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SMART AGRICULTURE ROBOT

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1] INTODUCTION :-

1.1] INTRODUCTION:

In modern globalization, many technologies are trying to update a new development based on automation which works very rigidly, high effectively and within short period of time period. Now the approach of this project is to develop smart machine which do the right think at right place at right time with right amount in process of farming. The main goal of this project is the development of the vehicle and the control unit, with possibility of using different sensor technologies. We want to test the vehicle and control unit and show that the robot is capable of following a path under field conditions.

Agriculture is done in every country from ages. Agriculture is the science and art cultivating
Plants. Agriculture was the key development in the rise of sedentary human civilization. Agriculture is done manually from ages. As the world is trending into new technologies and implementations it is a necessary goal to trend up with agriculture also .IOT plays a very important role in smart agriculture IOT sensors are capable of providing information about agriculture fields. We have proposed an IOT and smart agriculture system using automation. This IOT based Agriculture monitoring system makes use of wireless sensor networks that collects data from different sensor deployed at various nodes and sends it through
The wireless protocol agriculture is the backbone of Indian economy. About half of the total population of our country has chosen agriculture as their chief occupation. The states like Maharashtra, Punjab, and Kerala, Assam are highly involved in agriculture.

1.2] NECESSITY:-

The goal of smart agriculture research is to ground a decision making support system for farm management. Smart farming deems it necessary to address the issues of population growth, climate change and labour that has gained a lot of technological attention, from planting and watering of crops to health and harvesting

1.3] OBJECTIVE:-

The objective of smart agriculture robot apricot is a robot designed for agricultural purposes. It is designed to attenuate the labour of farmers additionally to increasing the speed and accuracy of the work. It performs the elementary functions concerned in farming i.e. pesticide spraying, harvesting, spraying, seeding and removing the weeds.

1.4] MOTIVATION:-

The concepts of multi-robots, human-robot collaboration, and environment reconstruction from aerial images and ground-based sensors for the creation of virtual farms were highlighted as some of the gateways of digital farming. It was shown that one of the trends and research focuses in agricultural field robotics is towards building a swarm of small scale robots and drones that collaborate together to optimize farming inputs and reveal denied or concealed information. For the case of robotic harvesting, an autonomous framework.

2] LITERATURE SURVEY:-

2.1] Dr. M.G. Sumithra, G.R. Gayathiri

The main proposed in their paper Leaf Disease Diagnosis and Pesticide Spraying Using Agricultural Robot (AGROBOT) ‖ that Plant diseases have created an immense post-effect scenario as it can significantly reduce agricultural products in terms of both quality and quantity. Early detection of pests is a big issue that concerns planting crops. First phase includes plant observation keenly and frequently. Then the affected plants will be identified and photographs will be collected using scanners or cameras for the affected portion of the plants. Then these images are pre-processed, transformed and clustered. Then these images are sent to the processor as input, and the images are compared by the processor

2.2] Philip J. Sammons, Furukawa Tomonari, and Burgin Andrew

The main proposed in their paper ―Autonomous Pesticide Spraying Robot for use in a Greenhouse‖ that an engineering solution includes spraying potentially toxic chemicals in the confined space of a hot and steamy glasshouse to the current human health hazards. This is done by designing and building an independent mobile robot that can be used in commercial greenhouses for Tools to control insects and prevent disease. The efficacy of this method is shown by the ability of the platforms to manoeuvre themselves efficiently down the rows of a greenhouse, while the pesticide spraying system effectively covers the plants with spray uniformly in the specified dosages. The results showed that the robot was able to meet the physical standards set by the National Greenhouse Horticulture Centre, so that it could work in its greenhouses.

2.3]. "Automated Farming Using Microcontroller and Sensors" (IJSRMS) ISSN: 23493371 (Abdullah Tanveer, Abhishek Choudhary, Divya Pal, Rajani Gupta, and Farooq Husain)

Farming can be done using new technologies to yield higher growth of the crops. In this project we are going to check temperature, light, humidity and soil moisture. The paper here is all about automatic control features with latest electronics technology using microcontroller and GSM phone line. The project works automatically and hence reduces the manpower

2.4] Neha S. Naik; Virendra. V. Shete

In recent years, robotics in agriculture sector with its implementation based on precision agriculture concept is the newly emerging technology. The main reason behind automation of farming processes are saving the time and energy required for performing repetitive farming tasks and increasing the productivity of yield by treating every crop individually using precision farming concept. Designing of such robots is modeled based on particular approach and certain considerations of agriculture environment in which it is going to work. These considerations and different approaches are discussed in this paper. Also, prototype of an autonomous Agriculture Robot is presented which is specically designed for seed sowing task only. It is a four wheeled vehicle which is controlled by LPC2148 microcontroller. Its working is based on the precision agriculture which enables efficient seed sowing at optimal depth and at optimal distances between crops and their rows, specific for each crop type.

2.5] S. Mohan; E. Praveen Kumar

Developed agriculture needs to find new ways to improve efficiency. One approach is to utilize available information technologies in the form of more intelligent machines to reduce and target energy inputs in more effective ways than in the past. Precision Farming has shown benefits of this approach but we can now move towards a new generation of equipment. [1]The advent of autonomous system architectures gives us the opportunity to develop a complete new range of agricultural equipment based on small smart machines that can do the right thing, in the right place, at the right

2.5] Shah Alamgir; Israt Jahan :

oil testing is essential for modern agriculture: to optimize the production, protect the environment from fertilizers overuse, save money and energy during the production. The purpose of this work was to develop an autonomous mobile platform with soil sampling device for agriculture. Soil samples are analysed to determine the composition, charac-teristics or nutrient levels of the soil. Smallholder farmers can use simple hand-held field-testing kits. However, in the case of large farms where plants are grown upon hundreds of hectares, the autonomous mobile platform with a soil sampler would be the optimal solution. Precision farming is a concept of using new production and management methods that use all kind of data collected about specific locations and crop variety. The mentioned robot can increase resource and cost efficiency in acquiring the required data. Information about the soil properties can be retrieved from the field using the robot's onboard systems, enabling farmers to respond to abrupt changes in real time. Data technologies and collecting soil system allows an efficient production process. Use of robots on farms is associated with the progressive digitisation of all areas of our lives, and agriculture is no exception.

2.7 Sami Salama Hussen Hajjaj ; Khairul Salleh Mohamed Sahari :

This paper investigates the possible reasons for this phenomena, by continuing the review of agriculture robots, only this time focusing on practicality and feasibility. Upon extensive review and analysis, the

authors concluded that practical agriculture robots rely not only on advances in robotics, but also on the presence of a support infrastructure. This infrastructure encompasses all services and technologies needed by agriculture robots while in operation, this include a reliable wireless connection, an effective framework for Human Robot Interaction (HRI) between robots and agriculture workers, and a framework for software sharing and re-use. Without such infrastructure being in place, agriculture robots, no matter how advanced in design they could be, would remain impractical and infeasible. However, for many organizations, the technological and monitory costs of establishing such infrastructure could be very prohibitive, which renders agriculture robots uneconomical and enviable. Therefore, the paper concludes that the key to practical agriculture robotics is to find a novel, cost-effective, and a reliable approach to develop the support infrastructure needed for agriculture robots.

2.8] Qingchun Feng ; Xiaonan Wang

In order to improve robotic harvesting for fresh tomato and reduce the amount of human labor, this paper designed a tomato intelligent picking robot. The picking robot included the vision positioning unit, the picking gripper, the control system and carrying platform. Based on the working principle of each component, the working process of picking robot was revised. Based on his color model for image segmentation, the recognition accuracy was improved. The sacs filled with constant pressure air were adopted as the grasping component of the picking end-effector, to prevent the fruits from being damaged. The performance test of picking robot indicated that vision positioning module and the gripper module ran well. The execution time of a single harvest cycle was about 24s,

3] SYSTEM DEVELOPMENT:-

Block Diagram

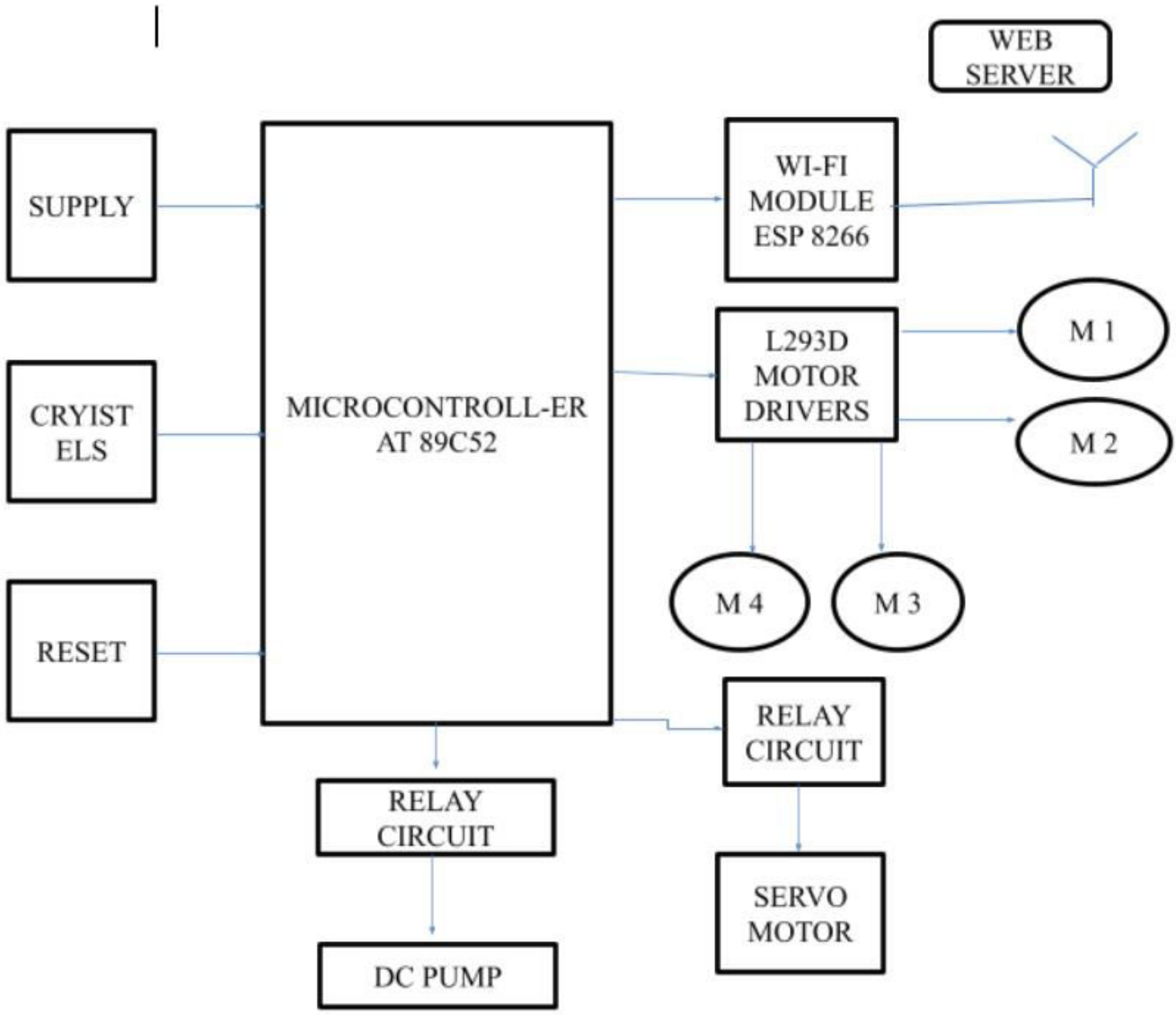


Fig 3.1

The main components consists of smart agriculture robot

- Power Supply
- Crystal
- Reset
- Relay Circuit
- Microcontroller
- Dc Pump
- Servo Motor
- L293D Motor Drives
- Wi-Fi Module ESP 8266
- Web Server

The above block diagram the hardware structure to control the robotic weed control, pestiside, and seeding and spraying water vehicle as advanced agriculture system is as shown in figure. Which is controlled by Microcontroller 89C52? Two DC motor, two servo motor and whole parts are controlled by microcontroller assembly as designed in hardware. The operation of DC motor is based on simple electromagnetism, used to give energy to the wheels of vehicle. A robot is a mechanical and artificial agent. It is usually an electromechanical system, conveys a sense that it has agency of its own. It is a device that automatically complicated task, because of software programming.

3.2] HARDEARE DESIGN: BLOCK WISE CIRCUIT DESIGN

3.2.1] POWER SUPPLY:-

In most of electronics products or project we need a power supply for converting AC voltage to a regulator DC voltage For making a power supply designing of each and every. Here I'm going to Discuss the designing of regulated 5v Power Supply.

Component List:

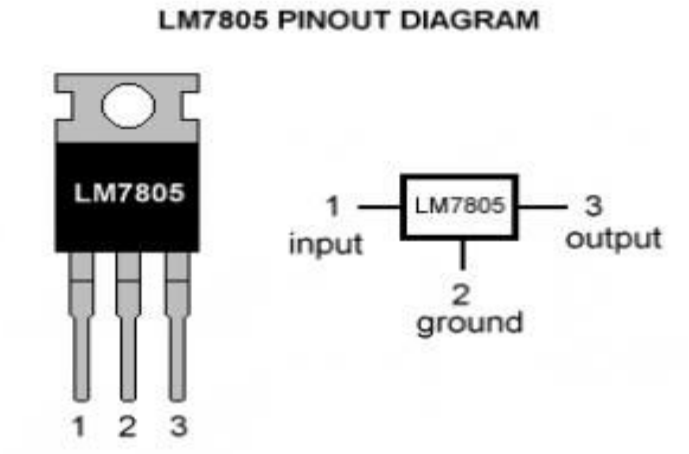
1. Step down Transformer
2. Voltage regulator
3. Capacitor
4. Diodes.

Voltage regulator:

As we require a 5V we need LM7805 Voltage Regulator IC.

7805 IC Rating

- Input voltage 7V-35V
- Current rating range Ic=1A
- Output Voltage range $V_{Max=5.2\ V}$ $V_{Min=4.8\ V}$



LM7805-PIN DIAGRAM

Transformer:

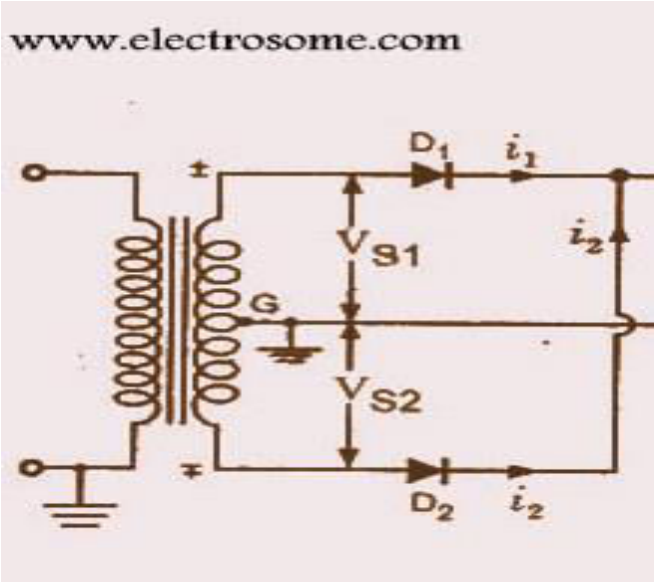
Selecting a suitable transformer is of great importance the current rating and the secondary voltage of the transformer is a crucial factor.

- The current rating of the transformer depends upon the current required for the load to be driven.
- The input Voltage to the 7805 IC should be at least 2v greeter than the required 2V therefore it requires an input voltage at least close to 7v
- So I choose a 6-0-6 transformer with current rating 500MA (Since 6*2=8.4V)

Rectifying Circuit

The best is using Full Wave Rectifier

- Its advantages are DC saturation is less as in both cycle diodes conduct.
- Higher Transformer Utilization Factor (TUF)
- 1N4007 diodes are used as it is capable of with Standing higher reverse voltage whereas 1N4001 is 50V



Capacitor:

Knowledge of Ripple Factor is essential why designing the values of capacitors is given by.

- Y=1/(4√3fRC) (as the capacitor filter is used)

1. f= frequency of AC (50 Hz)

2. R=resistance calculated

R= V/Ic

V= secondary voltage of transformer

- V=6√2=8. 4• R=8.45/500mA=16.9Ω standard 18Ω chosen

3. C= filtering capacitance

We have to determine this capacitance for filtering

Y=Vac-rams/Vdc

Vac-rms = Vr/2√3

Vdc= VMax-(Vr/2)

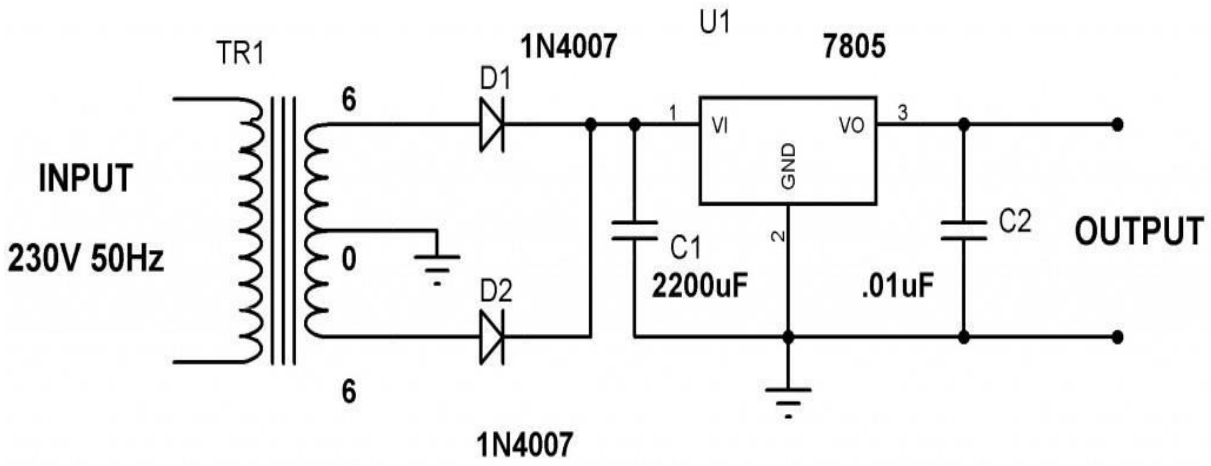
Vr= VMax- VMin

- Vr = 5.2-4.8 =0. 4V
- Vac-rms = .3464V
- Vdc = 5V
- Y=0 .06928

Hence the capacitor value is found out by substituting the ripple factor in Y=1/(4√3fRC)

Thus, C= 2314 µF and standard 2200µF is chosen

Datasheet of 7805 prescribes to use a 0.01µF capacitor at the output side to avoid transient changes in the voltages due to changes in load and a 0.33µF at the input side of regulator to avoid ripples if the filtering is far away from regulator



3.2.2] CRYSTAL: -

It is operate on the principle of inverse piezoelectric effect in which an alternating voltage applied across the crystal surfaces causes it to vibrate at its natural frequency. It is these vibrations which eventually get converted into oscillations.

These oscillators are usually made of Quartz crystal, even though other substances like Rochelle salt and Tourmaline exhibit the piezoelectric effect because, quartz is inexpensive, naturally-available and mechanically-strong when compared to others.

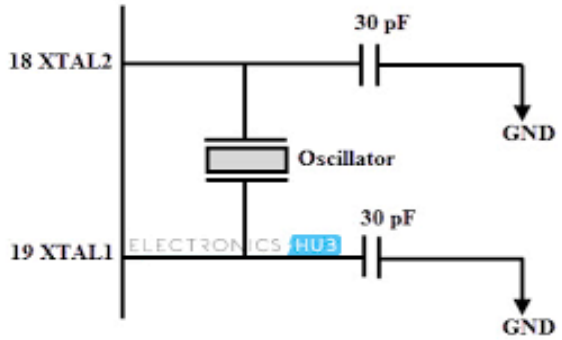


Fig 3.2.2 Crystal Oscillator

3.2.3] RESET:-

A reset is accomplished by holding the RST pin high for at least two machine cycles (24 oscillator periods), while the oscillator is running. To insure a good power-on reset, the RST pin must be high long enough to allow the oscillator time to start up (normally a few milliseconds) plus two machine cycles. At power-on, the voltage on VCC and RST must come up at the same time for a proper start-up. Ports 1, 2, and 3 will asynchronously be driven to their reset condition when a voltage above VIH1 (min.) is applied to RESET. The value on the EA pin is latched when RST is deserted and has no further effect

3.2.4] RELAY CIRCUIT:-

A relay is an electrical switch that uses an electromagnet to move the switch from the off to on position instead of a person moving the switch. It takes a relatively small amount of power to turn on a relay but the relay can control something that draws much more power. Ex: A relay is used to control the air conditioner in your home. The AC unit probably runs off of 220VAC at around 30A. That's 6600 Watts! The coil that controls the relay may only need a few watts to pull the contacts together. This is the schematic representation of a relay. The contacts at the top are normally open (i.e. not connected). When current is passed through the coil it creates a magnetic field that pulls the switch closed (i.e. connects the top contacts). Usually a spring will pull the switch open again once the power is removed from the coil.

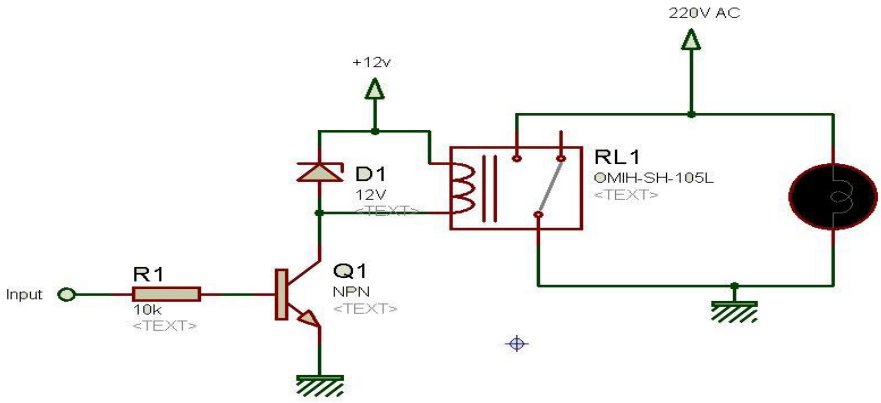


Fig 3.2.4] Relay Circuit

3.2.5] MICROCONTROLLER AT 89C52 :-

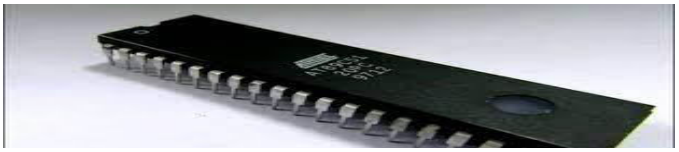
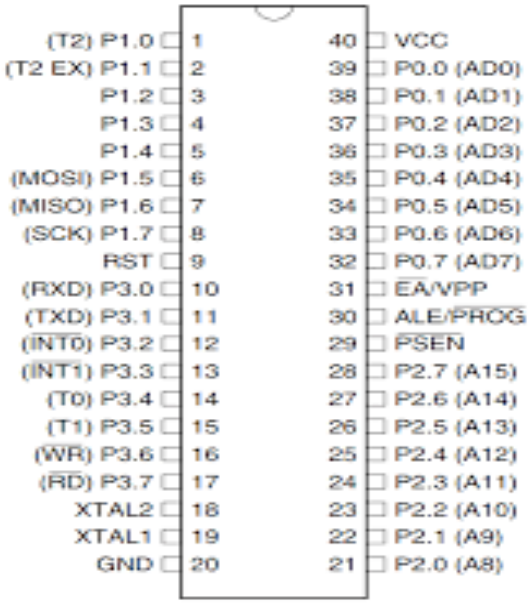


Fig 3.2.5 : Microcontroller At 89c52

AT 89C52 PINOUT:-



MICROCONTROLLER AT 89C52 FEATURES:-

- Compatible with MCS 51 products
- 8k bytes of in system Re-programmable Flash Memory
- Fully static operation : 0 Hz to 24 MHz
- 256 x 8 bit internal RAM
- 32 programmable I/O Lines
- Three 16 bit Timer or Counters
- 8 Interrupt sources
- Programmable serial channel
- Low power Idle & power down modes

MICROCONTROLLER AT 89C52 DISCRIPTION:-

The Microcontroller IC 89C52 has 256x8 bit internal RAM which is most important feature for this application. Here eight to ten readings can be recorded in RAM after each half an hour to achieve data logging. The Timer/Counter application of 89C52 is used to count the pulses from proximity sensor. The interrupt pin INTR0 is used to switch into different setting modes the serial channel is used to get interface with pc for data logger application. The AT89C52 provides the following standard features: 8Kbytes of Flash, 256 bytes of RAM, 32 I/O lines, three 16-bittimer/counters, six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89C52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power down ode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next hardware reset.

3.2.6] DC PUMP:-

In agriculture, water pumps have motors which help to pump the water from various water reserves to the field. It is usually connected to a relay switch. The relay helps in switching on and off the pump, which is controlled by the developer board. Since the proposed project work is a model of the smart agriculture system, the water pump is replaced by a DC Motor with a consideration that a motor is used in a water pump. A typical DC Motor. DC Motors are usually used in toys and small electronic appliances

3.2.7] SERVO MOTOR:-

A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.

Servomotors are not a specific class of motor, although the term servomotor is often used to refer to a motor suitable for use in a closed-loop control system.

3.2.8] L293D MOTOR DRIVE:-

The L293 and L293D are quadruple high-current half-H drivers. The L293 is designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V

36 V. Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as other high-current/high-voltage loads in positive-supply applications. It has connected four motor drive (m1, m2, m3, m4)

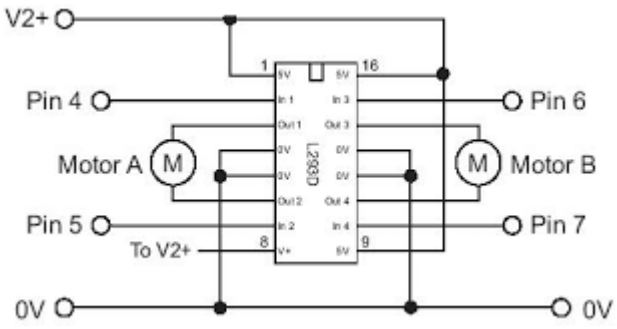


Fig 3.2.7 L293D circuit

- Featuring Unit rode L293 and L293D Products Now From Texas Instruments
- Wide Supply-Voltage Range: 4.5 V to 36 V
- Separate Input-Logic Supply
- Internal ESD Protection
- Thermal Shutdown
- High-Noise-Immunity Inputs
- Functionally Similar to SGS L293 and SGS L293D
- Output Current 1 A Per Channel (600 mA for L293D)
- Peak Output Current 2 A Per Channel (1.2 A for L293D)
- Output Clamp Diodes for Inductive Transient Suppression (L293D)

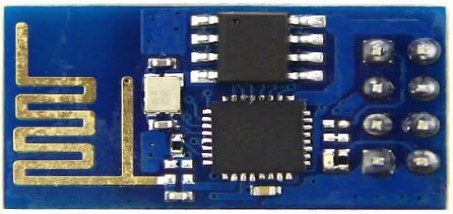
3.2.9] Wi-Fi MODULE ESP 8266:-

ESP8266 is an impressive, low cost Wi-Fi module suitable for adding Wi-Fi functionality to an existing microcontroller project via a UART serial connection. The module can even be reprogrammed to act as a standalone Wi-Fi connected device–just add power.

The feature list is impressive and includes:

- 802.11 b/g/n protocol
- Wi-Fi Direct (P2P),
- soft-AP Integrated TCP/IP protocol stack

This guide is designed to help you get started with your new Wi-Fi module so let's start.



Hardware Connections of Wi-Fi Module

The hardware connections required to connect to the ESP8266 module are fairly straight-forward but there are a couple of important items to note related to power:

- The ESP8266 requires 3.3V power–do not power it with 5 volts!
- The ESP8266 needs to communicate via serial at 3.3V and does not have 5V tolerant inputs, so you need level conversion to communicate with a 5V microcontroller like most Arduous use.

With FTDI 3.3V Board (Legit)

If you have a 3.3V FTDI Serial to USB board you can get started without fear of destroying your new ESP8266 Wi-Fi___33 module. Do note that many FTDI boards have a solder jumper to convert from 3.3V to 5V operation so ensure it is set to enable 3.3V operation

3.2.10] WEB SERVER: -

A web server is a computer that runs websites. It's a computer program that distributes web pages as they are requisitioned. The basic objective of the web server is to store, process and deliver web pages to the users. This intercommunication is done using Hypertext Transfer Protocol (HTTP). These web pages are mostly static content that includes HTML documents, images, style sheets, test etc. Apart from HTTP, a web server also supports SMTP (Simple Mail transfer Protocol) and FTP (File Transfer Protocol) protocol for emailing and for file transfer and storage .these device using mobile Wi-Fi.

3.2.10] SOFTWARE DISIGN :-

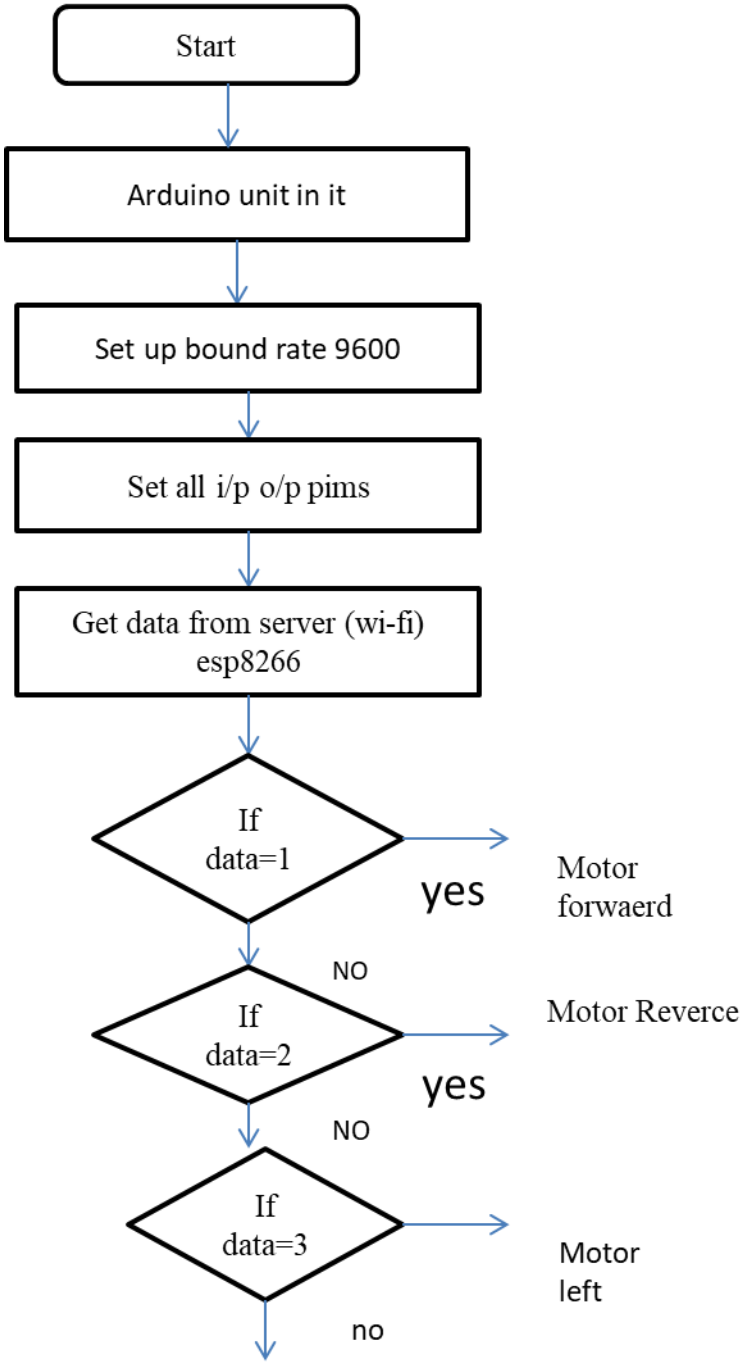
```
#include<reg51.h>

sbit mtr_1 =P2^3;

sbit mtr_2 =P2^4;

sbit mtr_12 =P0^2;

sbit mtr_22 =P0^3;

sbit mtr_121 =P0^4;

sbit mtr_221 =P0^5;

sbit mtr_122 =P0^6;

sbit mtr_222 =P0^7;

sbit m11=P2^0;

sbit m12=P2^1;

//sbit m21=P0^2;

//sbit m22=P0^3;

void serial_init(void)

{

 TMOD = 0x20;

 SCON = 0x60;

 TH1 = -0x08;

 TL1 = -0x03;//0xFD;

 //TR1 = 1;

// EA = ES = 1;

}

void main(void)
```

```
{
   unsigned char mybyte;
  serial_init();
 while(1)
 {
          while(RI==0);    //wait to receive
          mybyte=SBUF;  //save value
          SBUF = mybyte;
          RI=0;
if(mybyte=='a')
          {
        mtr_1 =1;
        mtr_2 =0;
        mtr_12 =1;
        mtr_22 =0;
 mtr_121 =1;
  mtr_221 =0;
  mtr_122 =1;
  mtr_222 =0;
          }
if(mybyte=='b')
          {
             mtr_1 =0; //m1
                          mtr_2 =1;          //m1
                          mtr_12 =0;         //m2
```

```
                    mtr_22 =1;      //m2


                    mtr_121 =0;             //m3

                    mtr_221 =1;             //m3

                    mtr_122 =0;             //m4

                    mtr_222 =1;             //m4

        }

if(mybyte=='c')

        {

      mtr_1 =1;       // m1

                    mtr_2 =0;       //      m1

                    mtr_12 =0;      //      m2

                    mtr_22 =1;      //      m2


                    mtr_121 =0;     //      m3

                    mtr_221 =1;     //      m3

                    mtr_122 =1;     //      m4

                    mtr_222 =0;     //      m4

        }

if(mybyte=='d')

        {

      mtr_1 =0;       // m1

                    mtr_2 =1;       //      m1

                    mtr_12 =1;      //      m2

                    mtr_22 =0;      //      m2
```

```
                    mtr_121 =1;  //          m3

                        mtr_221 =0;        //          m3

                        mtr_122 =0;        //          m4

                        mtr_222 =1;        //          m4

          }

          if(mybyte=='f')

          {

         m11=0;

                        m12=1;

          }

          if(mybyte=='e')

          {

         mtr_1 =1;

                        mtr_2 =1;

                        mtr_12 =1;

                        mtr_22 =1;

                     mtr_121 =1;

                        mtr_221 =1;

                        mtr_122 =1;

                        mtr_222 =1;

                        m11=1;

                        m12=1;

          }

 }

}
```

3.2.11] FLOWCHART:-



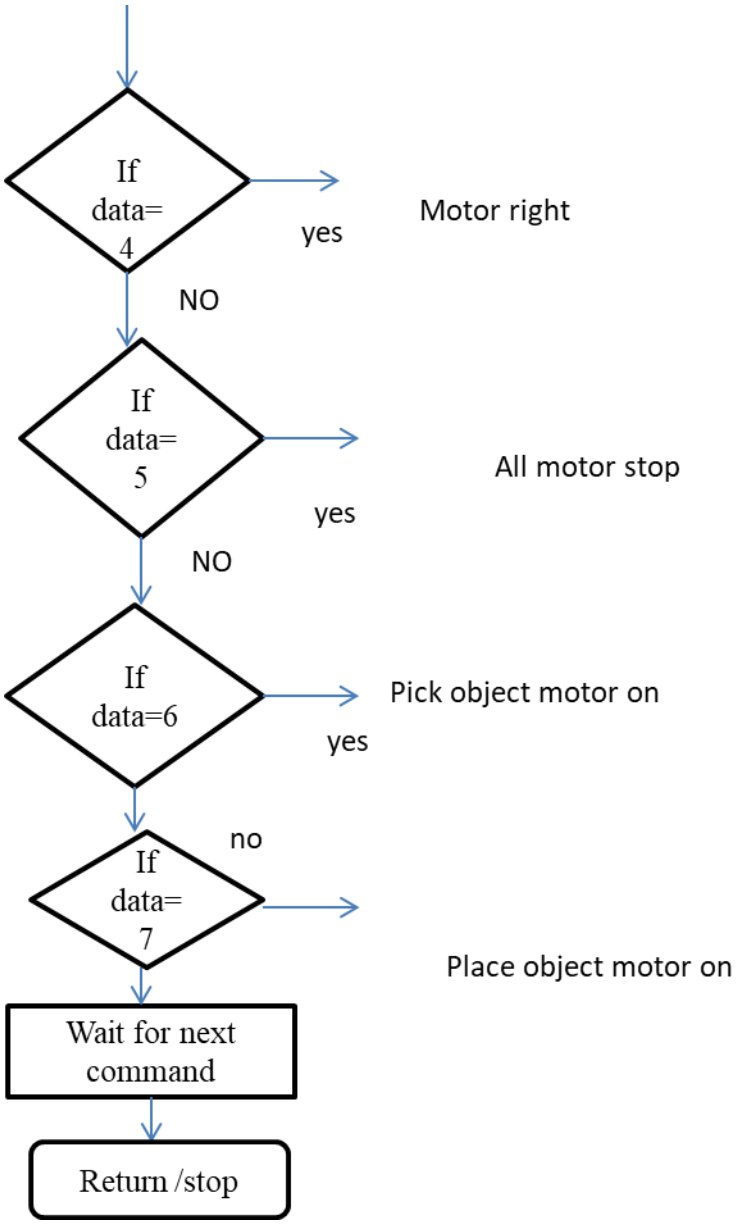


Fig 3.2.11 flow chart

4] PERFORMANCE ANALYSIS:

4.1] SYSTEM OPERATION:

The hardware components and various sensors are interfaced with the microcontroller. The Obstacles in the field are detected using ultrasonic sensor and temperature is measured using temperature sensor. Adriano integrates all the functions like ploughing, sowing of seeds, obstacle detection, obstacle clearance and irrigation. And pesticide these functions are controlled with the help of Wi-Fi module ESP 8266 via web server .the L293D having four DC motor (m1, m2, m3, m4) they are operated using microcontroller 89C52.

HC Serial Bluetooth product consists of Bluetooth serial interface module and Bluetooth adapter. Bluetooth serial module is used for converting serial port to Bluetooth. This module has two modes: master and slaver device.

Weeding was done manually without the use of pesticides. With the development of an autonomous agricultural vehicle with sensors for weed detection, it will again be possible to avoid the use of pesticide The conventional weed control strategy is to apply the same dose rate of herbicide or the same intensity of physical treatments to the whole field.

4.1.1] ROBOTIC SYSTEM:-

A robot is a mechanical and artificial agent. It is usually an electromechanical system, conveys a sense that it has agency of its own. It is a device that automatically complicated task, because of software programming.

1. **Design of robotic vehicle:** In this project, for developing the structure of robotic agriculture machine, simple technique is used. As shown on figure 2, it shows the designing of vehicle it has four wheels which are individually driven and steered. These wheels drive respectively with two dc motor, provides direct drive without gearing. Also there are two sliding bearings, respectively connect to the front wheel and body, so that the front wheel can rotate between +450 or -450 around bearing. All dc motors are energized by dc supply through microcontroller circuit

2. **Path controlling:**

In agriculture environment heavy or loaded vehicle can't move easily on the bumpy road, so small vehicle is designed, operates on dc motor, in this project. For controlling path of vehicle, it should be predefined as

previously, the vehicle drives in straight line to first column and after end of ploughed land, the vehicle rotate 1800 and select second column and proceed further. To maintain the robotic vehicle position in between the two lines of crop there are two sensors that are senses.

4.2] JUSTIFICATION:

Advanced sensing technologies in agriculture can help to meet the challenge; they provide detailed information on soil, crop status, and environmental conditions to allow precise applications of phytosanitar products, resulting in a reduced used of herbicides and pesticides, improved water use efficiency and increased To obtain efficient and accurate weed control systems they must be developed to target specific parts of the field. A field in which the crop is established in rows can be divided into three weeding target areas: (i) the area between the rows (inter-row area) (ii) the area between the crop seedlings within the rows (intra-row area), and (iii) the area close to and around the crop seedlings (close-to-crop area). Now a day the most challenging problem is still to remove weeds within the rows and close to crop plants. So far no commercial selective mechanical methods have been developed for the intra-row or

4.3] OUTPUT :-

5] CONCLUSIONS:

5.1] CONCLUSIONS:

The experiment showed that the robot can basically complete the work of automatic controlled and meet spraying requirements in the greenhouse. The control system has good stability and reliability. The wireless camera bases tracking performs well when the robot runs less than 0.5m/s and turning radius more than 0.5 meters. The spraying part can adjust position within a certain range according to the height of target, and reduce leakage spray and heavy spray as much as possible. There are still some shortcomings in the robot system. For example, there is no location system for nozzle some manual instructions are also required for remote control when the robot works. The system hast automatically adjusting devices of the spray quantity. In the current condition of rapid development of precision farming technology, we should make more efforts to realize variable automatic spray on the target.

The paper has presented that the requirements and progress made towards achieving a future precision autonomous farming system. The assembly is developed for weed control system in ploughed land automatically i.e. no man power required. The project has consists of two different mechanism. The first mechanism contains making an assembly of vehicle and its motion, whereas second mechanism is cutting the weed in between to crop lines. The microcontroller is used to control and monitoring the process of system motion of vehicle. It is controlled with help of DC motor and servo motor. This system also detect obstacle present in path of the vehicle by infrared sensor. It is also used for sensing turning position of vehicle at the end of land. Because of no man power requirement and high speed of operation, it has scope for further expansion

5.2] FUTURE SCOPE:

The system can be advanced for checking the moisture of farming land by moisture sensor and adjust the particular amount of water in soil (i.e. moisture of soil) according to seed and its requirement. It can automatically increase the moisture of soil in land, when providing water supply to this system. The system can further be modified to measuring various parameters in farming like crop growth, weed prevalence, For example, “thinning” is a process in farming where seeds are adequately spaced apart during planting to allow for optimal crop growth. It can also be a time-consuming process.

5.3] ADVANTAGES :-

1. The robots are not getting sick or tired, and the time off is not needed.
2. With higher speeds and closer tolerances, they can operate with fewer errors.
3. They make fewer errors and operate at higher velocities and higher quality.
4. The robots can reduce the use of pesticides by up to 80% of the farm.

5.4] APPLICATIONS:-

1. Nursery Planting
2. Crop Seeding
3. Crop Monitoring and Analysis
4. Fertilizing and irrigation.
5. Crop Weeding and spraying.
6. Thinning and punning.
7. Autonomous tractor.
8. Pecking and harvesting.
9. Milking

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