ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

An Automated Swarm Based Agriculture Robot

Mayur Bawaskar[1], Nikhil Tehare[1], Jaywardhan Mane[1], S.S.Sayyad[2]

Student, Dept. of ENTC Engineering, JSPM'S ICOER Wagholi, Savitribai Phule University, Pune, India[1]

Assistant Professor, Dept. of ENTC Engineering, JSPM'S ICOER Wagholi, Savitribai Phule University, Pune, India[2]

ABSTRACT: In the present situation most of the countries don't have sufficient skilled manpower specifically in agricultural sector and it influences the development of creating nations. So it's a time to automate the sector to overcome this problem. Agriculture is the foundation and backbone of the Indian economy. About half of the total population of our country has picked agri-businesses as their chief occupation. The states like Maharashtra, Punjab, and Kerala, Assam are highly involved in agriculture. It began because of the impact of the effect of, "Green Revolution" by method for which agriculturists came to think about the different techniques required in cultivating and the favorable circumstances in it. As centuries passed, certain advanced systems were developed in horticulture because of the advance in science. These present techniques incorporated the usages of tractors for plugging the field, production of pesticides, innovation of tube-wells and so on. Since water is the fundamental need in this circumstance, techniques were discovered which would help in watering the field easily, consume less water and lessen human endeavors. These revelations enhanced the standard of living of farmers. The constant expanding demand of the food requires the rapid improvement in food production technology. The principle reason is the lack of rain and scarcity of land reservoir water. The non-stop extraction of water from earth is lessening the water level because of which lot of land is coming gradually in the zones of un-irrigated land. Taking the above circumstance in thought, a mechanized sprinkler structure has been implemented which will turn out to be helpful in Irrigation.

KEYWORDS*:* Sprinkler, Irrigation, Moisture Sensor,RF transceiver, Display

I.INTRODUCTION

Agriculture utilizes 85% of accessible freshwater resources worldwide, and this percentage rate will continue to be dominant in water consumption because of population growth and increased food demand. There is an urgent need to make procedures in view of science and technology for sustainable utilization of water, including specialized, agronomic, managerial, and institutional improvements . Therefore, an agricultural robot platform, which is grown freely on the premise of the design concept of open architecture, is presented at first. At that point, a vision-based row guidance method is presented to guide the robot platform driven along crops planted in row. Irrigations the counterfeit use of water to the soil more often helping developing crops. In crop production it is mainly used in dry areas and in times of rain shortfalls, additionally to secure plants against frost. The fundamental discoveries in the sorts of irrigation systems being:

- Drip Irrigation
- Sprinkler Irrigation
- Surface Irrigation

Localized Irrigation:

In the sprinkler strategy for water system, water is sprinkled into the air and allowed to fall on the ground surface to some degree looking like rainfall. The spray is produced by the stream of water under pressure through little holes or nozzles. The pressure is normally gotten by pumping. With cautious choice of nozzle sizes, operating pressure and

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

sprinkler spacing the measure of water required to refill the harvest root zone can be connected almost uniformly at the rate to suit the infiltration rate of soil.

II.LITERATURE SURVEY

In [1], especially vegetables and flowers are cultivated by noting the moisture and temperature suitable to them. This robotic sprinkler makes use of similar concept. The main discoveries in the types of irrigation systems being. Drip Irrigation, Sprinkler Irrigation, Surface Irrigation So, our project aims to work on the traditional methods of irrigation through modern electronics.In [2]the authors, Proposed spray or shower Irrigation is vastly improved in water-saving and yield- expanding than other irrigation techniques. the traditional go-stop go driving technique make it difficult to control and get bed irrigation efforts, thus new control way with high effectiveness and low consuming is needed. Because of the difficulty of real examination, virtual reality is used to simulate the controlling and driving system in this thesis.The key objective [3]was to report on a developed indigenous low cost time based microcontroller based irrigation scheduler who performs user defined functions and outputs commands to derive appropriate actuators (relay, solenoid valves, motor). A soil moisture sensor was modeled, simulated and tested for achieving, with low-cost, accurate and reliable measurements. A low-cost high-performance and small temperature sensor is used, with the same PCB circuit it can measure humidity also. The tipping bucket rain gauge is used to measure rain fall. After a pre-set amount of precipitation falls, the lever tips, dumping the collected water and sending an electrical signal. Here the authors have coordinated [4] at the application conditions of field water saving irrigation technology and the existed issues of transportation engineering, introducing development conditions and obtained benefits of domestic and abroad pipeline transportation and distribution water irrigation systems, putting forward the resolved problems and the related benefits of developing pipeline transportation and distribution water irrigation systems, which offers reference meanings for water-saving irrigation advancement strategy.Here, the energy requirement for variable-rate irrigation sprinkler was analyzed. Boundary equations for triangular irrigation[5] were set up. The relationships between irrigated angle, flow-rate and wetted diameter were included. Based on them, the relationship between flow-rate and variable pressure head for variable-rate irrigation system was obtained. Structural diagram and systematic transfer function were established by the technology of frequency control. Simulated programs were established using MATLAB. It supplied theoretical foundation for energy-saving experimental verification of variable rate irrigation sprinkler for the future.

III.METHODOLOGY

Minimal size spouts are put on riser channels settled at uniform interims along the length of the sidelong pipe and the parallel funnels are typically laid on the ground surface. They may in manner be mounted on posts over the product stature and pivoted through 90 0, to water a rectangular strip. In rotating sort sprinklers, the most well-known gadget to turn the sprinkler heads is with a little sledge actuated by the push of water striking against a vane related with it. Seed sowing machine is a gadget which helps in the sowing of seeds in a craved position thus helping the agriculturists in saving time and money. The key focus of sowing operation is to put the seed and compost in columns at coveted profundity and seed to seed dispersing, cover the seeds with soil and give suitable compaction over the seed.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

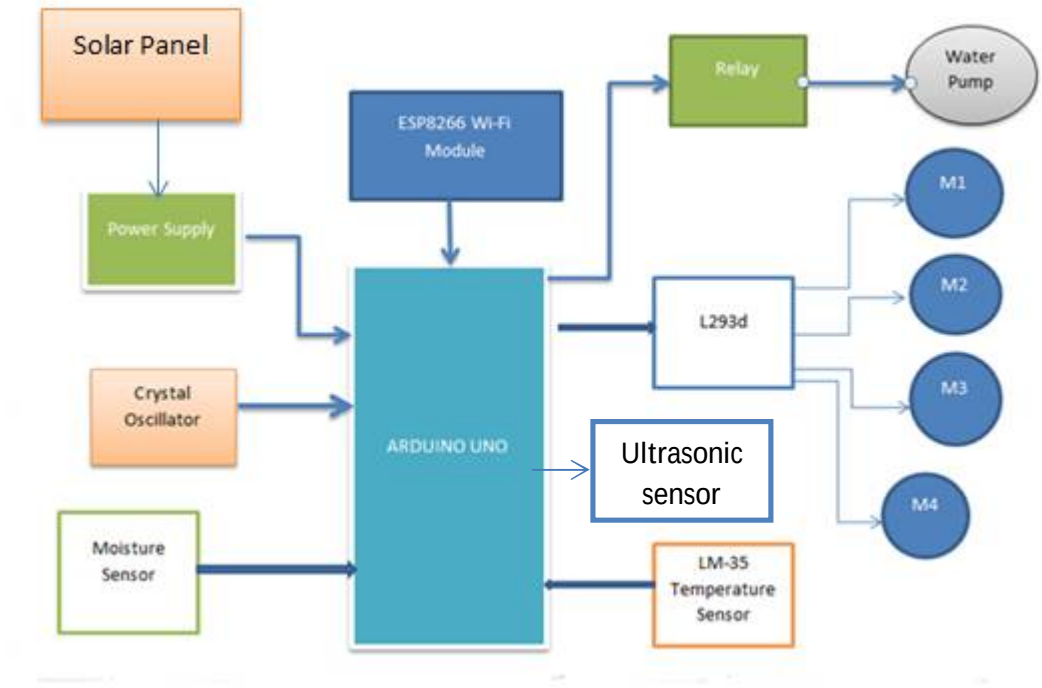

Fig.1: Block Diagram of System

The project implements different parts of seed sowing machine which will be useful for the cultivation business to move towards automation. The farming business has dependably been the establishment of India's supported development. As the number of inhabitants in India keeps on developing, the interest for deliver develops also. Subsequently, there is a more prominent requirement for different editing on the ranches and this along these lines requires effective and high-limit machines. Motorization of the Agricultural business in India is still in a phase of earliest stages because of the absence of learning and the inaccessibility of cutting edge instruments and hardware. In conventional methodologies seed sowing is done by conveying physically, opening wrinkles by a furrow and dropping seeds by hand.

The system is utilized for sensing, monitoring, controlling and for communication purpose. The System block diagram shown in fig .Different sensors are used to detect the various parameters of the soil like moisture and temperature of soil. Depending upon the sensors output the Arduino Uno controller board will take the necessary action. The moisture sensor output will help to determine whether to irrigate the land or not depending upon the moisture content. Along with moisture sensor the temperature sensor output can also be taken into consideration while irrigating the land. If the moisture content of soil is very low and the temperature is very high then there is need of irrigation for plants, but the time for which irrigation will be provided is different for different temperature range.

Working of System

In this project first the robot is go forward, then it will be digging process is going on. Then water will be spread also pesticide is spread. The obstacle is detected by the ultrasonic sensors. The power is given to the system by the solar panel. The first two motor are used for the robot and third dc motor used for water The moisture sensor is put into the ground in order to sense the moisture of the soil. The moisture has two conducting leads. The output of the

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

moisture sensor is based on the wetness of the soil. If the soil is wet there is certain level of continuity between the leads of the sensor. If the soil is dry then there is almost no connectivity between the two leads. Hence, it gives an output that the soil is dry.

B) Component Used

1.Arduino Uno:

Arduino is a single-board microcontroller to make using electronics in multidisciplinary projects more accessible. The hardware consists of a simple open source hardware board designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. The software consists of a standard programming language compiler and a boot loader that executes on the microcontroller.

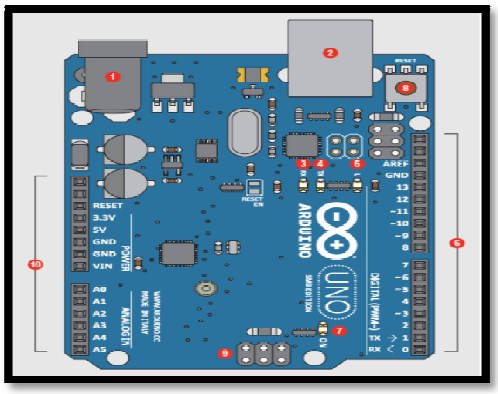

Fig.2:Arduino Uno

2. LM35 Temperature Sensor

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to 150°C temperature range. Lower cost is assured by trimming and calibration at the wafer level.

3. Soil Moisture Sensor:

This sensor can be used to test the moisture of soil, when the soil is having water shortage, the module output is at high level, else the output is at low level. By using this sensor one can automatically water the flower plant, or any other plants requiring automatic watering technique. Module triple output mode, digital output is simple, analog output more accurate, serial output with exact readings.

4. ESP8266 Wi-Fi Module:

Smart Connectivity Platform (ESCP) is a set of high performance, high integration wireless SOCs, designed for space and power constrained mobile platform designers. It provides unsurpassed ability to embed Wi-Fi capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement.

5. Ultrasonic Sensor

An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object.

Advantages

1. Expansive land leveling is not required.
2. High efficiency due to uniform water distribution.
3. Ease and uniform application of fertilizers and pesticides.
4. Piping reduced.
5. Dribbling method is avoided
6. Distance between seed helps perfect germination of seed & its growth
7. Net Gross Production Increases

Disadvantages

1. Higher initial cost.
2. High and continuous energy requirement for operation.
3. Loss of water due to evaporation from the area during irrigation.
4. Manual power required
5. Chances of choke up pipe

Application

1. Farming
2. Gardening
3. Sports stadium's

IV.CONCLUSION

Since moisture content at various areas is different, the system can cover whole area and sprinkle water to all areas relying on the information recorded by moisture sensors. Use of travelling sprinkler reduces piping and its related cost because of the pipe winding given over the Robotic gathering, diminishes water consumption and labor required to give water to the field. Automatic seed bowing method is also proposed herewith. The automated irrigation system implemented was found to be feasible and cost effective for optimizing water resources for agricultural production. This irrigation system allows cultivation in places with water scarcity thereby improving sustainability. A fully automated irrigation system which is controlled and monitor by using Arduino Uno. Using this system, can save manpower, water to improve production and ultimately increase profit. Our future work is to implement an automated irrigation management system by using the wireless sensor networks and test in the real environment by monitoring its performance.

REFERENCES

1. Gore Jayashari, #2Patil Mansi, Solar Operating Traveling Sprinkler For Irrigation ,International Engineering Research Journal (IERJ) Volume 1 Issue 11 Page 1701-1703 , 2016, ISSN 2395-1621
2. Yuan Yan-weiand Zhang Xiao-chao, "Study on precision irrigation technology of large scale irrigator", Chinese Academy of Agricultural Mechanization Sciences, 2009, pp 618-621.
3. Xingye Zhu, Shouqi Yuan, Junping Liu and Yin Luo, "Strategy of Energy-saving for Variable-Rate Irrigation Sprinkler", Technical and Research Center of Fluid Machinery Engineering, Jiangsu University, China, 2009, pp 29-32.
4. WEI Chuang and LI Ming-si, "Advantages and Problems of Developing Pipeline Transportation Water Irrigation Technology", Shihezi University, China, 2011, pp 492-495.
5. Bhosale P.A. and Dixit V.V.,"Water Saving-Irrigation Automatic Agricultural Controller", International Journal of Scientific & Technology Research Volume 1, India, December 2012, pp 118-123.
6. www.nelsonirrigation.com
7. Wall R.W. and King B. A., "Power line carrier communication for center pivot irrigation control" IEEE Computer Applications in Power, April 2001, pp. 109-113.