

GSM BASED AGROBOT WITH AUTOMATIC SUN TRACKING SOLAR PANEL

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Abstract

One of the agricultural countries in the world is India, where 70 percent population depends on agriculture. Agriculture is a backbone of Indian Economy as the contribution of agriculture in India has high national income. While maintaining both the quality and quantity of the crops for future generations as well as the resources, the farmers met with the challenge of producing a sufficient amount of crops for the consumer demand. To meet up the future demands for food and to overcome the drawbacks of the conventional method, we have developed the seed sowing machine with automatic sun tracking solar panel and soil testing process in an automatic manner. The agrobot will move on various ground contours and it performs digging, sows the seed and covers it with the soil and an adequate content of water is added according to its texture. This project also spells out the soil testing process using LabVIEW and the results are displayed in the mobile phones using GSM module. It gives the complete installation of the agricultural robot. The method of sowing seeds with automatic sun tracking solar panel is somewhat different from the traditional seed sowing method. The main purpose of the GSM based Agrobot with automatic sun tracking solar panel is to sow the seeds and monitor the soil's fertility as well as the moisture automatically.

1. INTRODUCTION

Agriculture is one of the important parts in our life. It plays a very important role in India's economy. In the current generation, agriculture is demolishing due to lack of man power as well as the natural calamities. The traditional methods are less efficient and time consuming. The environmental influence of agricultural production is very much in focus and the demand to industry is increasing. Even though agriculture is demolishing, at the same time technology for agriculture is also developing with the help of automation. To overcome the drawbacks faced by the farmers, automation in agriculture is implemented. Automation plays a very important role and it helps a lot for developing many fields in the society. So, automation is implemented in the agricultural field to overcome the problems faced by the farmers as well as the people. The technology for the cultivation system is upgraded with the help of automation. The innovation in the field of agriculture is the very big step in our traditional life style. The improvement in agriculture depends on the tools used for agriculture and also lessen the burden of the farmers. In the project GSM based Agrobot with Automatic Sun Tracking Solar Panel, a new technique is implemented with the help of agrobot without affecting the texture of the soil and also crop production. This project reduces the efforts of the workers and also maintains the soil with help of the sensors. The GSM based Agrobot with Automatic Sun Tracking Solar Panel performs a number of simultaneous operations. As day by day, the labor availability becomes the great concern for the farmers and labor cost is more, this project reduces the efforts as well as increasing the easy way of sowing the seeds and soil testing process. In order to increase productivity, an agrobot has been designed for seed sowing, obstacle detection and irrigation process in an automatic manner.

The main aim of the project GSM based Agrobot with Automatic Sun Tracking solar panel is sowing the seed with the help of the agrobot and is moved with the help of the solar energy which works on the principle of the automatic sun tracking solar panel. The automatic sun tracking solar panel moves on the side where there is the light source since it has Light Dependent Resistor with the help of the servo motor. Then, the fertility and the moisture of the soil is monitored with help of sensors and the obstacles in the field is removed by sensing it and also direction of the field is monitored. Then, depending upon the moisture and fertility level which is monitored with the help of LabVIEW, water is poured and fertilizer is sprayed. At last all the information is passed to the farmers with the help of GSM module.

2. HARDWARE DESCRIPTION

The project is designed with

- Microcontroller
- Solar Panel
- Moisture sensor
- pH Sensor
- Ultrasonic Sensor
- Optical Sensor
- GSM module

The GSM-based Agrobot with Automatic Sun Tracking Solar Panel performs a number of simultaneous operations. As day by day, the labor availability becomes the great concern for the farmers and labor cost is more, this machine reduces the efforts as well as increasing the easy way of sowing the seeds and soil testing process. The seed sowing process is carried out with the help of agrobot using PIC16F877 microcontroller and is programmed to sow the seed by maintaining the distance. The agrobot is powered with the help of solar energy using solar activation system. In order to increase productivity, an agrobot has been designed for seed sowing, obstacle detection and irrigation process in an automatic manner. The obstacles are detected with the help of ultrasonic sensor and digged out using digging process. The soil conditions also checked with the help of moisture sensor and pH sensor. The movement of the agrobot is monitored with the help of the optical. The methodology includes the soil monitorization using LabVIEW. GSM technology is used to communicate with the farmers for passing the information through SMS.

3. EXPERIMENTAL SETUP

The Agrobot acts as a major block of the entire project. Since the Agrobot done the irrigation process with the help of the microcontroller. The moisture content of the soil from the soil moisture sensor, pH from the soil pH sensor, obstacle detection from ultrasonic sensor, movement of the bot is monitored by optical sensor is sensed and collected through the Microcontroller software. The data which are collected from this set up displays the result in the software and also it sends the information through the GSM module.

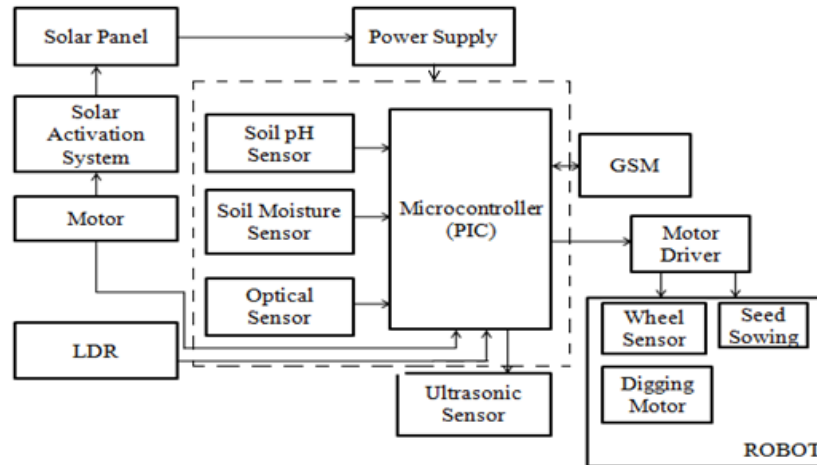


Fig.3.1 Block Diagram

This is the block diagram representation for the proposed method of GSM based Agrobot with Automatic Sun Tracking Solar Panel.

4. SOFTWARE DESCRIPTION

The software which we used for our project is

MPLAB

LabVIEW

4.1 MPLAB

Microchip has a large suite of hardware and software development tools integrated within one software package called MPLAB Integrated Development Environment (IDE). MPLAB IDE is an integrated toolset for the development of embedded applications on Microchip's PIC. It is called an Integrated Development Environment, or IDE because it provides a single integrated environment for embedded microcontrollers to develop the code.

4.2 LabVIEW

Laboratory Virtual Instrument Engineering Workbench (LabVIEW) is a development environment and system-design platform for a visual programming language from National Instruments.

5. RESULT

The fig.5.1 shows the simulation of GSM based Agrobot with Automatic Sun Tracking Solar Panel using Proteus Software with PIC16F877a. The simulation process show some of the result of the sensor used. The robot inspects the soil condition and sends the information to the farmers.

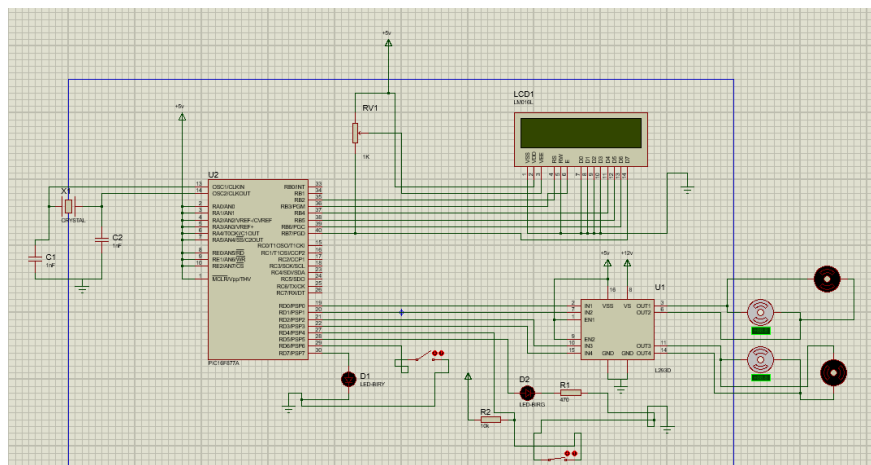


Fig.5.1 Simulated Output

6. CONCLUSION

The proposed system is automated and manages soil status effectively and efficiently and also reduces risk to farmers. The Agrobot monitors and thus provides information to the farmers through web servicing and a SMS is sent to farmers mobile. The developed system maintains seed to seed spacing and it reduces the labour requirement and also save lots of energy. The proposed is mainly developed for the betterment of farmers.

7. FUTURE SCOPE

The agrobot can be further enhanced by adding various sensors like Atmospheric sensor, leaf wetness sensor and so forth. The Agrobot can be further developed with Zigbee technology to alert farmers in case of emergencies through messages. The data collected from the farmland can be stored in the cloud using server.

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