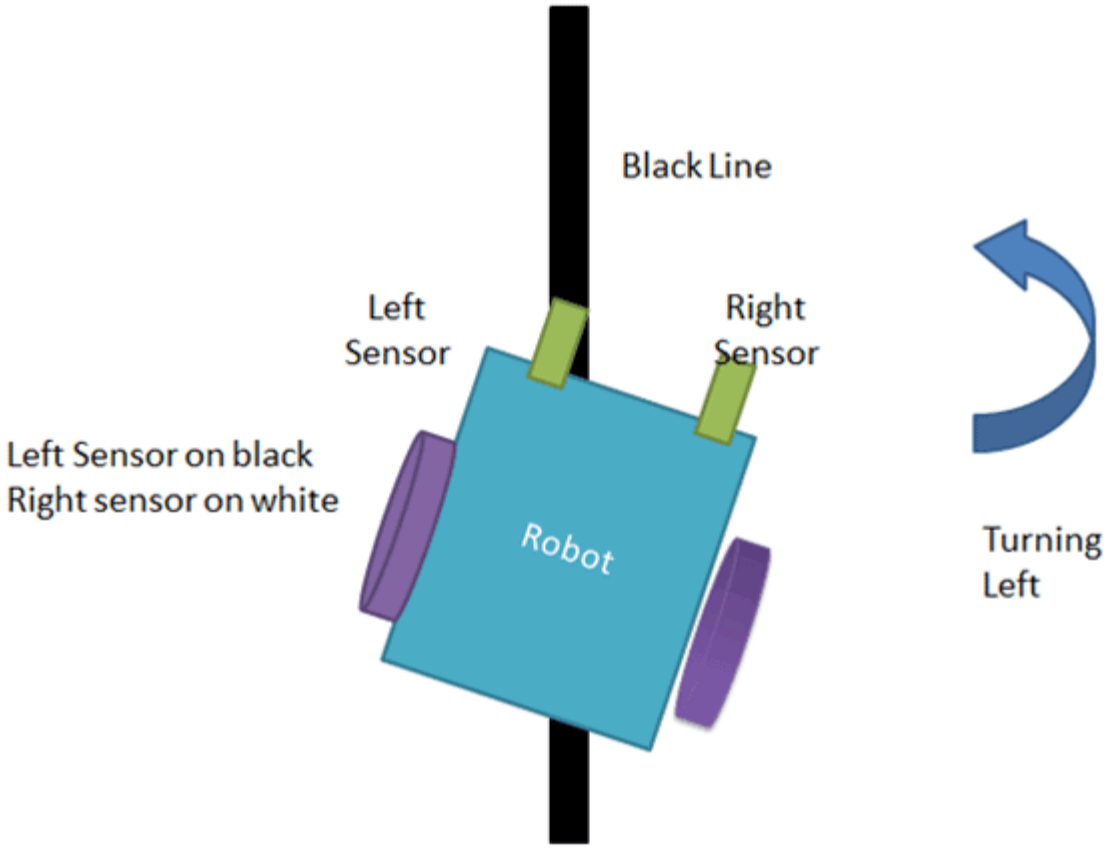

FIG 1.7 TURNING LEFT

If right sensor comes on black line then the microcontroller instructs the robot to turn right by rotating the left wheel alone.

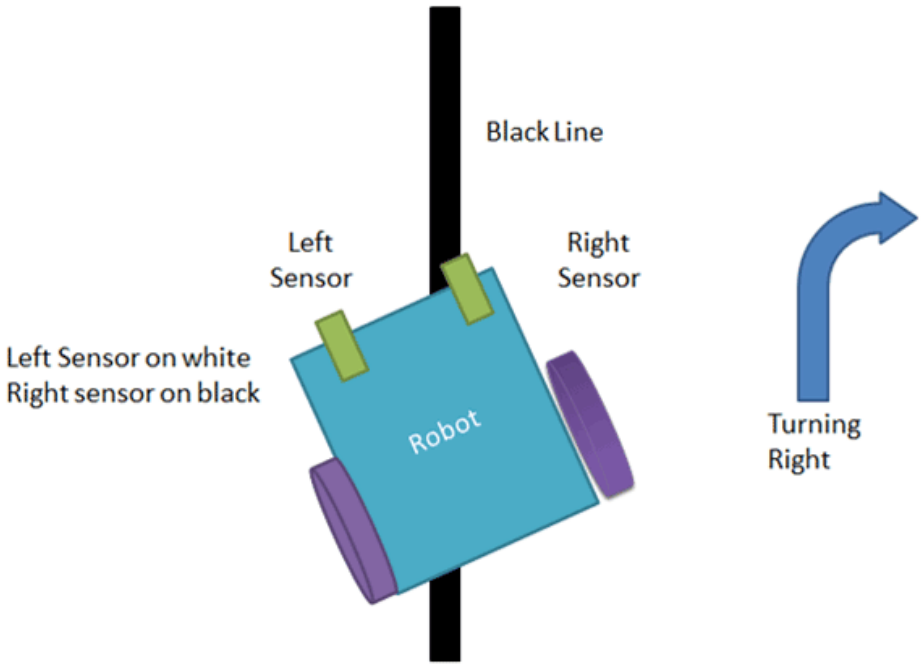

FIG 1.8 TURNING RIGHT

If both sensors comes on black line, robot stops.

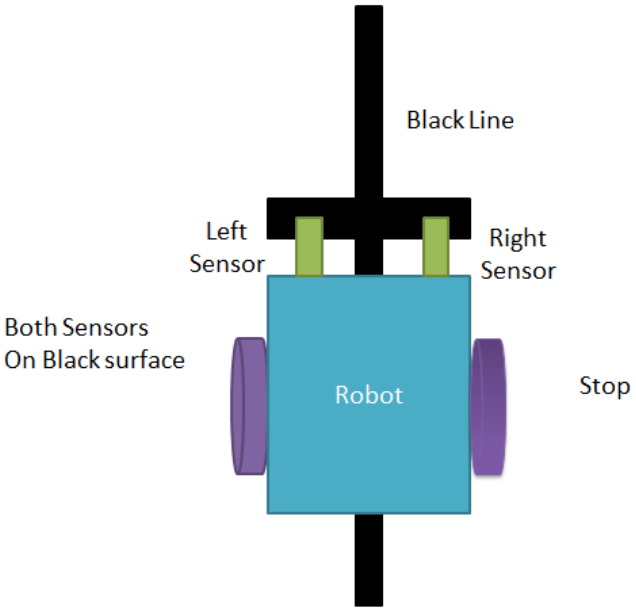

FIG 1.9 STRAIGHT

This way the Robot will be able to follow the line without getting outside the track.

3.1.2 VEHICLE UNIT:

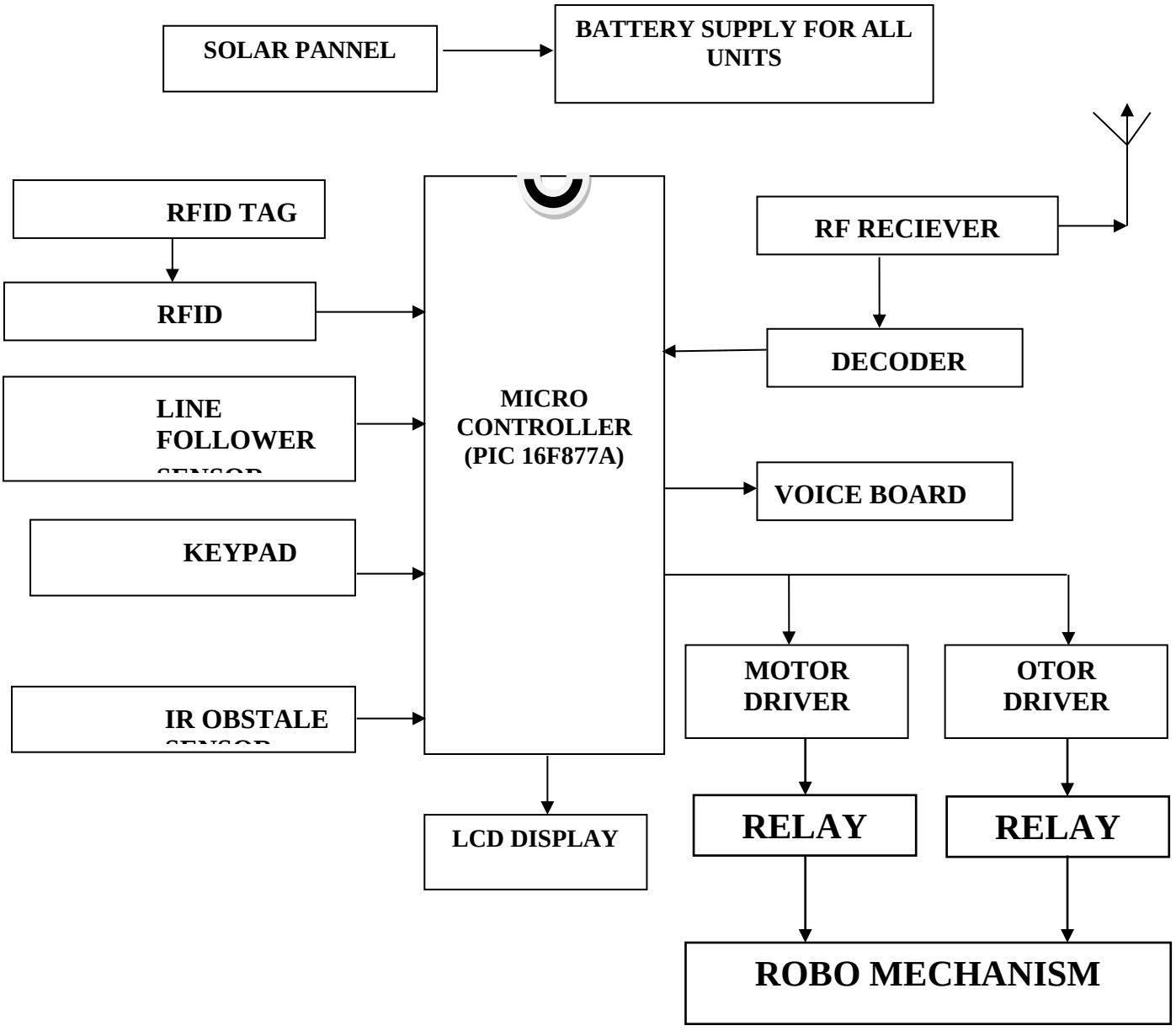

FIG 1.10 VEHICLE UNIT

3.1.3 CONTROL UNIT:

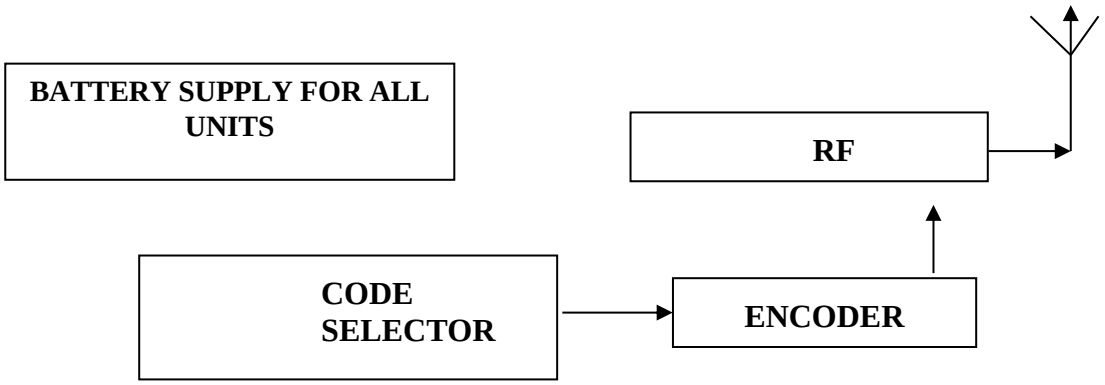

FIG 1.11 CONTROL UNIT

3.1.4 PROPOSED SYSTEM EXPLANATION

- The proposed block diagram consists of micro controller, keypad, Vehicle unit setup, LCD display, IR sensor, RFID module and also voice board.
- Initially the stand alone vehicle module stands in particular place in areas like court, schools, colleges, institution etc. If suppose a person need to move from one place to another place, in such areas where they find difficult themselves to migrate they can use this kind of vehicle for easy navigation.
- Control unit setup will be with the physically challenged people. If they want to move somewhere inside the infrastructure, they want to select their destination using the keys in the control unit.
- The data from the control unit will be sent to the vehicle unit using wireless RF communication technology. Once the data received in the robot unit then the robot will move towards the direction from where the data is received by following the line.
- Once the vehicle reached then the person wants to get into the vehicle and want to select the destination where the vehicle wants to move using the keypad in the vehicle unit. Their selected destination will be displayed in the LCD and also played in the voice board.

- Once the person entered the vehicle they want to show their card that was read by RFID reader in the vehicle unit and press the keypad (In the vehicle module, the available blocks the vehicle can navigate will be displayed for each key of the keypad) the vehicle will start moving in the line according to the key selected by the person.
- A self-controlled is an autonomous robot which is able to follow either a black or white line that is drawn on the surface consisting of a contrasting color. Our vehicle is designed to move automatically and follow the plotted line.
- IR sensor present with vehicle is used to find the object present while it's navigation. On detection of object the vehicle will change its path according to the instruction given in the controller.
- Using our designed vehicle physically challenged people can able to reach their destination without any manual help.

3.2 MATERIALS

3.2.1 LEAD ACID BATTERY

A lead-acid battery is an electrical storage device that uses a reversible chemical reaction to store energy. It uses a combination of lead plates or grids and an electrolyte consisting of a diluted sulphuric acid to convert electrical energy into potential chemical energy and back again. The electrolyte of lead-acid batteries is hazardous to your health and may produce burns and other permanent damage if you come into contact with it.

FIG 1.12 LEAD ACID BATTERY

Lead acid batteries were invented in 1859 by Gaston Planté and first demonstrated to the French Academy of Sciences in 1860. They remainthe technology of choice for automotive SLI (Starting, Lighting and Ignition) applications because they are robust, tolerant to abuse, tried and tested and because of their low cost. The cell voltage is 2 Volts .

DISCHARGE

During discharge, the lead dioxide (positive plate) and lead (negative plate) react with the electrolyte of sulfuric acid to create lead sulfate, water and energy.

CHARGE

During charging, the cycle is reversed: the lead sulfate and water are electro-chemically converted to lead, lead oxide and sulfuric acid by an external electrical charging source.

Many new competitive cell chemistries are being developed to meet the requirements of the auto industry for EV and HEV applications.

Even after 150 years since its invention, improvements are still being made to the lead acid battery and despite its shortcomings and the competition from newer cell chemistries the lead acid battery still retains the lion's share of the high power battery market.

Gassing is the production and release of bubbles of hydrogen and oxygen in the electrolyte during the charging process, particularly due to excessive charging, causing loss of electrolyte. In large battery installations this can cause an explosive atmosphere in the battery room. Sealed batteries are designed to retain and recombine these gases.

Sulphation may occur if a battery is stored for prolonged periods in a completely discharged state or very low state of charge, or if it is never fully charged, or if electrolyte has become abnormally low due to excessive water loss from overcharging and/or evaporation. Sulphation is the increase in internal resistance of the battery due to the formation of large lead sulphate crystals which are not readily reconverted back to lead, lead dioxide and sulphuric acid.

3.2.2 TRANSMITTER

The Transmitter module consists of three pins namely Vcc, Din and ground as shown above. The Vcc pin has a wide range input voltage from 3V to 12V. The transmitter consumes a minimum current of 9mAand can go as high as 40mA during transmission. The center pin is thedata pin to transmiter the signal. This signal modulated using the ASK and then sent on air at a frequency of 433MHz

FIG 1.13 TRANSMITTER

3.2.3 RECEIVER

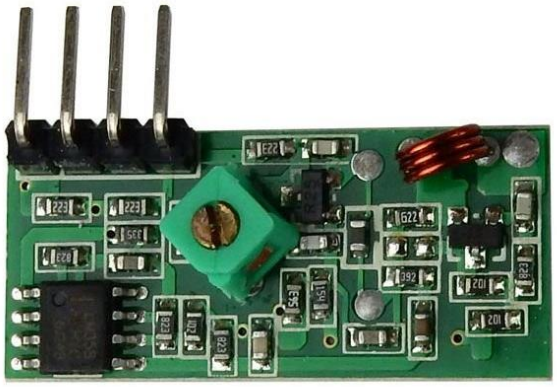

FIG 1.14 RECEIVER

RF receiver module has four pins namely Vcc, Dout, Linear out and Ground as shown above. The Vcc pin should be powered with a regulated 5V supply. The operating current of this module is less than 5.5mA. The pins Dout and Linear out is shorted together to receive the 433Mhz signal from air. This signal is then demodulated to get the data and sent out through the data pin.

3.2.4 IR SENSOR

Infrared radiation (IR) is electromagnetic radiation with a wavelength between 0.7 and 300 micrometers, which equates to a frequency rangebetween approximately 1 and 430 THz. Its wavelength is longer (and the frequency lower) than that of visible light, but the wavelength is shorter (and the frequency higher) than thatof terahertz radiation microwaves. Bright sunlight provides an irradiance of about 1 kilowatt per square meter at sea level. Of this energy, 527 watts is infrared light, 445 watts is visible light, and 32 watts is ultraviolet light.

FIG 1.15 IR SENSOR

3.2.5 RFID READER

An RFID reader is a device that is used to interrogate an RFID tag. Thereader has an antenna that emits radio waves; the tag responds by sending back its data. The frequency used for identification, the antenna gain, the orientation and polarization of the reader antenna and the transponder antenna, as well as the placement of the tag on the object to be identified will all have an impact on the RFID system's read range.

3.2.6 RFID TAG

An RFID tag is a microchip combined with an antenna in a compact package; the packaging is structured to allow the RFID tag to be attached to an object to be tracked. "RFID" stands for Radio Frequency Identification. The tag's antenna picks up signals from an RFID reader or scanner and then returns the signal, usually with some additional data (like a unique serial number or other customized information). RFID tags can be very small - the size of a large rice grain.

FIG 1.16 RFID TAG & MODULE

3.2.7 DRIVER & RELAYS

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw (changeover) switch contacts as shown in the diagram.
Relays allow one circuit to switch a second circuit which can be completely separate from the first.

The relay's switch connections are usually labeled COM, NC and NO:
COM = Common, always connect to this, it is the moving part of the switch.
NC = Normally Closed, COM is connected to this when the relay coil is off.
NO = Normally Open, COM is connected to this when the relay coil is on.
Connect to COM and NO if you want the switched circuit to be on when the relay coil is on.
Connect to COM and NC if you want the switched circuit to be on when the relay coil is off.

FIG 1.17 RELAY

3.2.8 LCD DISPLAY

Liquid crystal cell displays (LCDs) are used in similar applications where LEDs are used. These applications are display of display of numeric and alphanumeric characters in dot matrix and segmental displays.
LCDs are of two types:

I. Dynamic scattering type
II. Field effect type

LCD or Liquid Crystal Display is a flat electronic display which is very commonly used in digital watches, calculators, laptops, televisions etc. It make use of light modulating properties of liquid crystal and polarization of light for its operation. Low power consumption, less thickness and less weight of LCD enables its use in battery powered and portable applications.

FIG 1.18 LCD

3.2.9 SOLAR PANEL

Solar panels are those devices which are used to absorb the sun's rays and convert them into electricity or heat. A solar panel is actually a collection of solar (or photovoltaic) cells, which can be used to generate electricity through photovoltaic effect. A photovoltaic (PV) module is a packaged and connected assembly of 6×10 solar cells. solar panels are used in wide-ranging electronic equipments like calculators, which work as long as sunlight is available.

FIG 1.19 SOLAR PANEL

3.2.10 PIC 16877A

Various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in PIC 16877 is flash technology, so that data is retained even when the power is switched off. Easy programming and erasing are other features of PIC 16F877. PIC16F877A microcontroller is used in the project.

FIG 1.20 PIC16F877A

3.2.10.1 Pin Description:

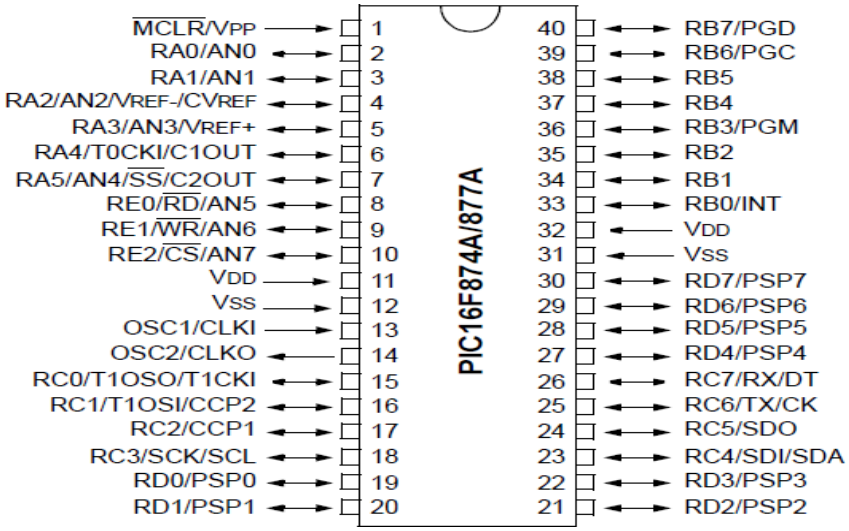

FIG 1.21 PIC16F877A PINS

PIN 1: MCLR

The first pin is the master clear pin of this IC. It resets the microcontroller and is active low, meaning that it should constantly be given a voltage of 5V <1mA typical standby current.

PIN 2: RA0/AN0

PORTA consists of 6 pins, from pin 2 to pin 7, all of these are bidirectional input/output pins. Pin 2 is the first pin of this port. This pin can also be used as an analog pin AN0. It is built in analog to digital converter.

PIN 3: RA1/AN1

This can be the analog input 1.

PIN 4: RA2/AN2/Vref-

It can also act as the analog input2. Or negative analog reference voltage can be given to it.

PIN 5: RA3/AN3/Vref+

It can act as the analog input 3. Or can act as the analog positive reference voltage.

PIN 6: RA0/T0CKI

To timer0 this pin can act as the clock input pin, the type of output is open drain.

PIN 7: RA5/SS/AN4

This can be the analog input 4. There is synchronous serial port in the controller also and this pin can be used as the slave select for that port.

PIN 8: RE0/RD/AN5

PORTE starts from pin 8 to pin 10 and this is also a bidirectional input output port. It can be the analog input 5 or for parallel slave port it can act as a ‘read control’ pin which will be active low.

PIN 9: RE1/WR/AN6

It can be the analog input 6. And for the parallel slave port it can act as the ‘write control’ which will be active low.

PIN 10: RE2/CS/A7

It can be the analog input 7, or for the parallel slave port it can act as the ‘control select’ which will also be active low just like read and write control pins.

PIN 11 and 32: VDD

These two pins are the positive supply for the input/output and logic pins. Both of them should be connected to 5V.

PIN 12 and 31: VSS

These pins are the ground reference for input/output and logic pins. They should be connected to 0 potential.

PIN 13: OSC1/CLKIN

This is the oscillator input or the external clock input pin.

PIN 14: OSC2/CLKOUT

This is the oscillator output pin. A crystal resonator is connected between pin 13 and 14 to provide external clock to the microcontroller. ¼ of the frequency of OSC1 is outputted by OSC2 in case of RC mode. This indicates the instruction cycle rate.

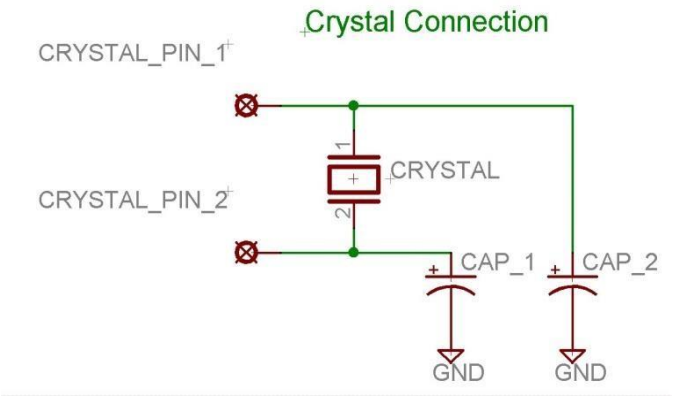

Fig 1.22 Crystal resonater

PIN 15: RC0/T1OCO/T1CKI

PORTC consists of 8 pins. It is also a bidirectional input output port.

PIN 16: RC1/T1OSI/CCP2

It can be the oscillator input of timer 1 or the capture 2 input/compare 2 output/ PWM 2 output.

PIN 17: RC2/CCP1

It can be the capture 1 input/ compare 1 output/ PWM 1 output.

PIN 18: RC3/SCK/SCL

It can be the output for SPI or I2C modes and can be the input/output for synchronous serial clock.

PIN 23: RC4/SDI/SDA

It can be the SPI data in pin. Or in I2C mode it can be data input/output

pin.

PIN 24: RC5/SDO

It can be the data out of SPI in the SPI mode.

PIN 25: RC6/TX/CK

It can be the synchronous clock or USART Asynchronous transmit pin.

PIN 26: RC7/RX/DT

It can be the synchronous data pin or the USART receive pin.

PIN 19,20,21,22,27,28,29,30

All of these pins belong to PORTD which is again a bidirectional input and output port. When the microprocessor bus is to be interfaced, it can act as the parallel slave port.

PIN 33-40: PORT B

All these pins belong to PORTB. Out of which RB0 can be used as the external interrupt pin and RB6 and RB7 can be used as in-circuit debugger pins.

- Data Memory
- Data EEPROM

3.2.11 433 MHz RF Transmitter

It is an ideal for remote control applications where low cost and longer range is required. The transmitter operates from a 1.5-12V supply, making it ideal for battery-powered applications.

3.2.11.1 PIN DIAGRAM:

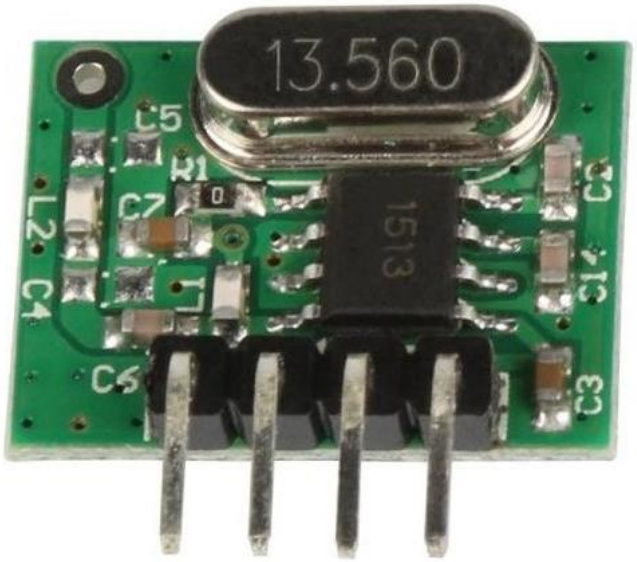

FIG 1.23 RF TRANSMITTER PIN

3.2.11.2 PINS

ANT

50 ohm antenna output. The antenna port impedance affects output power and harmonic emissions. An L-C low-pass filter may be needed to sufficiently filter harmonic emissions. Antenna can be single core wire of approximately 17cm length or PCB trace antenna.

VCC

Operating voltage for the transmitter. VCC should be bypassed with a .01uF ceramic capacitor and filtered with a 4.7uF tantalum capacitor.

Noise on the power supply will degrade transmitter noise performance.

DATA

Digital data input. This input is CMOS compatible and should be driven with CMOS level inputs.

GND

Transmitter ground. Connect to ground plane.

Operation

OOK (On off Keying) modulation is a binary form of amplitude modulation. When a logical 0 (data line low) is being sent, the transmitter is off, fully suppressing the carrier. In this state, the transmitter current is very low, less than 1mA. When a logical 1 is being sent, the carrier is fully on. In this state, the module current consumption is at its highest, about 11mA with a 3V power supply.

On-off keying (OOK) is a type of modulation that represents digital data as the presence or absence of a carrier wave. In its simplest form, the presence of a carrier for a specific duration represents a binary one, while its absence for the same duration represents a binary zero. Some more sophisticated schemes vary these durations to convey additional information.

OOK is the modulation method of choice for remote control applications where power consumption and cost are the primary factors. Because OOK transmitters draw no power when they transmit

a 0, they exhibit significantly better power consumption than FSK transmitters.

OOK data rate is limited by the start-up time of the oscillator. High-Q oscillators which have very stable center frequencies take longer to start-up than low-Q oscillators. The start-up time of the oscillatordetermines the maximum data rate that the transmitter can send.

Data Rate

The oscillator start-up time is on the order of 40uSec, which limits the maximum data rate to 4.8 Kbit/sec

Features

433.92 MHz Frequency

- Low Cost
- 1.5-12V operation
- 11mA current consumption at 3V
- Small size
- 4 dBm output power at 3V

Applications

Remote Keyless Entry (RKE)

- Remote Lighting Controls

start-up than low-Q oscillators. The start-up time of the oscillator determines the maximum data rate that the transmitter can send.

Data Rate

The oscillator start-up time is on the order of 40uSec, which limits the maximum data rate to 4.8 Kbit/sec

SAW stabilized oscillator

The transmitter is basically a negative resistance LC oscillator whose center frequency is tightly controlled by a SAW resonator. SAW (Surface Acoustic Wave) resonators are fundamental frequency devices that resonate at frequencies much higher than crystals.

Features

433.92 MHz Frequency

- Low Cost
- 1.5-12V operation
- 11mA current consumption at 3V
- Small size
- 4 dBm output power at 3V

Applications

Remote Keyless Entry (RKE)

- Remote Lighting Controls
- On-Site Paging
- Asset Tracking

- Wireless Alarm and Security Systems
- Long Range RFID
- Automated Resource Management

3.2.12 433 MHz RF Receiver

It is an ideal for short-range remote control applications where cost is a primary concern. The receiver module requires no external RF components except for the antenna. It generates virtually no emissions, making FCC and ETSI approvals easy. The super-regenerative design exhibits exceptional sensitivity at a very low cost.

3.2.12.1 PIN DIAGRAM

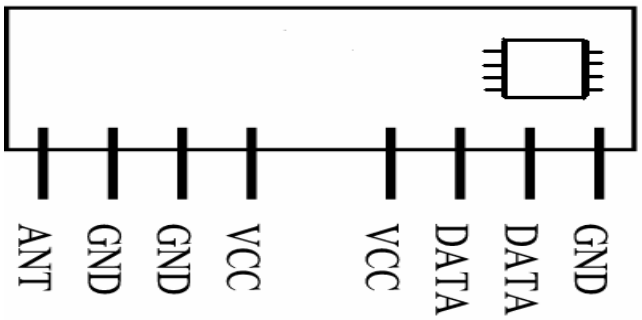

FIG 1.24 RF RECEIVER

3.2.12.2 PINS

ANT

Antenna input.

GND

Receiver Ground. Connect to ground plane.

VCC (5V)

VCC pins are electrically connected and provide operating voltage for the Receiver. VCC can be applied to either or both. VCC should be bypassed with a .1μF ceramic capacitor. Noise on the power supply will degrade receiver sensitivity.

DATA

Digital data output. This output is capable of driving one TTL or CMOS load. It is a CMOS compatible output.

Operation

Super-Regenerative AM Detection

The RF Receiver module uses a super-regenerative AM detector to demodulate the incoming AM carrier. A super regenerative detector is a gain stage with positive feedback greater than unity so that it oscillates. An RC-time constant is included in the gain stage so that when the gain stage oscillates, the gain will be lowered over time proportional to the RC time constant until the oscillation eventually dies. When the oscillation dies, the current draw of the gain stage decreases, charging the RC circuit, increasing the gain, and ultimately the oscillation starts again. In this way, the oscillation of the gain stage is turned on and off at a rate set by the RC time constant. This rate is chosen to be super-audible but much lower than the main oscillation rate. Detection is accomplished by measuring the emitter current of the gain stage. Any RF input signal at the frequency of the main oscillation will aid the main oscillation in restarting. If the amplitude of the RF

input increases, the main oscillation will stay on for a longer period of time, and the emitter current will be higher. Therefore, we can detect the original base-band signal by simply low-pass filtering the emitter current. The average emitter current is not very linear as a function of the RF input level. It exhibits a 1/ln response because of the exponentially rising nature of oscillator start-up. The steep slope of a logarithm near zero results in high sensitivity to small input signals.

Data Slicer

The data slicer converts the base-band analog signal from the super-regenerative detector to a CMOS/TTL compatible output. Because the data slicer is AC coupled to the audio output, there is a minimum data rate. AC coupling also limits the minimum and maximum pulse width. Typically, data is encoded on the transmit side using pulse-width modulation (PWM) or non-return-to-zero (NRZ).

The most common source for NRZ data is from a UART embedded in a micro-controller. Applications that use NRZ data encoding typically involve microcontrollers. The most common source for PWM data is from a remote control IC such as the HC-12E.

Data is sent as a constant rate square-wave. The duty cycle of that square wave will generally be either 33% (a zero) or 66% (a one). The data slicer on the STR-433 is optimized for use with PWM encoded data, though it will work with NRZ data if certain encoding rules are followed

Power Supply

The STR-433 is designed to operate from a 5V power supply. It is crucial that this power supply be very quiet. The power supply should be bypassed using a 0.1uF low-ESR ceramic capacitor and a 4.7uF tantalum capacitor. These capacitors should be placed as close to the power pins as possible. The STR- 433 is designed for continuous duty operation. From the time power is applied, it can take up to 750mSec for the data output to become valid.

Antenna Input

It will support most antenna types, including printed antennas integrated directly onto the PCB and simple single core wire of about 17cm. The performance of the different antennas varies. Any time a trace is longer than 1/8th the wavelength of the frequency it is carrying, it should be a 50 ohm microstrip.

Features

- Low Cost
- 5V operation
- 3.5mA current drain
- No External Parts are required
- Receiver Frequency: 433.92 MHZ
- Typical sensitivity: -105dBm
- IF Frequency: 1MHz

Applications

- Sensor reporting
- Automation system
- Remote Keyless Entry (RKE)
- Remote Lighting Controls
- On-Site Paging
- Asset Tracking
- Wireless Alarm and Security Systems
- Long Range RFID
- Automated Resource Management

Design 1: Low range, Always ON

As the name implies, the sensor is always ON, meaning that the IR led is constantly emitting light. This design of the circuit is suitable for **counting objects**, or **counting revolutions** of a rotating object, that may be of the order of 15,000 rpm or much more. However this design is more power consuming and is not optimized for high ranges. in this design, range can be from 1 to 10 cm, depending on the ambient light conditions.

Dectect using an Op-Amp (operational Amplifier **LM358**). You will have to adjust the variable resistor (POT.) R8 so the voltage at the positive input of the Op-Amp (pin No. 5) would be somewhere near 1.6 Volt. if you understand the functioning of Op-Amps, you will notice that the output will go High when the volt at the cathode of D1 drops under 1.6. So the output will be High when IR light is detected.

3.2.13 DC GEAR MOTOR:

A gear motor is an all-in-one combination of a motor and gearbox. The addition of a gear head to a motor reduces the speed while increasing the torque output. The most important parameters in regards to gear motors are speed (rpm), torque (lb-in) and efficiency (%). In order to select the most suitable gear motor for your application you must first compute the load, speed and torque requirements for your application. ISL Products offers a variety of motors to meet all application requirements. Most of our DC motors can be complemented with one of our unique gearheads, providing you with a highly efficient gear motor solution. These motors are simple DC Motors featuring Metal gears for the shaft for obtaining the optimal performance characteristics. They are known as Center Shaft DC Geared Motors because their shaft extends through the center of their gear box assembly.These standard size DC Motors are very easy to use. Also, you don't have to spend a lot of money to control motors with an Arduino or compatible board. TheL298N H-bridge module with onboard voltage regulator motor driver can be used with this motor that has a voltage of between 5 and 35V DC.This DC Motor 60RPM 12Volts can be used in all-terrain robots and a variety of robotic applications. These motors have a 3 mm threaded drill hole in

the middle of the shaft thus making it simple to connect it to the wheels or any other mechanical assembly.Nut and threads on the shaft to easily connect and internally threaded shaft for easily connecting it to the wheels.

1.25 DC GEAR MOTOR

3.2.13.1 WORKING

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

speed of the vehicle but increase its torque is known as gear reduction. This Insight will explore all the minor and major details that make the gear head and hence the working of geared DC motor.

1.26 DC GEAR MOTOR (INSIDE)

SPECIFICATIONS

Gear Material	Metal
Rated Speed (RPM)	60
Operating Voltage (VDC)	12
Rated Torque(kg-cm)	3.6
Stall Torque(Kg-Cm)	15
Load Current Max (mA)	300
No-Load Current (mA)	60
Gearbox Diameter (mm)	38
Motor Diameter(mm)	32
Motor Length (mm)	75
Shaft Diameter (mm)	6
Shaft Length (mm)	21
Weight (gm)	75

CHAPTER – 4

EXPERIMENTAL SETUP AND PROCEDURE

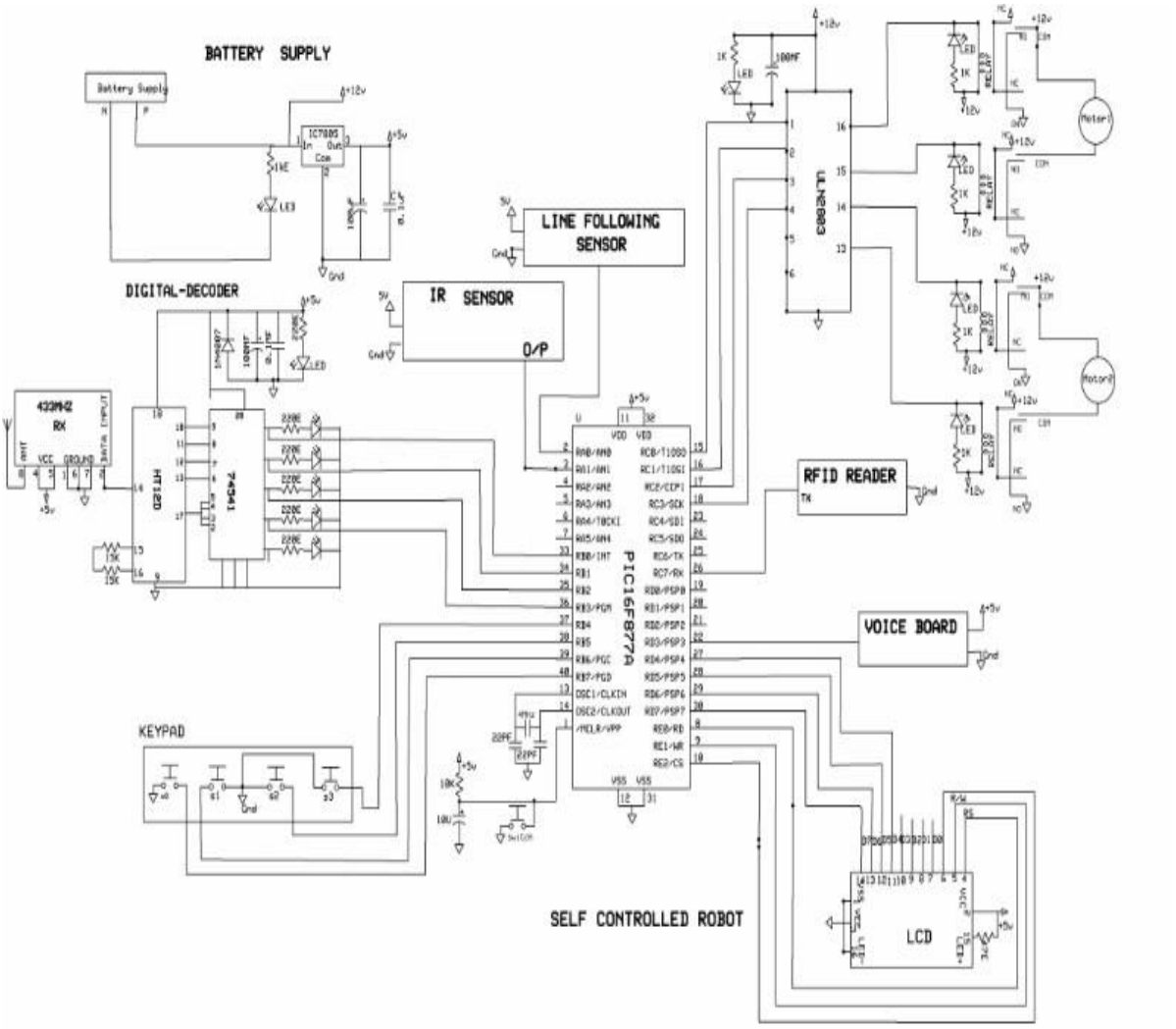

FIG 1.27 CIRCUIT DIAGRAM – VEHICLE UNIT

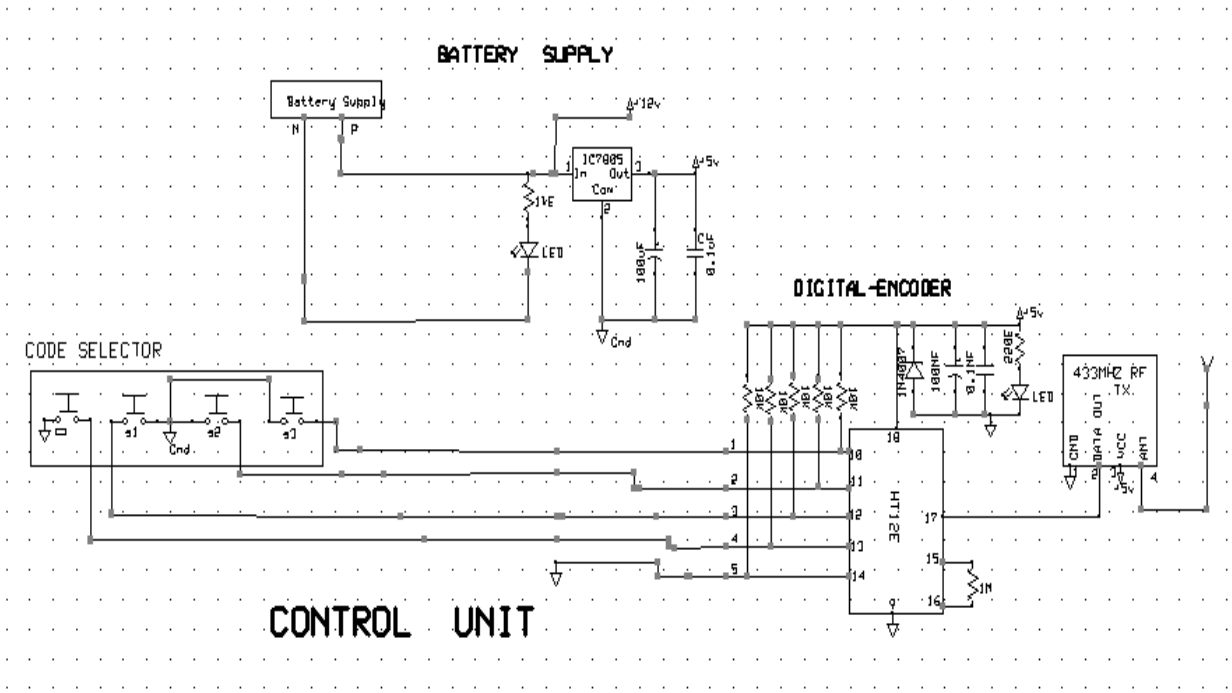

FIG 1.28 CIRCUIT DIAGRAM – CONTROL UNIT

4.1 ALGORITHM

- The proposed block diagram consists of micro controller, keypad, Vehicle unit setup, LCD display, IR sensor, RFID module and also voice board.
- Initially the stand alone vehicle module stands in particular place in areas like court, schools, colleges, institution etc. If suppose a person need to move from one place to another place, in such areas where they find difficult themselves to migrate they can use this kind of vehicle for easy navigation.
- Control unit setup will be with the physically challenged people. If they want to move somewhere inside the infrastructure, they want to select their destination using the keys in the control unit.
- The data from the control unit will be sent to the vehicle unit using wireless RF communication technology. Once the data received in the robot unit then the robot will move towards the direction from where the data is received by following the line.
- Once the vehicle reached then the person wants to get into the vehicle and want to select the destination where the vehicle wants to move using the keypad in the vehicle unit. Their selected destination will be displayed in the LCD and also played in the voice board.
- Once the person entered the vehicle they want to show their card that was read by RFID reader in the vehicle unit and press the keypad (In the vehicle module, the available blocks the vehicle can navigate will be displayed for each key of the keypad) the vehicle will start moving in the line according to the key selected by the person.
- A self-controlled is an autonomous robot which is able to follow either a black or white line that is drawn on the surface consisting of a contrasting colour. Our vehicle is designed to move automatically and follow the plotted line

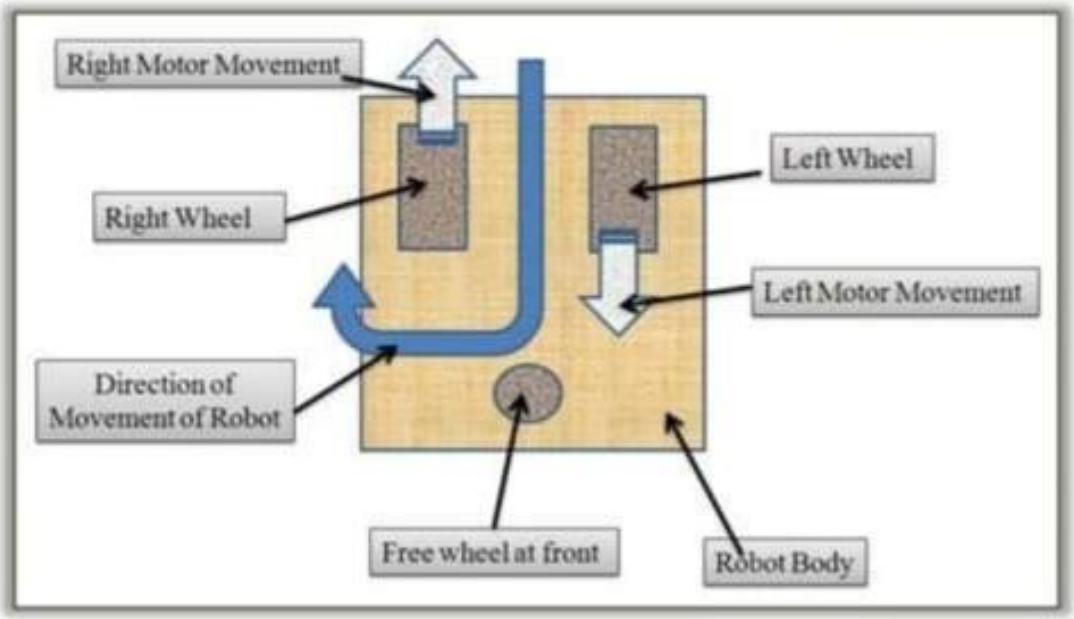

FIG 1.29 FORWARD & REVERSE

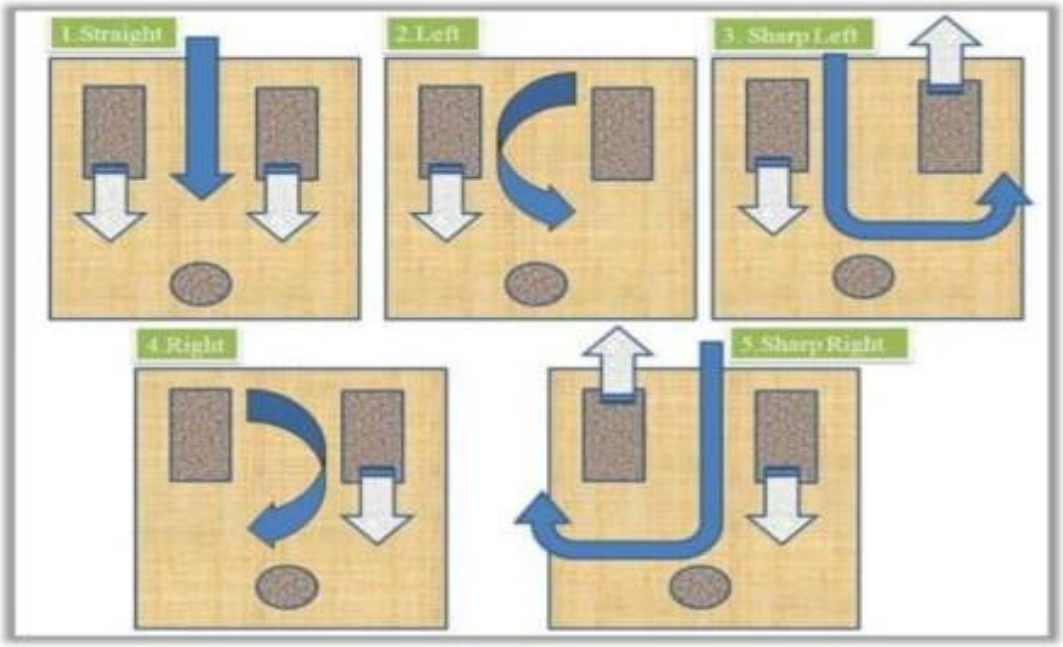

FIG 1.30 TURNING

4.1 FLOWCHART

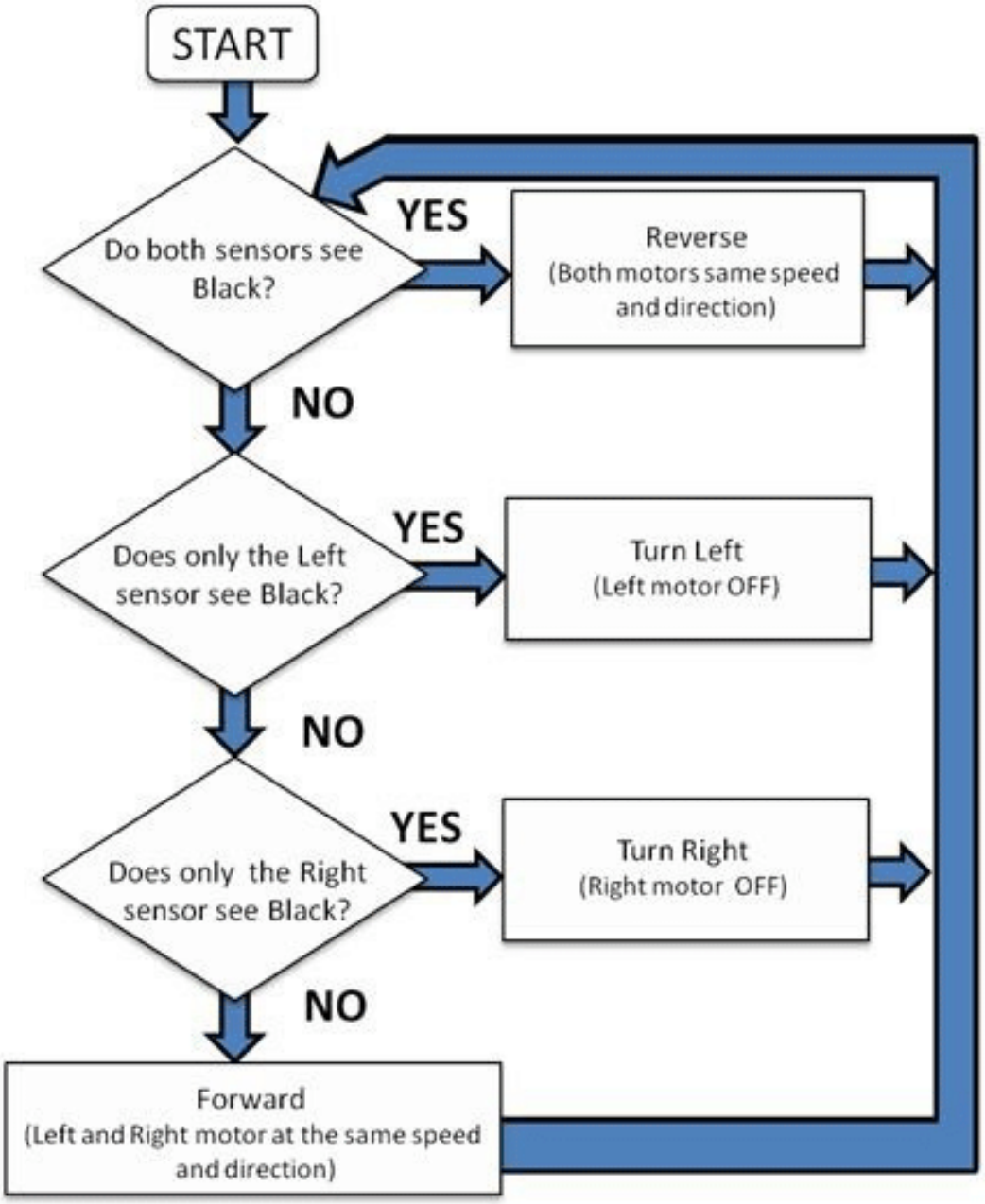

FIG 1.31 FLOWCHART - SIMPLE

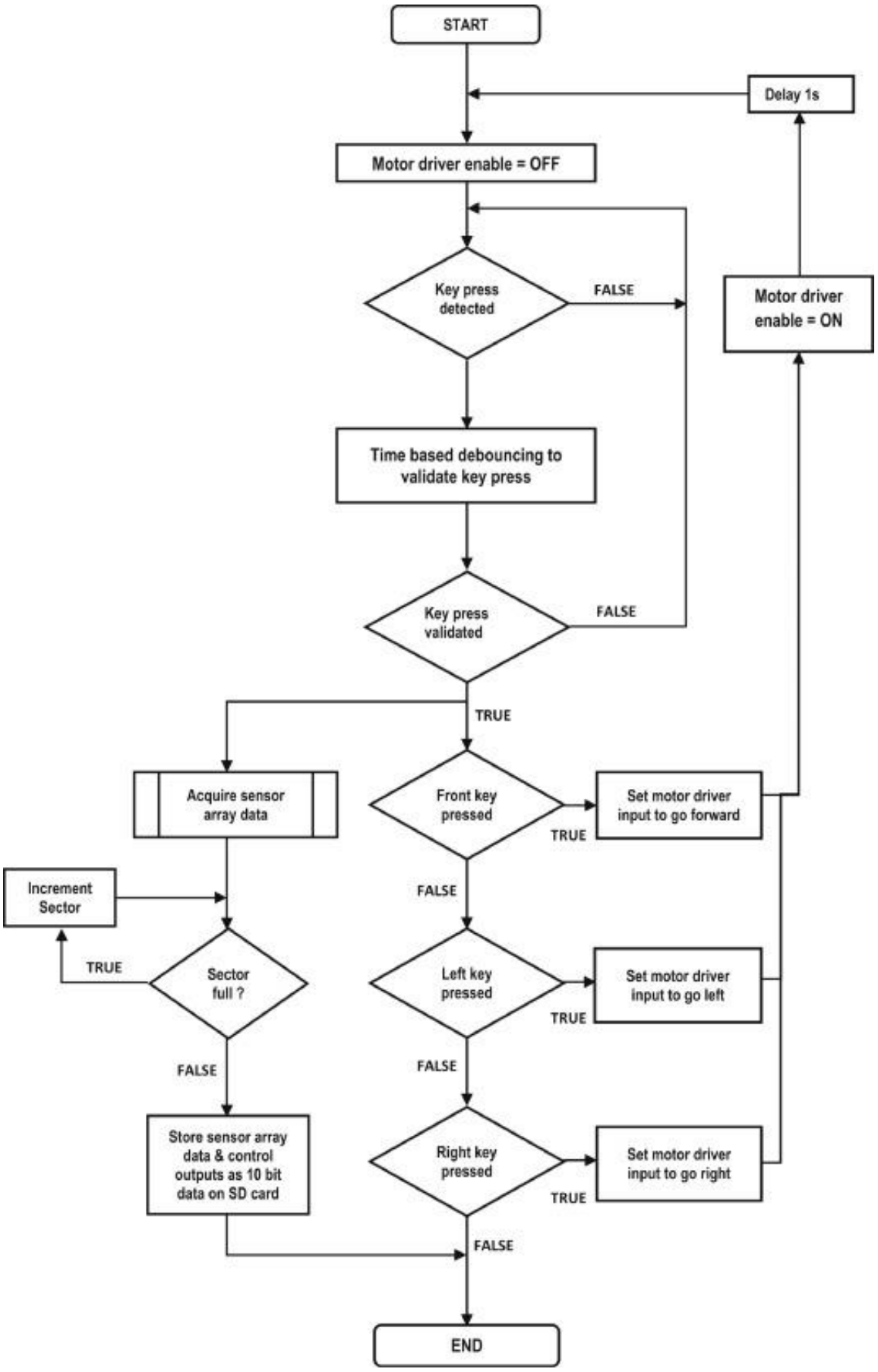

FIG 1.32 FLOWCHART – DETAIL

4.2 SOFTWARE DESCRIPTION

4.2.1 MPLAB IDE

MPLAB is a proprietary freeware integrated development environment for the development of embedded applications on PIC and dsPIC microcontrollers, and is developed by Microchip Technology.

MPLAB X is the latest edition of MPLAB, and is developed on the NetBeans platform .MPLAB and MPLAB X support project management, code editing, debugging and programming of Microchip 8-bit, 16-bit and 32-bit PIC microcontrollers MPLAB is designed to work with MPLAB-certified devices such as the MPLAB ICD 3 and MPLAB REAL ICE, for programming and debugging PIC microcontrollers using a personal computer. PIC KIT programmers are also supported by MPLAB.

MPLAB 8.X is the last version of the legacy MPLAB IDE technology, custom built by Microchip Technology in Microsoft Visual C++. MPLAB supports project management, editing, debugging and programming of Microchip 8-bit, 16-bit and 32-bit PIC Microcontrollers. MPLAB only works on Microsoft Windows. MPLAB is still available from Microchip's archives, but is not recommended for new projects.

MPLAB supports the following compilers:

- MPLAB MPASM Assembler
- MPLAB ASM30 Assembler
- MPLAB C Compiler for PIC18
- MPLAB C Compiler for PIC24 and dsPIC DSCs
- MPLAB C Compiler for PIC32
- HI-TECH C

MPLAB X is the latest version of the MPLAB IDE built by Microchip Technology, and is based on the open-source NetBeans platform. MPLAB X supports editing, debugging and programming of Microchip 8-bit, 16-bit and 32-bit PIC microcontrollers.

FIG 1.33 MPLAB XIDE

MPLAB X is the first version of the IDE to include cross-platform support for Mac OS X and Linux operating systems, in additionto Microsoft Windows.

MPLAB X supports the following compilers:

- MPLAB XC8 — C compiler for 8-bit PIC devices
- MPLAB XC16 — C compiler for 16-bit PIC devices
- MPLAB XC32 — C/C++ compiler for 32-bit PIC devices
- HI-TECH C — C compiler for 8-bit PIC devices
- SDCC — open-source C compiler.

HI-TECH C compiler for PIC10/12/16 MCUs (PRO)

This compiler has been discontinued and is no longer supported. This compiler has been replaced by the MPLAB® XC8 PRO .

HI-TECH C Compiler for PIC10/12/16 MCUs - PRO fully implements the optimizations of Omniscient Code Generation™ - a whole-program compilation technology - to provide denser code and better performance on PIC MCUs. This ANSI C compiler integrates into Microchips MPLAB(R) IDE and is compatible with Microchip debuggers and emulators.

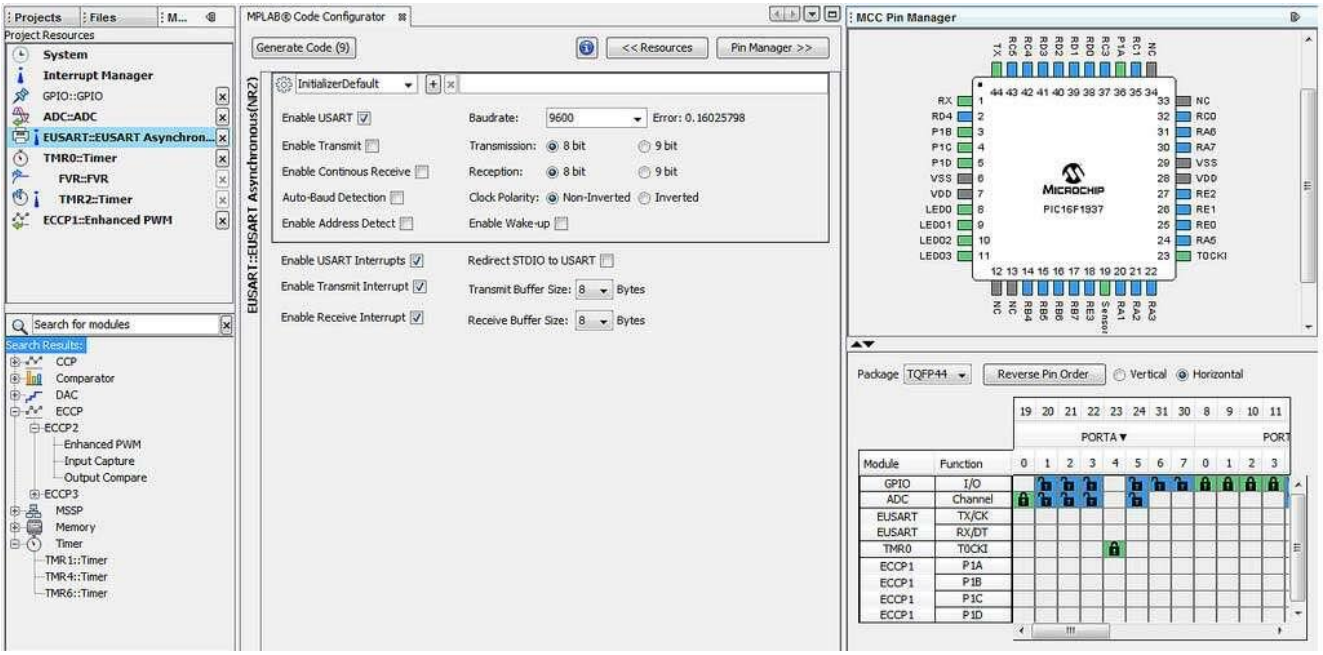

FIG 1.34 MPLAB - PIC MC SQUARE

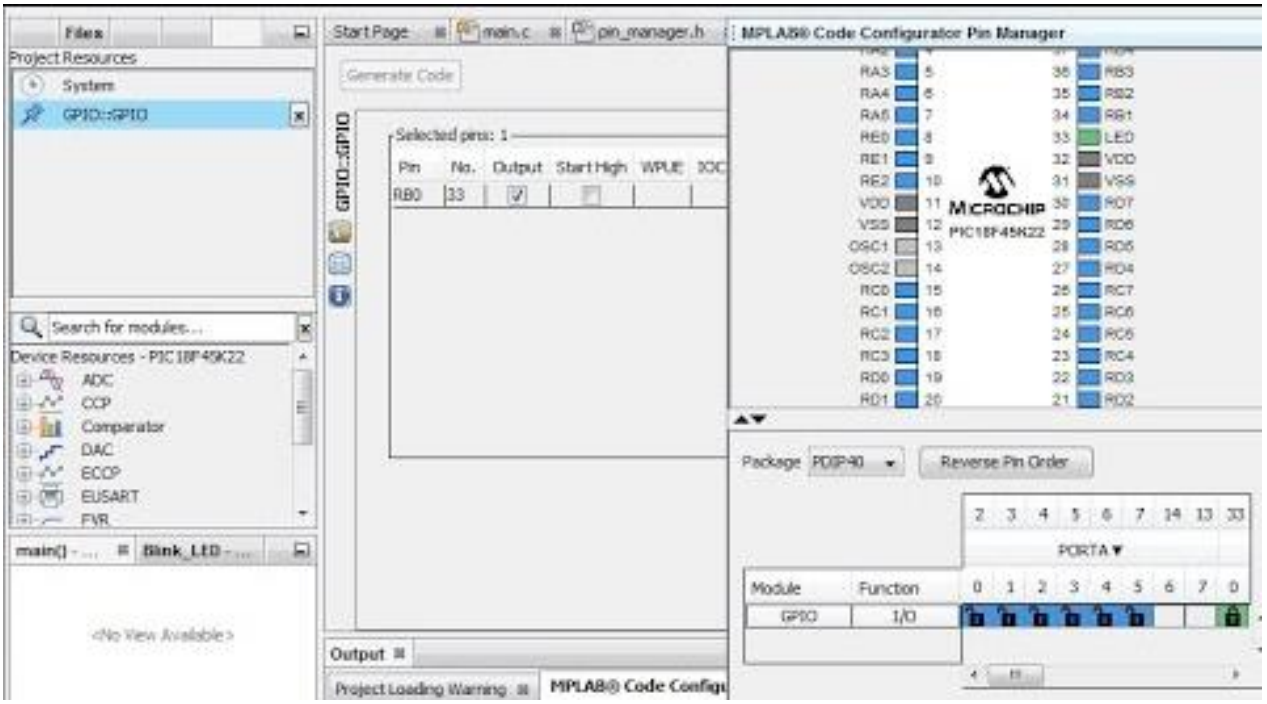

FIG 1.35 MPLAB – PIC MC

CHAPTER 5

RESULTS AND DISCUSSIONS

VEHICLE UNIT

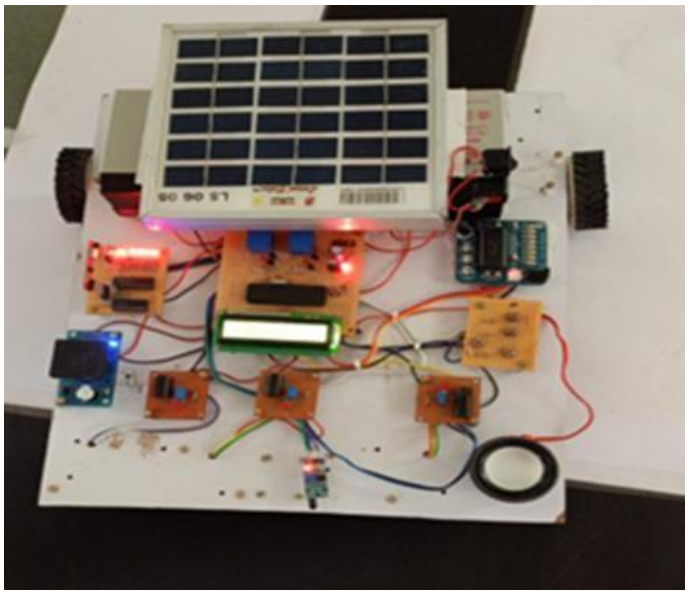

FIG 1.36 VEHICLE UNIT

CONTROL UNIT

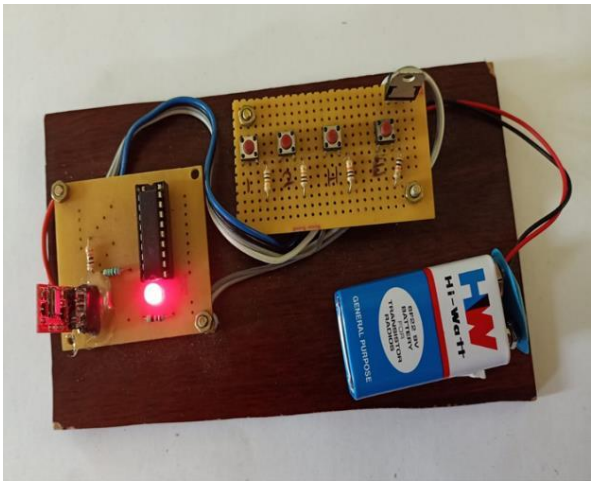

FIG 1.37 CONTROL UNIT

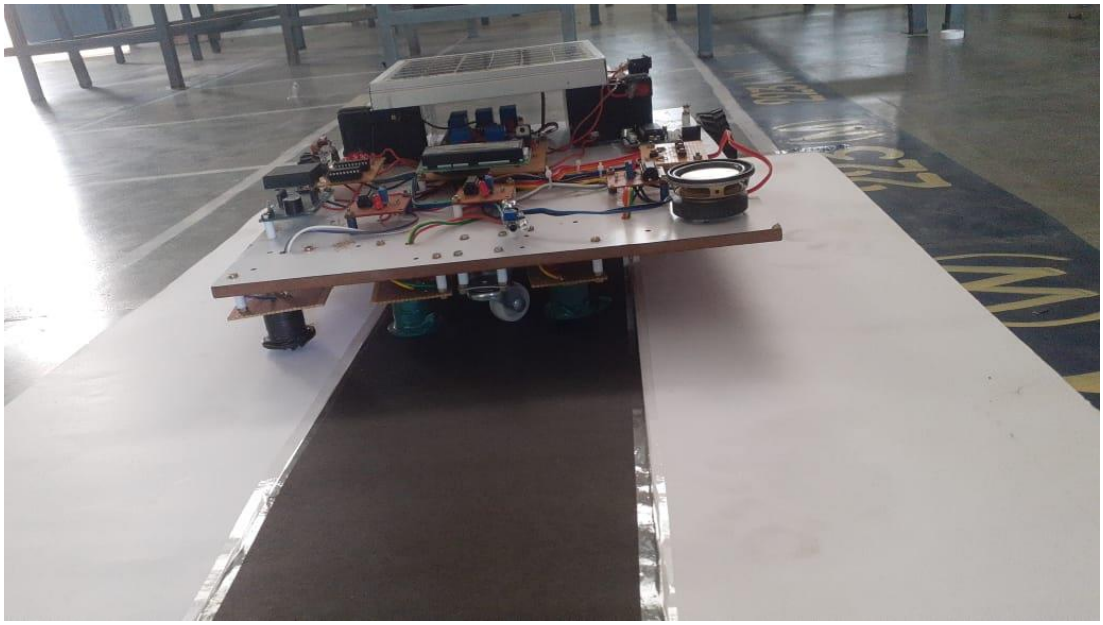

FIG 1.38 LINE FLOW

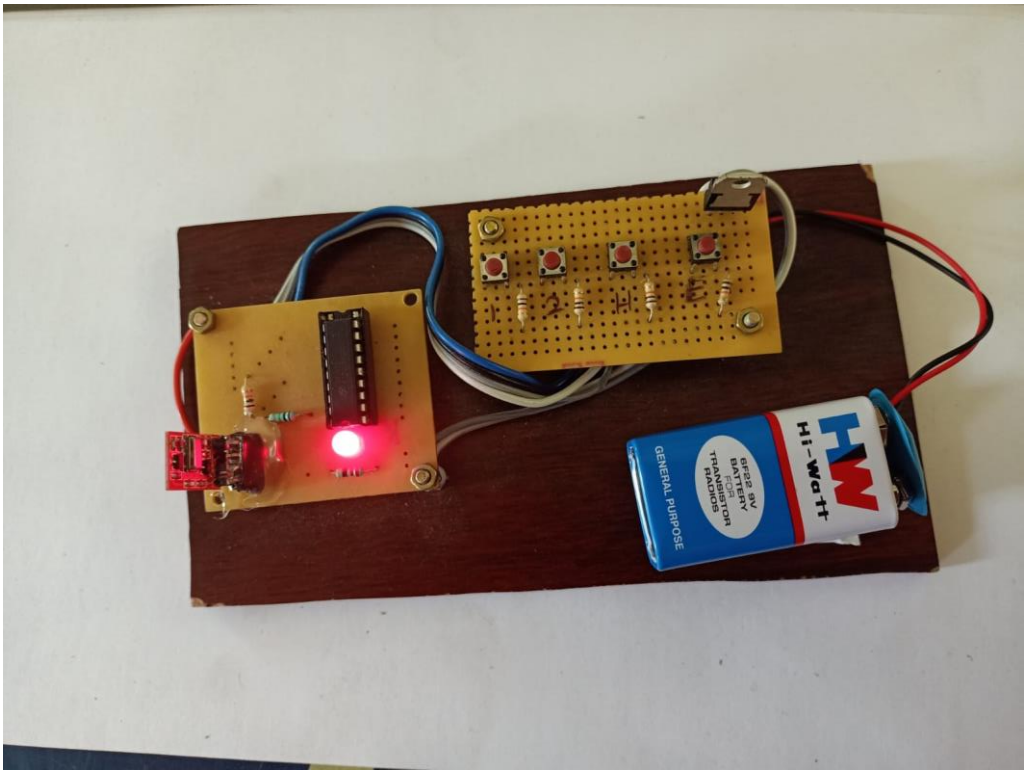

FIG 1.39 CONTROL UNIT (1)

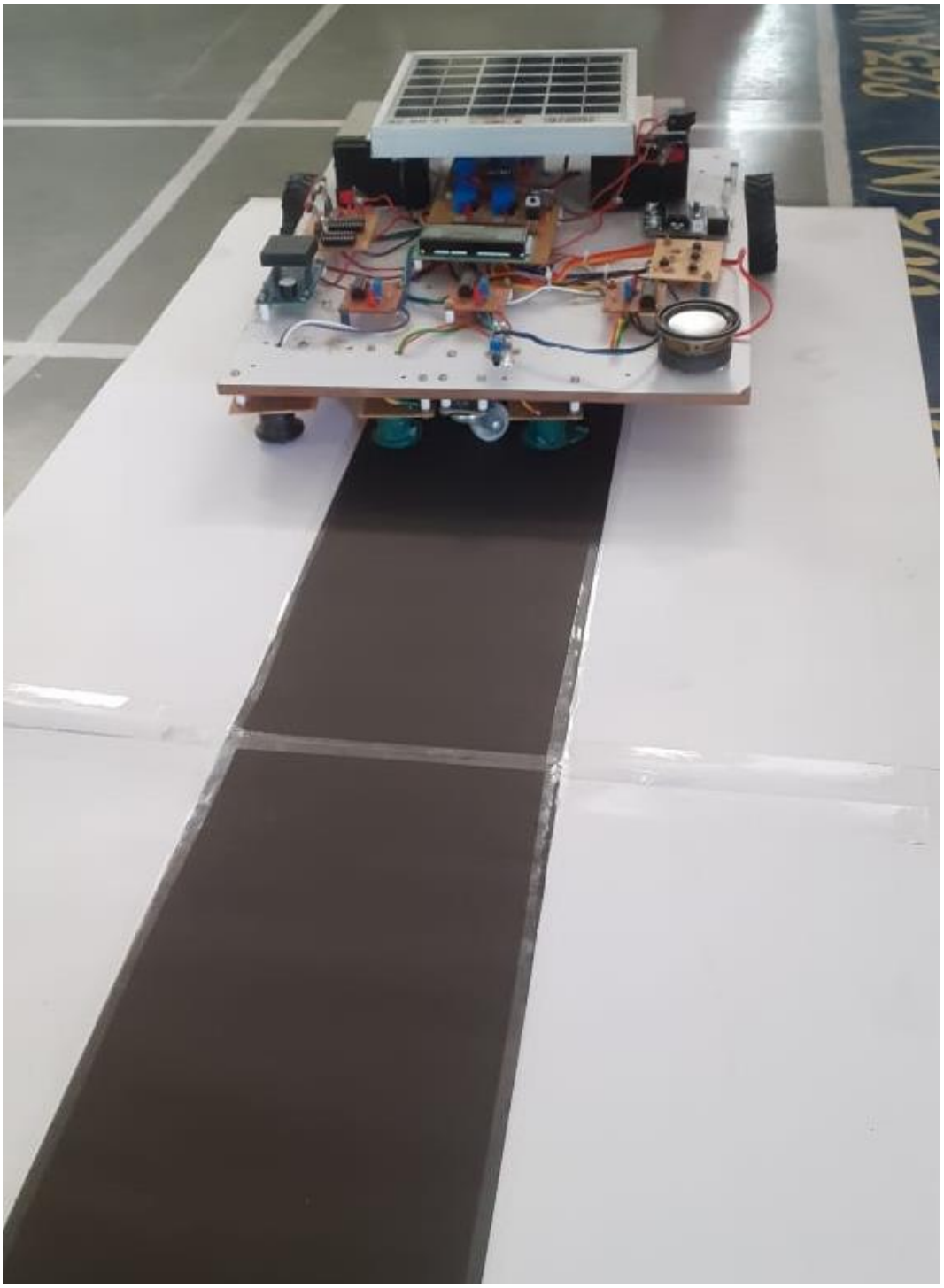

FIG 1.40 RUNNING TIME

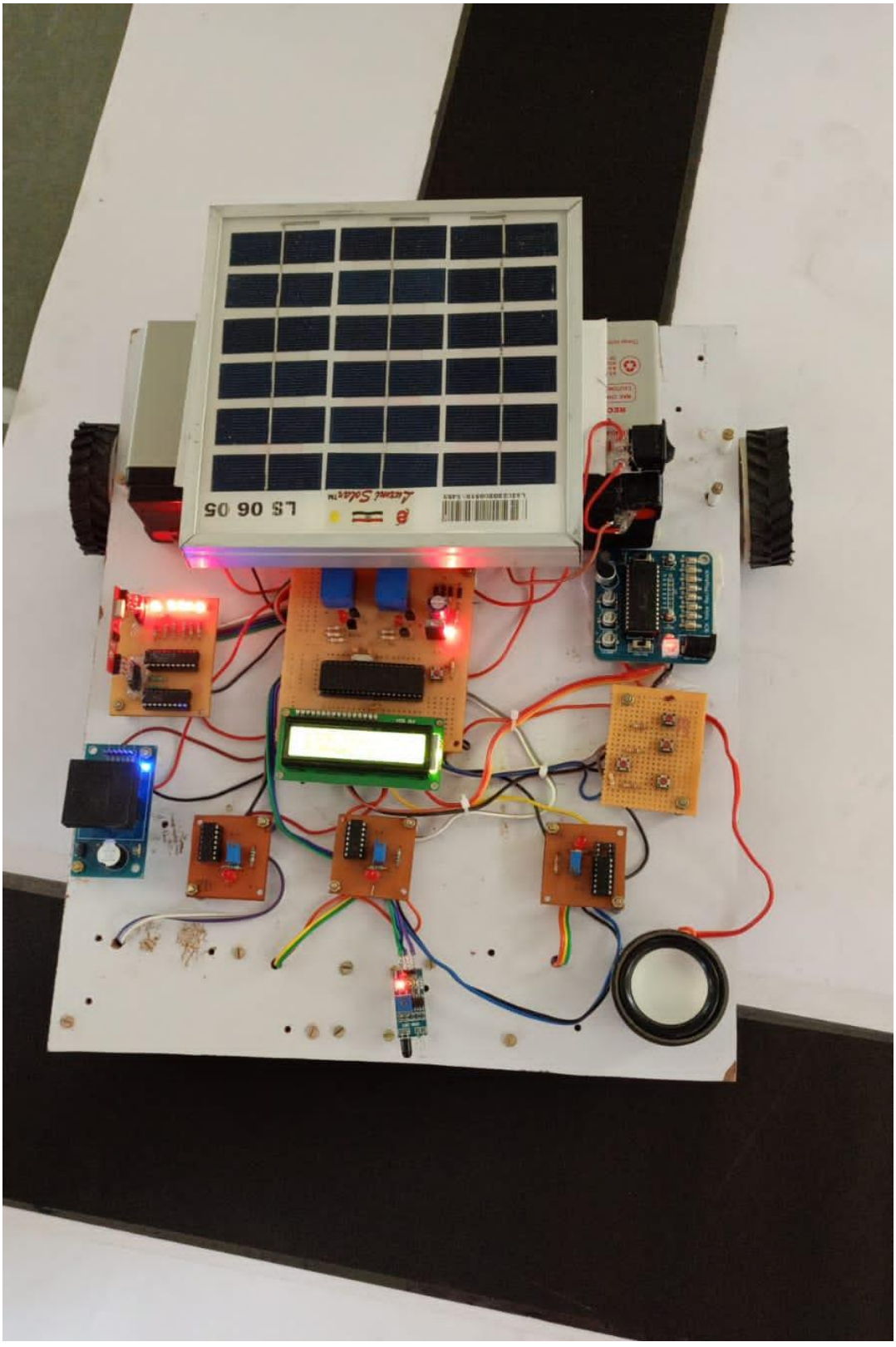

FIG 1.41 TURNING POINT

CHAPTER 6

CONCLUSION

The design and implementation of a RF based Driverless vehicle for disabled people using PIC micro controller and line following mechanism for controlling the motion of a vehicle is designed. Driverless vehicle is designed and connection of the sensor and actuators were given based on the circuit diagram. Unlike traditional design the present method is successful in carrying physically challenged people without meeting any error. The proposed design notonly reduce the manufacture cost compared with present market but also will give great competitive with other types of electrical wheelchair. A system that can directly enhanced the lifestyle of a physically disabled person in the community is implemented. This project has many advantages like safety, comfort, energy saving, full automation etc.

6.1 CODING

SELF CONTROLLED E-VEHICLE FOR DEAF AND DUMB PEOPLE

REFERENCE

1. M. S. Islam & M. A. Rahman, “Design and Fabrication of Line Follower Robot,” Asian Journal of Applied Science and Engineering, Volume 2, No.2, 2013.
2. Sheikh Farhan Jibrail, Rakesh Maharana, PID Control of Line Followers, B.C. thesis, National Institute of Technology, Rourkela, 2013.
3. Tanvir Ahmed, Khandakar Mahbubul Islam, Md. Faiz Ahmed, Rakib Hossain, and Md. Mahbubur Rahman. “Tree Based Localization Model for Line Following Robots-,” International Journal of Multimedia and Ubiquitous Engineering, Vol.12, No.1 , pp. 17-34, Dec 2017.
4. Zhiqiang Gao, “On Disturbance Rejection Paradigm in Control Engineering,” in Proceedings of the 29th Chinese Control Conference, July 29-31, 2010, Beijing, China, pp. 6071-6076.
5. Pololu Corporation, Pololu AVR Library Command Reference, 2001–2015 https://www.pololu.com/docs/0J18
6. Frangois G. Pin and Hubert A. Vasseur, “Autonomous Trajectory Generation for Mobile Robots with Non-holonomic and Steering Angle Constraints,” in Proceedings of the IEEE International Workshop on Intelligent Motion Control, Istanbul, Turkey, August 20-22, 1990.
7. Jingqing Han, “From PID to Active Disturbance Rejection Control,” IEEE Transactions on industrial Electronics, Vol. 56, No. 3, March 2009.

8. Jonathan Connell, Paul Viola. “Cooperative Control of a Semi-Autonomous Mobile Robot,” ICRA-90.
9. Z. Gao and R. Rhinehart, “Theory vs. Practice Forum,” in Proc. of the 2004 American Control Conference, June 30-July 2, 2004, Boston MA, pp. 1341-1349.
10. J. Han, “Control Theory: Is it a Theory of Model or Control?” Systems Science and Mathematical Sciences, Vol.9, No.4, pp.328-335, 1989. (In Chinese)
11. Zhiqiang Gao, “On the Problem of Information in Engineering Cybernetics,” J. Sys. Sci. & Math. Scis. Vol.36 (7), pp. 908–923, July 2016.
12. GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age–sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013
13. Starship, (2015) [Online] starship.xyz. Available at: starship.xyz. [Last accessed 13 January 2016]
14. Debenhams, (2015) Buying luggage, Average suitcases sizes, [Online] debenhams.com. Available at: debenhams.com/webapp/wcs/stores/servlet/contentView?filepath=/DebenhamsUKSite/Static/Buying_Guide_luggage_uk.xml&storeId=10701&langId=-1
15. Engineering and Physical Sciences Research Council, (2010) Principles of robotics, [Online] epsrc.ac.uk. Available at: epsrc.ac.uk/research/ourportfolio/themes/engineering/activities/principlesofrobotics/. [Last accessed 13 January 2016]
16. StackExchange, (2015) Electrical Engineering, shelf-life of a lithium polymer battery, [Online] electronics.stackexchange.com. Available at: www.electronics.stackexchange.com/questions/150818/shelf-life-of-a

lithium-polymer-battery. [Last accessed 13 January 2016]

17. Imperial College London Statista. Average time spent per shopping visit in Great Britain between 2012 and 2013, by location (in minutes).
18. RS, (2016) Commell GPS Module MP-954GPS, [Online] uk.rs-online.com. Available at: uk.rs-online.com/web/p/gps-modules/7166407/. [Last accessed 13 January 2016]
19. Gps.gov, (2008) GPS Accuracy, [Online] gps.gov. Available at: gps.gov/systems/gps/performance/accuracy/. [Last accessed 13 January 2016]
20. Sparkfun, (2015) GPS Buying Guide, Power consumption, [Online] sparkfun.com. Available at: https://www.sparkfun.com/pages/GPS_Guide. [Last accessed 13 January 2016]