AUTOMATIC DRIP IRRIGATION SYSTEM AND AGRICULTURAL ROBOT

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ABSTRACT	ARTICLE INFO
In modern world, Automation robot is used in many of the fields such as defense, surveillance, medical field, industries and so on. In this paper, the robot system is used to develop the process of cultivating agricultural land without the use of man power. The aim of the paper is to reduce the man power, time and increase the productivity rate. The entire basic automation robot works like weeding, harvesting and so on. Here the designing systems like plough the land, sowing the seed, watering the plant or spraying are preferred by this autonomous robot using microcontroller. An automated irrigation system was developed to optimize water use for agricultural crops and also to verify water scarcity in the field. A watering system controlled by android application. **Key word: Drip irrigation, robot.**	

I. INTRODUCTION

Non-renewable Farmers today spend a lot of money on machines that help them decrease labor work and increase yield of crops. There are various machines that are available for ploughing, harvesting, spraying pesticides etc. however these machines have to be manually operated to perform the required operations and moreover separate machines are used for every function. Autonomous agricultural robots are an alternative to the tractors found on fields today. Cultivation tasks like seeding, spraying, fertilizing and harvesting may be performed by autonomous agricultural robots in the future. Purpose of this work is to show how someone can easily make own and cheap automatic drip irrigation and plant watering system in just few hours by connecting certain electronic components and other materials required.

Present project work:
This automatic seed sowing & irrigation agribot has increase productivity for Indian farmer. The agribot developed in this paper performs digging, seed sowing and covering seeds simultaneously it powered by solar pane and also introduce automatic plant watering system. Seed sowing and digging robot will move on various ground contours and performs digging, sowing the seed and covers the ground by closing it. This system uses sensor technology along with microcontroller and other electronics in order to

like smart switching system which senses soil moisture level and irrigates the plant if necessary. Agribot is control on android application. The irrigation process is done better than before to yield the proper production.

II. LITERATUREREVIEW

Muhammad et al. proposed a simple approach to irrigation control problem using artificial neural network controller. The proposed system is compared with ON/OFF controller and it is shown that ON/OFF controller based system fails miserably because of its limitations. On the other hand ANN based approach has resulted in possible implementation of better and more efficient control. These controllers do not require a prior knowledge of system and have inherent ability to adapt to the changing conditions unlike conventional methods. It is noteworthy that ANN based systems can save lot of resources (energy and water) and can provide optimized results to all type of agriculture areas. [1]

Kalyan et al. proposed the need for systems that make agriculture easier and more sustainable has increased within the past few years. The ability to conserve two of the most important resources of a farmer, water and time, has been the latest challenge. A system that provides this ability - through the use of efficient and reliable methods such as wireless sensor networking, sprinkler irrigation, GSM, SMS

technologies and readily available mobile phone devices is certain to help the farmers get a better yield and on a larger scale, help the agricultural and economic growth of the country. [2]

Prisilla et al. proposed water is one of nature's most important gifts to mankind, because of the increase in population food requirement for human being is also increasing. Over the past few decade usage of water for irrigation has increased hysterically. Water is polluted due to wastage and contaminants in the industries. Saving water is more important. This ultimate aim can be achieved by using the exiting ANN control system. It will provide a way to save flood water in the fields for future irrigation purpose. [3]

Cosminet al. proposed this investigation demonstrates that there is an unquestionable growing tendency in the adoption of artificial intelligence in agriculture. Computerized expert systems cover a broad area of farming but their number and complexity vary considerably from country to country. Underdevelopment of the IT infrastructure in many countries is the first obstruction in using them, only around 30% of the world population currently having access to these new technologies. [4]

Yethiraj et al. proposed there are a growing number of applications of data mining techniques in agriculture and a growing amount of data that are currently available from many resources. This is relatively a novel research field and it is expected to grow in the future. There is a lot of work to be done on this emerging and interesting research field. The multidisciplinary approach of integrating computer science with agriculture will help in forecasting/managing agricultural crops effectively. [5]

Chetana et al. proposed the automated wireless watering system is a user friendly system, which notifies the user about its status. The 2 modes of operations provide the user with the option of automatic and manual process. The system also provides the log file of the events carried out. [6]
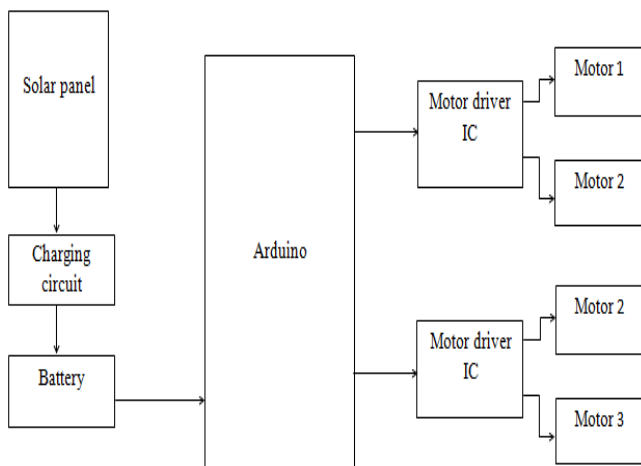
III. BLOCK DIAGRAM

Fig 1. Block diagram

Component List:
1. Moisture sensor
2. Motor drive IC
3. Charging Circuit
4. DC motor
5. Arduino Uno Atmega328
6. Wi-Fi Module ESP8266
7. Solar panel
8. Water Pump
9. Battery 12V 1.3Ah

Circuit diagram of Drip irrigation

In this circuit diagram, motor driver IC is interfaced with the ESP8266. A moisture sensor is interfaced with input. The water pump is output device is connected to ESP8266. Water pump is controlled by manually using android application as well as automatically.
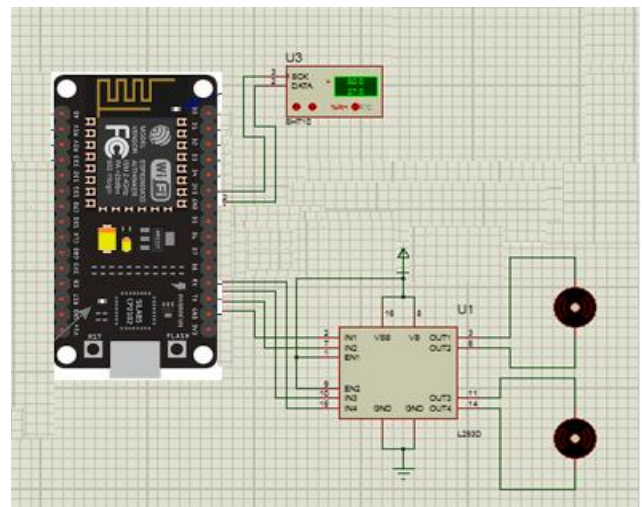

Fig. 2.Circuit diagram of drip irrigation

Circuit diagram of agriculture robot

In this interfacing diagram, arduino is interfaced with motor drive IC. The arduino send the command motor drive IC .The result will be display on virtual terminal as per the coding.
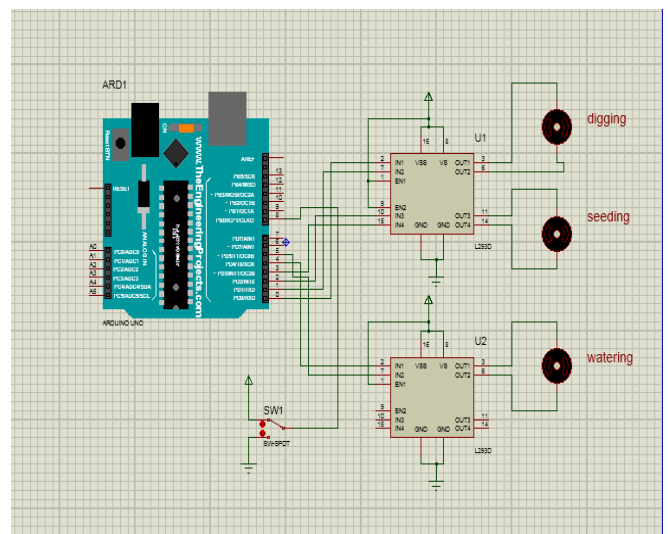

Fig. 3. Circuit diagram of agriculture robot

IV. RESULTS

The system starts by applying the supply voltage to the circuit. The robot has to plant the seeds after every 10cm; it will have to stop after every 10cm. This can be done by turning off the dc motors. Once the robot stops the mechanism attached to the robot will be used for planting the seeds. This mechanism consists of a funnel containing the respective seeds which will be clamped to a hinge attached to motor. There is a plate below the funnel with an indentation in the corner. Note that there is no space between the funnel and the disc below so the seeds would not slip out. Also the disc is smooth to avoid friction between funnel and disc. The seeds are been sowed in a proper sequence which results in proper germination of seeds.

The microcontroller always monitors the temperature and the water content of the soil by using the soil moisture sensor. The irrigation part works in two modes. One mode is automatic mode second mode is manual mode. If it is automatic mode the microcontroller automatically controls the irrigation motor based on the water content, if it is manual mode the motor will switch on/off based on the user command which can be sent through the android app.
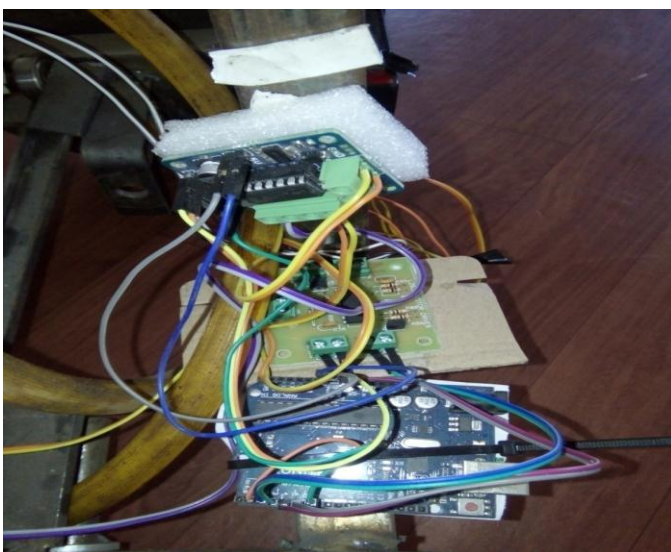

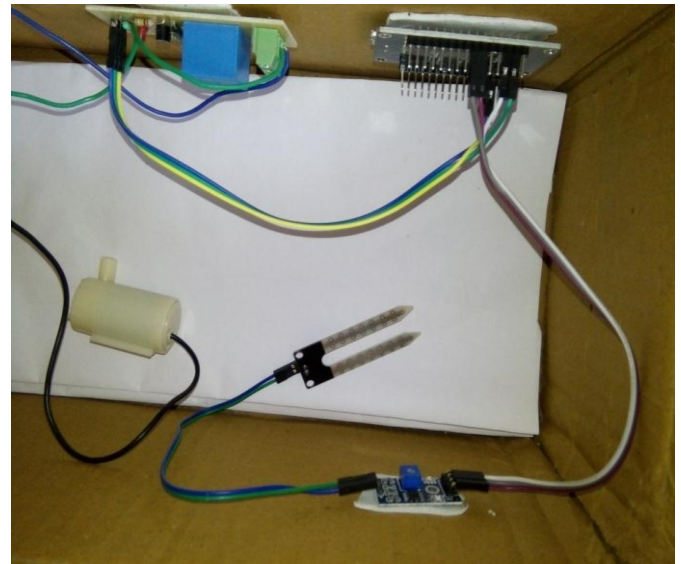Fig 4. Design of seeding robot

Fig 5. Hardware of seeding robot

Fig 6: Hardware of watering robot

V. CONCLUSIONS

This project is mainly based on minimizing man power as well as cost of the equipment. The robot can be with open source system instead of normal robotic car. Automation is needed such as industry, bio-medical, survey line etc. Especially in agriculture field for increasing yield of crops. Flexibility of automation system is high than traditional system. The advantages of this system reduce the labor cost and time. In this work a robot is built and established to carry out automatic and manual seeding, Irrigation, Fertilization in an agriculture field. The functioning of the robot is performed by renewable energy like solar energy. It is expected that the robot will support the farmers in improving the efficiency of operations in their farms. The automated irrigation system developed proves that the use of water can be diminished for a given amount of fresh biomass production. Besides the monetary savings in water use, the importance of the preservation of this natural resource justify the use of this kind of irrigation systems.

VI. FUTURE SCOPE

The use of wireless cameras it connects to our PC to monitor the condition of the crop. And one or more system can be monitoring through the GSM system. Then it also includes the weeding and harvesting in this system.

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