**IoT based Solar Powered Agribot for Irrigation and Farm Monitoring**

**ABSTRACT**

Agriculture contributes to a major portion of India’s GDP. Two major issues in modern agriculture are water scarcity and high labor costs. These issues can be resolved using agriculture task automation, which encourages precision agriculture. Considering abundance of sunlight in India, this paper discusses the design and development of an IoT based solar powered Agribot that automates irrigation task and enables remote farm monitoring. The Agribot is developed using an Raspberry pi. It harvests solar power when not performing irrigation. While executing the task of irrigation, it moves along a pre-determined path of a given farm, and senses soil moisture content and temperature at regular points. At each sensing point, data acquired from multiple sensors is processed locally to decide the necessity of irrigation and accordingly farm is watered. Further, Agribot acts as an IoT device and transmits the data collected from multiple sensors to a remote server using GPS/GPRS. At the remote server, raw data is processed using signal processing operations such as filtering, compression and prediction. Accordingly, the analyzed data statistics are displayed using an interactive interface, as per user request.

**INTRODUCTION**

According to the recent statistics [1], the land used for crop cultivation in India is decreasing at an accelerating rate. Outdated irrigation techniques and availability of water resources are the primary reasonsfor incoherent production. Hence, technological solutions for agriculture task automation are the need of the hour. In particular, simplified irrigation mechanisms reducing water wastage are very essential, which encourage precision agriculture. Technological solutions for irrigation and agricultural task automation are driven by electric power. Throughout a year India receives solar radiation on an average 3000 hours of sunshine (i.e. 4-7kWh of solar radiation per sq. meters) [3]. Hence solar driven technological solutions for agriculture task automation can yield better benefits for Indian environmental conditions.

EXISTING SYSTEM

Many such technological solutions have been addressed in the literature that achieve agriculture task automation and help in remote monitoring the farm land. Some of them are discussed as follows. A smart irrigation controller is developed using PIC16F876A microcontroller, which transmits the data using XBee link to a remote server. However, the developed system can monitor moisture only at a single point. Hence, to monitor a given farm area, large number of sensor have to be deployed which increases the cost of the system. XBee can communicate in a limited range of 50 m. The developed remote interface does not perform any signal processing operations to obtain useful statistics relevant for farm monitoring. A two cell overhead crane system [5] is proposed for agricultural task automation. Specifically, tasks such as spraying fertilizer, irrigation, planting seeds have been proposed for automation by a solar driven crane system. However development of such systems require a large budget and in addition if such systems need to monitor the farm land ,multiple sets of sensors need to be placed at various geographical points.

DISADVANTAGES

* XBEE only used in Short Range
* It required more cost.
* It cannot predict the condition of Agriculture.
* It automatically Spray pesticide.

PROPOSED SYSTEM

In this paper, we develop an Agribot, capable of irrigating the form, harvesting solar power while not irrigating and also monitoring the farm from a distant node. At the distant node, after proper analysis of raw data obtained from different data transmissions at the farm, useful data statistics are obtained and displayed according to user interest. The benefits of the developed Agribot are better efficiency in water usage compared to manual irrigation, achieved via direct soil moisture and humidity measurements at various geographical positions in the farm. It is worth noting that the developed Agribot irrigates the farm not based on a single point data like in the automated systems, but irrigates based on averaged data obtained at each point. As the Agribot can move around the farm, there is no necessity of installing multiple sensors at various geographical points in the given farm. In this they automatically capture the image and spray the pesticide .And they send temperature and soil moisture.

PROPOSED ADVANTAGE

* Used to capture image and compare with the database and suggest the best pesticide.
* Automatically Spray Pesticide.
* Send IOT the temperature and Soil moisture to webpage.
* So we can get high yield from the agriculture form.

BLOCK DIAGRAM

POWER SUPPLY

Camera

GPS/GPRS

MOTOR 2

MOTOR 1

SOIL MOISTURE SENSOR

PUMP 1

PUMP 2

TEMPERATURE SENSOR

RASPBERRY PI

HARDWARE REQUIREMENT

* RASPBERRY PI
* SOIL MOISTURE SENSOR
* TEMPERATURE SENSOR
* GSM/GPRS
* MOTOR
* PUMP
* CAMERA

SOFTWARE REQUIREMENT

* PYTHON