PROJECT TITLE (SMART CAR)

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ABSTRACT (SMART CAR)

artificial intelligence is branch of computer science that is concerned with the automation of intelligence behavior also another definition for artificial intelligence is for artificial intelligence is complement for algorithms simulation for concept work human brain and applications of artificial intelligence such as :robotics and search engine also smart car of artificial intelligence applications and from here she came idea this project for built smart car for process traffic jam Experiencing it Amman capital and in this project Purchase car abstract of any control Where it was provide car in devices following :ultrasonic,arduino board,blutooth,shield motor,solar panel and where it was connection all this devices on arduino board and connection motors car connection on arduino board and done built smart phone application for control in car remotely

well control car by smart phone application and car move by coordinates system by input user two point in smart phone application car well take specific path for move and well be charge car battery by solar also provide car in ultrasonic device do measure distance between car and any object front of car and car void collision from any object by measure distance by ultrasonic .

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Finally, I am grateful to my colleagues in FIT: names of your colleagues

Ammar yaser awad

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DEDECATION

Write a brief dedication for your work.

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CHAPTER 1: INTRODUCTION

1.1 Overview

Smart car has features artificial intelligence and car in our project keep up evolved artificial intelligence .artificial intelligence is branch of computer science that is concerned with the automation of intelligence behavior also another definition for artificial intelligence is complement for algorithms simulation for concept work human brain. There is two type of artificial intelligence:

weak artificial intelligence :develops useful ,powerful application

strong artificial intelligence:machines have cognitive minds comparable to humans such as: artificial neural network

artificial neural network : a type of machine learning which models itself after the human brain, creating an artificial neural network that via an algorithm allows the computer to learn by incorporating new data .

machine learning strategies go by three methods:

1. The Supervised learning: This learning strategy is the simplest, as there is a labeled dataset, which the computer goes through, and the algorithm gets modified until it can process the dataset to get the desired result.

2. Unsupervised learning: This strategy gets used in cases where there is no labeled dataset available to learn from. The neural network analyzes the dataset, and then a cost function then tells the neural network how far off of target it was. The neural network then adjusts to increase accuracy of the algorithm.

3. . Reinforced learning: In this algorithm, the neural network is reinforced for positive results, and punished for a negative result, forcing the neural network to learn over time.

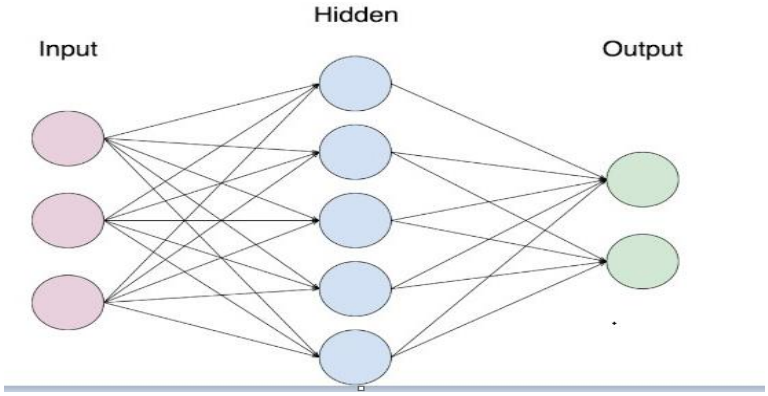
Artificial Neural Network is made up of 3 components:

1.input layer: neural network is composed of artificial input neurons, and brings the initial data into the system for further processing by subsequent layers of artificial neurons.

2.hidden layer: an artificial neural network is a layer in between input layers and output layers, where artificial neurons take in a set of weighted inputs and produce an output

3.output layer: artificial neural network is the last layer of neurons that produces given outputs for the program.

Below diagram explain component of artificial neural network in figure(1-2)



Figure(1-1):component of artificial neural network

1.2 Problem Statement

Traffic jam problem on roads in world country became big problem when increase number of cars on roads led to traffic jam and traffic jam will causes number of negative effects:

1.wasting time of motorists and passenger

2.non –productivity activity for people late arrival for companies

3.lost business for companies

For solve traffic jam problem we are need to smart car for reduced of traffic jam ,smart car has artificial intelligence features smart car has ability take best path according less traffic and less time for arrive to specific location by use artificial intelligence algorithms specialist in search such as :A* algorithm.

Reduced car accidents occure in world country by provide smart car in sensor device such as; ultrasonic use for measure distance between car and any object of front car for avoid collision .

1.3 Objectives

Project achieve the goals following **:**

1.to build a smart car which is controlled by a smart phone.

2.to reduce cars accident between cars and object using ultrasonic sensor.

3.to minimize co2 and produce clean and green environment using solar energy through solar panels.

1.4 Documentation Layout

Project documentation divided to chapters following:

Chapter one:gives an introduction to the project

Chapter two:discuss project requirements which are dived into software requirement and hardware requirement.

Chapter three:explain desing phase use flow chart for representation algorithm use in programming smart car and explain components of car and device attached to arduino board

Chapter four:discuss implementation and results

Chapter five:discuss conclusions and future work.

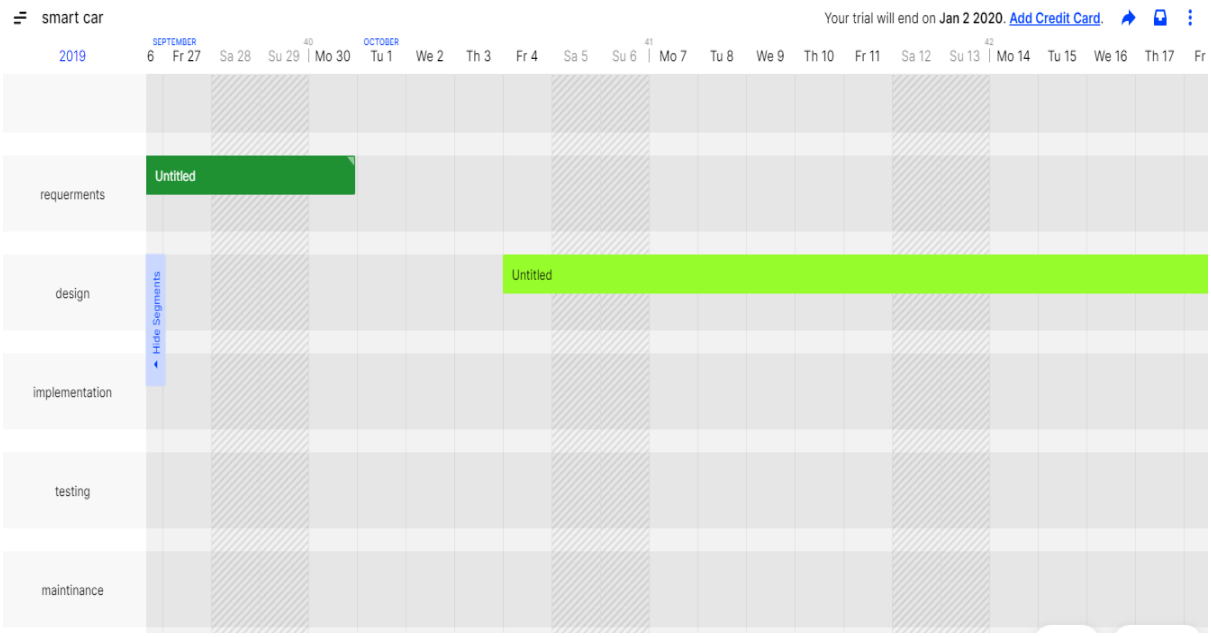
CHAPTER 2: PROJECT REQUIREMENTED AND ANALYSIS

The software requirements are description of features and functionalities of the target system. Requirements convey the expectations of users from the software product. The requirements can be obvious or hidden, known or unknown, expected or unexpected from client's point of view.

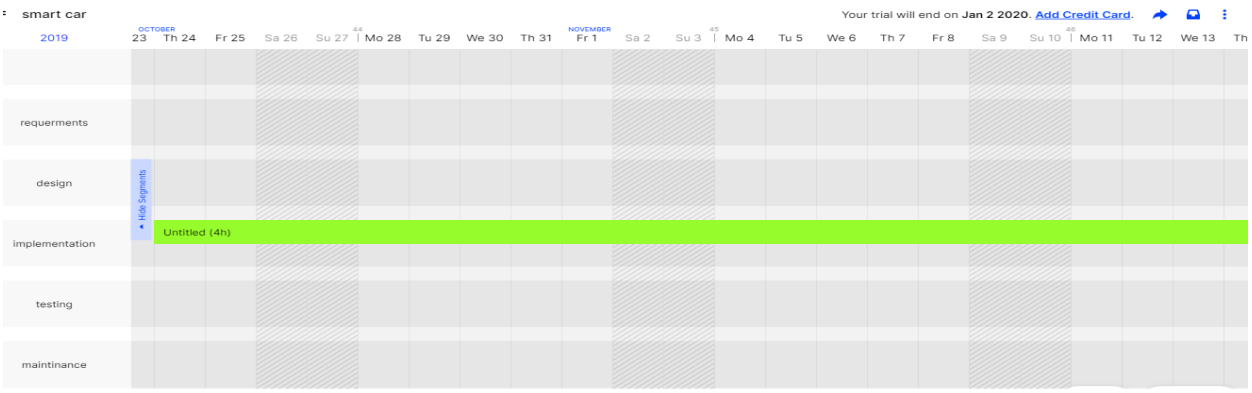
We are use in our project software development method by agile method
Agile method: incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product. Agile Methods break the product into small incremental builds.
We are in our project do requirement aggregation by interview and requirement our project divided two part :software requirement and hardware requirement

Hardware requirements :
1.ultrasonic sensor front and ultrasonic behind
2- Bluetooth
3-arduino board
4-shield motor
5-wires
6- battery external
7- inside battery
8-solar panels
9-power button
10-power switch button
11- charge external battery by solar panels
Software requirement:1- control smart car by smart phone application 2-run ultrasonic and move car to forward and back and left and right and stop car by smartphone application 3-Move car by coordinates points input by user in application will car take specific path according to coordinates input by user also.

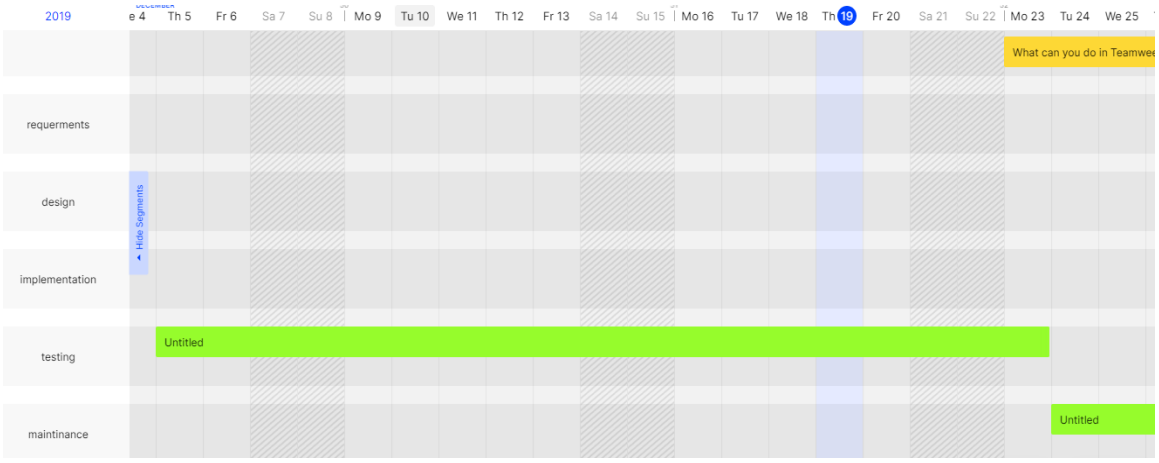
Schedule time for each phase :
Requirements :(23/9-30/9)in figure(2-1)explain date star and end
Deising:4/10-20/10in figure (2-1)explain date star and end
Implementation:24/10-30/11in figure(2-2)
Testing:5/12-23/12 in figure(2-3)
Maintenance:24/12-8/1/2020 in figure (2-4)



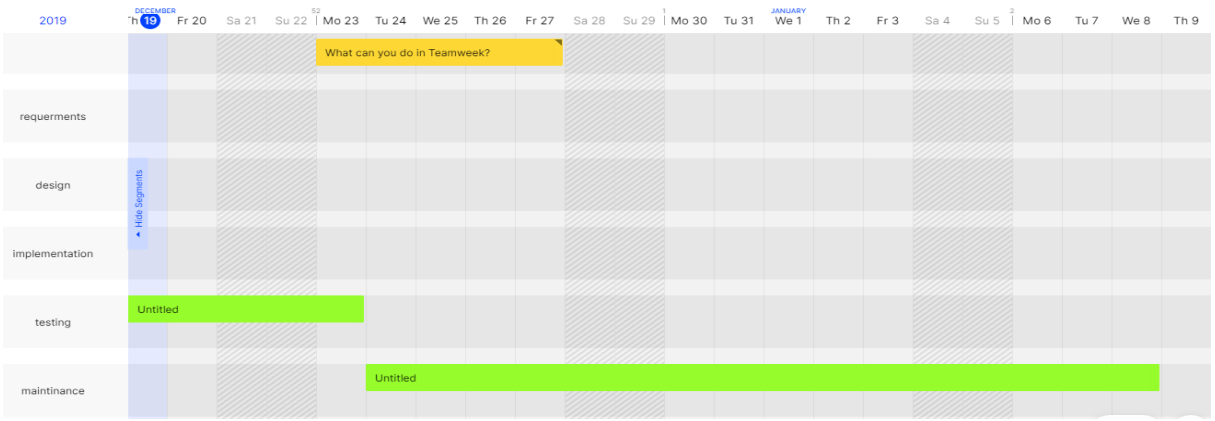
Figure(2-1):explain date start and end requirement phase and desing phase



Figure(2-2):explain date start and end implementation phase



Figure(2-3):explain start date and end testing phase



Figure(2-4):explain start date and end maintinance

CHAPTER3:DESIGN

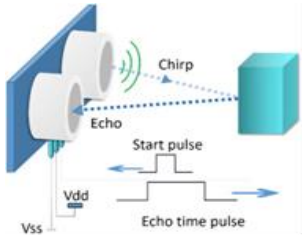
The next stage of Software Development Life Cycle is the Design phase. During the design phase, developers and technical architects start the high-level design of the software and system to be able to deliver each requirement.

Component inside car contains two motors first motor right and motor left and motor back and front we have connection two motors for car on arduino board by wires and first connection motors on driver shield and connection driver shield on arduino board figure (3-2)explain connect motors on shield and connect shield motor on arduino
and arduino board contains microprocessor Consists: cpu and rom and ram .
board arduinoContains pins for digital signal and pins for analog signal we have connect motors car in arduino board by number of pins of arduino and connect device ultrasonic on board arduino in figure(3-4)explain arduino board. Bluetooth is a wireless technology standard for exchanging data between fixed and mobile devices over short distances in figure(3-3)explain connect blutooth on arduino board.

And connect blutooth on board arduino and Solar panels on orgnizer chip and will write code in arduino language for control car by smart phone application. but Work principle ultrasonic following:
An ultrasonic sensor is a device that can measure the distance by using ultrasonic waves. It works by sending out an ultrasonic wave at a specific frequency and receiving the wave reflected back from the target. In figure(3-1)explain work principle ultrasonic.

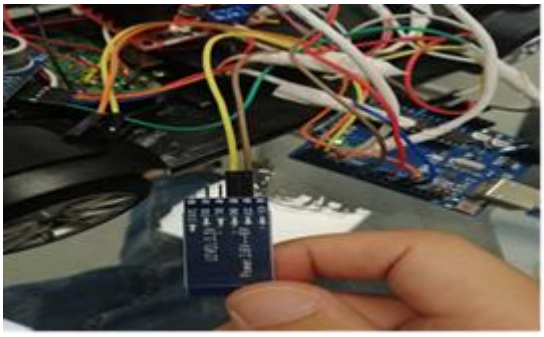
In figure(3-8)explain flow chart for algorithm use programmer car
in Figure(3-6):explain completely car
in Figure(3-7):explain car connect with ultrasonic

in Figure(3-8):explain smart phone application



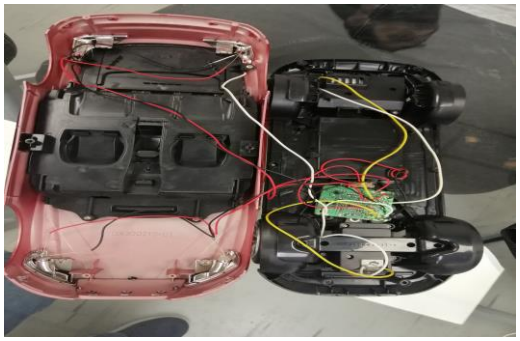
Figure(3-1):ultrasonic device

Figure(3-2):connect motors on shield motor and connect shield on and arduino board



figure(3-3)explain connect blutooth on arduino board**.**

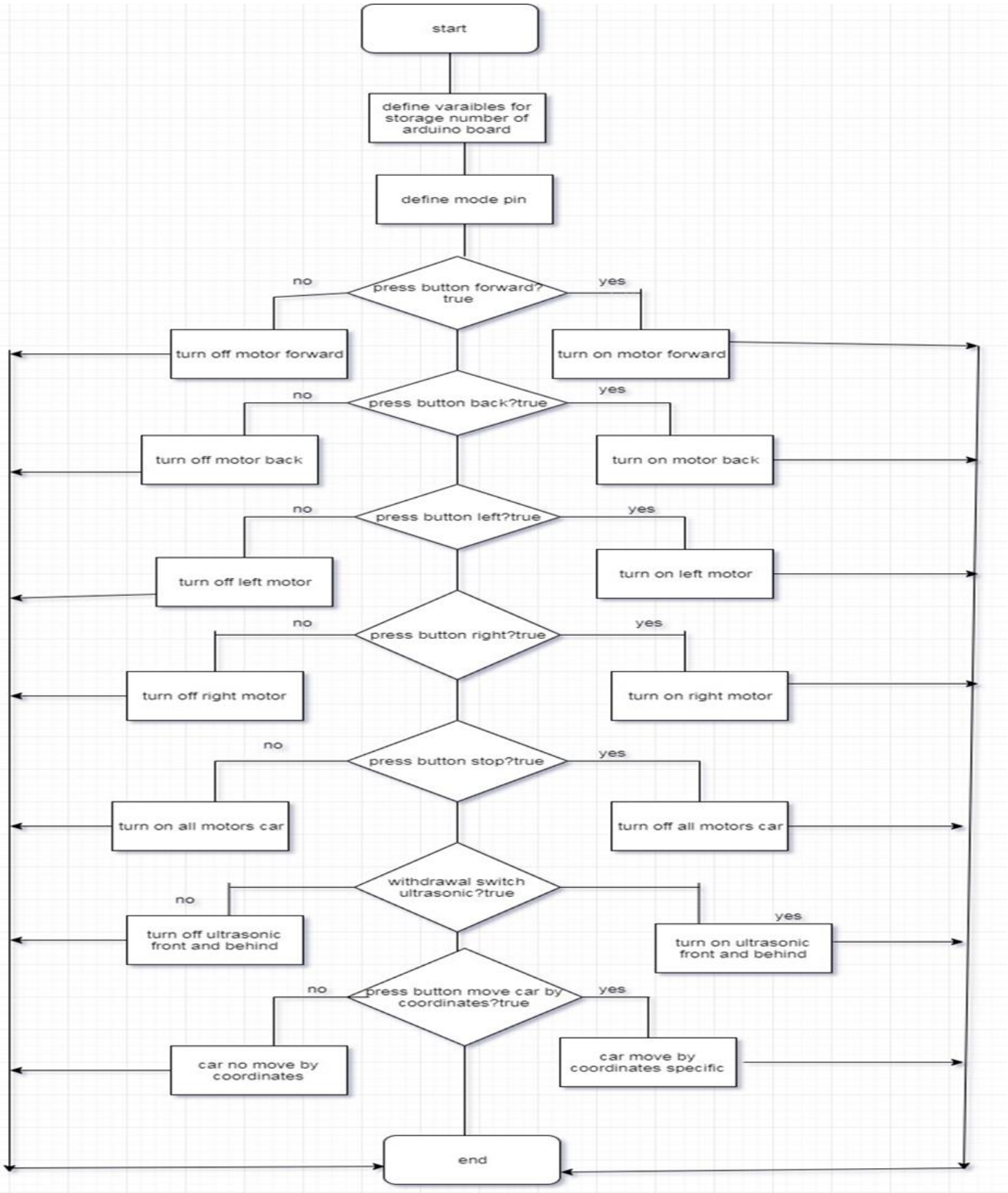
Figure(3-4):arduino board



Figure(3-5):explain inside components for car

Figure(3-6):explain completely car

Figure(3-7):explain car connect with ultrasonic



Figure(3-8):representation flow chart for algorithm use in programmer car

CHAPTER 4:IMPLEMENTATION AND RESULTS

After the requirements and design activity is completed, the next phase of the Software Development Life Cycle is the implementation or development of the software. In this phase, developers start coding according to the requirements.

Testing is the last phase of the Software Development Life Cycle before the software is delivered to customers. During testing, experienced testers start to test the system against the requirements.

.

Explain code use in programming car and code consist methods and libraries and based concept programming object oriented and methods and libraries use in programming smart cat as follows:

1. pinMode(pin,value):Configures the specified pin to behave either as an input or an output.
2. digitalWrite(pin, value): Write a HIGH or a LOW value to a digital pin.
3. pulseIn(pin, value): Reads a pulse (either HIGH or LOW) on a pin and Returns the length of the pulse in microseconds or gives up and returns 0 if no complete pulse was received within the timeout.
4. delay(ms): Pauses the program for the amount of time (in milliseconds) specified as parameter. (There are 1000 milliseconds in a second.)
5. delayMicroseconds(us): Pauses the program for the amount of time (in microseconds) specified as parameter. There are a thousand microseconds in a millisecond, and a million microseconds in a second

Libraries use in programming car:

#include <RemoteXY.h>: allows you to control your device using an Android or iOS smartphone. There are Bluetooth, WiFi, Ethernet or Cloud server can be used for connection.
#include <SoftwareSerial.h>: allow serial communication on other digital pins of the Arduino.
Explain implementation results:
Press button forward in application:run front motor for ,car move forward and turn off back motor for car.
Press button back:run back motor for car,car move to back and turn off front motor for car.
Press button right:run front motor and right motor,car move to right and forward and turn off left motor.
Press button left:run front motor and left motor ,car move to left and forward and turn off of right motor.
Press button stop:turn off all motors car ,car is pause
.
Press button coordinates :car move based on coordinates take value coordinates from edit field on application ,car move based on specific path by points following: (10,10),(50,50),(30,30),(60,60),otherwise car move forward and stop car.
Pull switch ultrasonic:run device ultrasonic front and back ,front ultrasonic measure distance between car and any object front of car if distance is largest of specific distance car move to forward otherwise run behind ultrasonic do measure distance between car and any object back of car if distance largest then car move to back and did delay of time 1000milliseconds after delay car move right and did delay500milliseconds after delay car move to forward ,do delay of time 1000milliseconds after delay stop car,if distance smallest then car move to forward and do delay of time 1000milliseconds after delay stop car
Pull switch sun energy:run sun energy by external button exist on body car.

.figure(4-1) below explain desing smart phone application

figure(4-1):smart phone application

CHAPTER5:CONCLUSIONS AND FUTURE WORK

Conclusions:

1.smart car control by smart phone application

2.smart car move based on coordinates system by input user two point in smart phone application well smart car take specific path based on coordinates

3.smart car energy charge by sun energy alternative about fuel led to keep clean and green environment and reduce air pollution

4.smart car assistant in reduce cars accidents by provide car in ultrasonic sensor measure distance between car and any object lead to void collisions in any object

5-smart car keep up development in artificial intelligence field

Future work:

1.smart car development use search algorithm in artificial intelligence such as:A* Use A* algorithm in programming smart car well be chose best path according to less distance and less time for move car on this path for arrive to goal when A* support chose less distance between two point also smart car development for work in smart city communication with smart car by sensor wireless communication with base station select best path for car according to less traffic and base station send coordinates path over wireless sensor to car and provide car in wireless adapter until communication any object in smart city this smart car keep up internet of things applied in smart city.

2.smart car development for make has ability on self-driven by provide car in unit learning machine by artificial neural network and use self learning and without supervisor learning this is type of learning machine for artificial neural network.

3.smart car development for control in car by internet well provide car in wireless adapter or Ethernet card and give car ip address well be control car by smart phone application and access to control car from remotely over internet well be use ip version 6 each device has ip address specialist can not change this type of ip address or use ip version 4.

4.smart car development for move based on sound command give for car by human
Car move to forward if car received specific sound word such as: word "forward" .
By provide car in microphone place in car or by smart phone application pass sound to car and car received sound by Bluetooth .

REFERENCES

Simon monk,"30 arduino project for the evil genius",McGraw-Hill,New Yourk,2010.

Michael Margolis,"Make an Arduino-controlled Robot",O'Reilly media,New Yourk ,2012.

David Cuartielles Ruiz,"Android open Accessory programming with Arduino",John Wiley&Sons,Canada,2013.

Andrew K.Dennis,Raspberry, "Pi Home Automation With Arduino",Packt Publishing,Birmingham,2013.

Dave catcher ,"electronic circuits for the evil genius",McGraw-Hill,New York,2011.

Dave Prochnow,"101 Outer Space Project For The evil genius",McGraw-Hill,New York,2007.

Gavin D.j.Harper,"Ful Cell Projects For the evil Genius", McGraw-Hill,New York,2008

Stuart J.Russel,"Artificial intelligence:A modern approach",person education usa,october14,2012

James V stone,"Artificial intelligence engines:Atutorial introduction mathematics of deep learning",sebtel press,UK,march28,2019

Vinod Chandra.s.s,"artificial intelligence and machine learning",prentice hall india learning private limited,delhi ,2014

Tom taulli,"Artificial intelligence basics:A non –technical introduction",aprèss,usa ,2019

Dr.parag mahajan,"artificial intelligence in health care",parag suresh mahajan,india ,2018

Dr.dheeraj mehrotra,"basics of artificial intelligence &machine learning",notion press,chetpet chennai, 2019

Matthew lamons,"python:beginners guide to artificial intelligences",packt,uk 2018.

index

```
// RemoteXY configurate
#pragma pack(push, 1)
uint8_t RemoteXY_CONF[] =
  { 255,30,0,0,0,240,0,8,13,0,
  1,0,6,25,12,12,2,31,88,0,
  1,0,6,46,12,12,2,31,88,0,
  1,0,50,35,12,12,2,31,88,0,
  1,0,30,35,12,12,2,31,88,0,
  2,0,74,5,22,11,2,26,31,31,
  79,78,0,79,70,70,0,2,0,2,
  3,22,11,2,26,31,31,79,78,0,
  79,70,70,0,1,0,38,3,12,12,
  2,31,88,0,1,0,87,50,12,12,
  2,31,88,0,129,0,37,16,14,4,
  17,115,116,111,112,0,129,0,3,37,
  18,6,17,102,111,114,119,97,114,100,
  0,129,0,3,58,18,6,17,98,97,
  99,107,0,129,0,32,48,18,6,17,
  108,101,102,116,0,129,0,48,47,18,
  6,17,114,105,103,104,116,0,129,0,
  43,55,44,6,17,99,97,114,32,99,
  111,111,114,100,105,110,97,116,101,115,
  0,129,0,1,14,24,5,17,115,117,
  110,32,101,110,101,114,103,121,0,129,
  0,72,17,27,5,17,117,108,116,114,
  97,115,111,110,105,99,0,7,36,75,
  27,20,5,2,26,2,11,7,36,75,
  35,20,5,2,26,2,11 };
```

```
  35,20,5,2,26,2,11 };

// this structure defines all the variables of your control interface
struct {

    // input variable
  uint8_t button_1; // =1 if button pressed, else =0
  uint8_t button_2; // =1 if button pressed, else =0
  uint8_t button_3; // =1 if button pressed, else =0
  uint8_t button_4; // =1 if button pressed, else =0
  uint8_t switch_1; // =1 if switch ON and =0 if OFF
  uint8_t switch_2; // =1 if switch ON and =0 if OFF
  uint8_t button_6; // =1 if button pressed, else =0
  uint8_t button_7; // =1 if button pressed, else =0
  char edit_1[11];  // string UTF8 end zero
  char edit_2[11];  // string UTF8 end zero

    // other variable
  uint8_t connect_flag;  // =1 if wire connected, else =0

} RemoteXY;
#pragma pack(pop)
```

```
//////////////////////////////////////////////


#define backb 7
#define backf 6
#define rightm 2
#define leftm 4
#define echo 10
#define trig 9
#define tr  13
#define ec  12
long duration;
int dist=5;
const int DangerT=10;

void setup()
{
  RemoteXY_Init ();
  pinMode(leftm,OUTPUT);   //set pin modes
   pinMode(rightm,OUTPUT);
   pinMode(backb,OUTPUT);
pinMode(backf,OUTPUT);
   pinMode(trig,OUTPUT);
   pinMode(echo,INPUT);
pinMode(tr,OUTPUT);
   pinMode(ec,INPUT);

  // TODO you setup code
```

```
void loop()
{
  RemoteXY_Handler ();
  if(RemoteXY.button_1==1)
   {
       digitalWrite(backf,HIGH);
       digitalWrite(backb,LOW);

   }
  else if(RemoteXY.button_2==1)
   {
    digitalWrite(backb,HIGH);
    digitalWrite(backf,LOW);

   }
  else if(RemoteXY.button_3==1)
   {


        digitalWrite(rightm,HIGH);
         digitalWrite(backf,HIGH);
         digitalWrite(leftm,LOW);

   }
```

```
  }
   else if(RemoteXY.button_4==1)
  {

       digitalWrite(leftm,HIGH);
        digitalWrite(rightm,LOW);
        digitalWrite(backf,HIGH);

  }

}
 else if(RemoteXY.button_6==1)
{
    digitalWrite(rightm,LOW);
    digitalWrite(leftm,LOW);
    digitalWrite(backf,LOW);
    digitalWrite(backb,LOW);
}


 }
   else if(RemoteXY.switch_1==1)
       {
        digitalWrite(trig,HIGH); //set
       delayMicroseconds(5);
       digitalWrite(trig,LOW);



     duration = pulseIn(echo,HIGH);
  int  distange=duration / 29 / 2;
if(distange>DangerT)
{

   digitalWrite(backf,HIGH);



}
```

```
}

else if(distange<DangerT)
    {
      digitalWrite(tr,HIGH); //set it high for 5 microseconds
       delayMicroseconds(5);
      digitalWrite(tr,LOW);


     duration = pulseIn(ec,HIGH);
  int  distange=duration / 29 / 2;
```

```
if(distange>dist)
{
  digitalWrite(backf,LOW);

 digitalWrite(backb,HIGH);
gitalWrite(leftm,HIGH);

 delay(1000);
 digitalWrite(leftm,LOW);

 digitalWrite(rightm,HIGH);
 delay(500);
 digitalWrite(backb,LOW);
 digitalWrite(backf,HIGH);
 delay(1000);
 digitalWrite(rightm,LOW);
 digitalWrite(backb,LOW);
 digitalWrite(backf,LOW);
 }
```

```
  }
  else if(distange<dist)
        {

         digitalWrite(backb,LOW);
          digitalWrite(backf,HIGH);
          delay(1000);
          digitalWrite(backf,LOW);
        }

        }
 }
    }
else if(RemoteXY.button_7==1)
{
  int y=atoi(RemoteXY.edit_1);
  int a=atoi(RemoteXY.edit_2);
```

```
if(y==10 &&a==10)
{

  digitalWrite(rightm,HIGH);
  digitalWrite(backf,HIGH);


 delay(1000);

 digitalWrite(backf,LOW);
 digitalWrite(backb,HIGH);
 delay(1000);
 digitalWrite(backb,LOW);


}
```

```
    else  if(y==30 &&a==30)
    {

      digitalWrite(rightm,HIGH);
     digitalWrite(backf,HIGH);
     delay(1000);
     digitalWrite(rightm,LOW);
     digitalWrite(backf,LOW);


    }
```

```
}
else  if(y==50 &&a==50)
{
  digitalWrite(backf,HIGH);

    delay(1000);


      digitalWrite(rightm,HIGH);
 digitalWrite(backf,HIGH);
  delay(1000);

  digitalWrite(backf,LOW);
  digitalWrite(rightm,LOW);
}



 }
 else  if(y==60 &&a==60)
 {
       digitalWrite(backf,HIGH);
   digitalWrite(rightm,HIGH);

   delay(1000);
     digitalWrite(backb,HIGH);
   digitalWrite(rightm,HIGH);
   delay(1000);
   digitalWrite(backb,LOW);
   digitalWrite(rightm,LOW);


 }




 }
 else
 {
     digitalWrite(backf,HIGH);
     delay(500);
     digitalWrite(backf,LOW);

 }


}
}
```

Code button forward:

```
if(RemoteXY.button_1==1)
 {
     digitalWrite(backf,HIGH);
     digitalWrite(backb,LOW);

 }
```

Code button back:

```
}
 else if(RemoteXY.button_2==1)
 {
  digitalWrite(backb,HIGH);
  digitalWrite(backf,LOW);

 }
```

Code button right:

```
}
else if(RemoteXY.button_3==1)
 {


      digitalWrite(rightm,HIGH);
       digitalWrite(backf,HIGH);
       digitalWrite(leftm,LOW);

 }
```

Code button lift:

```
}
 else if(RemoteXY.button_4==1)
{

     digitalWrite(leftm,HIGH);
      digitalWrite(rightm,LOW);
      digitalWrite(backf,HIGH);

}
```

Code button stop:

```
}
 else if(RemoteXY.button_6==1)
{
    digitalWrite(rightm,LOW);
    digitalWrite(leftm,LOW);
    digitalWrite(backf,LOW);
    digitalWrite(backb,LOW);
}
```

Code switch ultrasonic:

```
 }
   else if(RemoteXY.switch_1==1)
       {
        digitalWrite(trig,HIGH); //set it high for 5 micros
       delayMicroseconds(5);
       digitalWrite(trig,LOW);



     duration = pulseIn(echo,HIGH);
  int  distange=duration / 29 / 2;
if(distange>DangerT)
{

   digitalWrite(backf,HIGH);



}
```

```
  }

  else if(distange<DangerT)
      {
        digitalWrite(tr,HIGH); //set it high for 5 microseconds
         delayMicroseconds(5);
        digitalWrite(tr,LOW);


       duration = pulseIn(ec,HIGH);
    int  distange=duration / 29 / 2;
    if(distange>dist)
    {
      digitalWrite(backf,LOW);

    digitalWrite(backb,HIGH);
digitalWrite(leftm,HIGH);

    delay(1000);
    digitalWrite(leftm,LOW);

    digitalWrite(rightm,HIGH);
    delay(500);
    digitalWrite(backb,LOW);
```

```
                    digitalWrite(backf,HIGH);
                    delay(1000);
                    digitalWrite(rightm,LOW);
                    digitalWrite(backb,LOW);
                    digitalWrite(backf,LOW);
                    }

        }
        else if(distange<dist)
              {

               digitalWrite(backb,LOW);
                digitalWrite(backf,HIGH);
                delay(1000);
                digitalWrite(backf,LOW);
              }

              }
       }
```

Code button coordinates:

```
  }
else if(RemoteXY.button_7==1)
{
  int y=atoi(RemoteXY.edit_1);
  int a=atoi(RemoteXY.edit_2);



  if(y==10 &&a==10)
  {

    digitalWrite(rightm,HIGH);
    digitalWrite(backf,HIGH);


   delay(1000);

   digitalWrite(backf,LOW);
   digitalWrite(backb,HIGH);
   delay(1000);
   digitalWrite(backb,LOW);


  }
```

```
    else  if(y==30 &&a==30)
    {

      digitalWrite(rightm,HIGH);
     digitalWrite(backf,HIGH);
     delay(1000);
     digitalWrite(rightm,LOW);
     digitalWrite(backf,LOW);


    }



else  if(y==50 &&a==50)
{
  digitalWrite(backf,HIGH);

    delay(1000);


      digitalWrite(rightm,HIGH);
 digitalWrite(backf,HIGH);
  delay(1000);

  digitalWrite(backf,LOW);
  digitalWrite(rightm,LOW);
}

  }
  else  if(y==60 &&a==60)
  {
        digitalWrite(backf,HIGH);
    digitalWrite(rightm,HIGH);

    delay(1000);
      digitalWrite(backb,HIGH);
    digitalWrite(rightm,HIGH);
    delay(1000);
    digitalWrite(backb,LOW);
    digitalWrite(rightm,LOW);


  }
```

```
  }
  else
  {
      digitalWrite(backf,HIGH);
      delay(500);
      digitalWrite(backf,LOW);

  }



}
}
```