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ADVANCED ESSENTIALS BASED ON AGRICULTURE USING SOLAR TRACTOR WITH WIRELESS SENSOR NETWORKS

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ABSTRACT

This paper presents an overview on agriculture using wireless sensor with solar tractor. Using wireless sensor, here we discuss about Soil Monitoring, Animal's Protection, and Manure so on. The farmer cultivates his field level by level to the growth of plant life, and farmer's waste lot of money for workers, and also wasting the time for yielding. Agriculture is the science of art practice of refining the soil, crops, and raise farm nature and in varying degrees the preparation and marketing of the resulting products. Agriculture is the basic need for animals, plants, fungi, and other life food, fiber, bio fuel and other goods used to sustain and enhance human life. For plants, this usually requires some outward show of irrigation, although there is method of dry land farming. Livestock are raised in a mixture of grassland-based and landless systems. And important task the farmers lands are enclosed by power supply to protect plants from animals like elephant, forest cow, and tiger. The tractor avoidance system gives an alarm and messages to the farmer and agriculture department to protect the plants.

KEYWORDS

Precision Agriculture, Environmental Monitoring, Process Control, Wireless Sensor Networks.

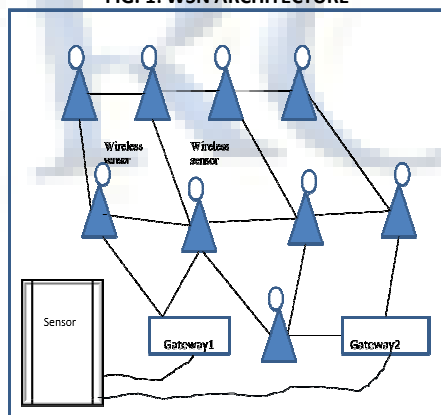
1. INTRODUCTION

The service demand for irrigation from pumping is based on more than a few factors including the growth of the sector, cropping patterns, other irrigation armed forces, and water management practice. The rights of pump-sets and the average hours of operation of pump-sets. India is an agriculture country. The basic need of an Indian cultivation is agriculture 75% sides are bounded by water, and 25% sides are bounded by land. By using solar tractor they yield land very easy with less amount of time, with wireless sensor network we gather the day to day data factor like soil, weather situation, and others. Farmer plays an important role. Mechanical sensor and wireless network allow local and real-time observation and monitoring. Now a days, robotics plays an important role to cultivate. In some country they discover this type of robotics for research.

1.1. REQUIREMENT OF WIRELESS SENSOR AND TRACTOR

Sensor and Telecommunication technology has quickly developed. Using Grass property and labor-intensive downloading to develop wireless on-line sensors and is affecting towards interoperable and also self-reliant sensor webs. Most new tractors equipment is sold with factory installed (GNSS) global navigation satellite system take delivery of a range of sensors. WSN system have need of a centralized control unit with use interface, Communication gateways and routers, control elements and most vital – the sensors.

FIG. 1: WSN ARCHITECTURE



2. RELATED TO WIRELESS SENSOR NETWORK MODULES

Based on soil characteristics, plant resources, crop protection, some other diseases and pest attacks are inform through the farmer with WSN. Using tractor, the necessary action taken like spraying, cropping, yielding, spraying chemicals to plants depends on farmer land. How many acres of land can calculate by using sensor and done the process.

The different factors related to task are

- Soil monitoring
- Plant protections
- Insect protections
- Animal protections
- Fertilizers
- Tractor Guidance system
- Irrigations
- Harvestings

2.1. SOIL MONITORING

Wireless sensor helps the farmer depending on soil characteristics. A huge quantity of fertilizer is used to cultivate crop depends from one place to another, can estimate by using Wireless Sensor Network. WSNs have become an important tool in soil monitoring. The relatively low cost of the devices allows the installation of a dense population of nodes that can adequately represent the variability present in the environment.

They can give danger measurement information, like for example alerting farmers at the onset of frost damage and providing better microclimate awareness. It help farmer to reduce time consumption and yield cost more toward farmer. The tractor using sensor update the data's day to day activity.

2.2. PLANT PROTECTIONS

Using WSN, The affected seed disease which is caused can be easily monitored through sensed or detected (removed). Plant monitoring also called phytomonitoring, is easier using wireless sensor network. For example, with the help of a WSN the owner of producer can manage the operation of the vineyard more efficiently and automatically. After sensing, the unnecessary seeds are removed. This method of checking the plant protection improves the growth of plant. So, the farmer can be yield more cost.

2.3. INSECT PROTECTIONS

The agriculture can spoil more, with and without Insects. The insects can cause some disease to plants and it spoils the growth of plants. A system provides a valuable framework for farmers and pest control officials to analyses the relation between population dynamics of the fruit fly and meteorological actions. Based on the analysis insect pest risk assessment and decision supporting system can be made as an aid to programs against to control, by using the sensor tractor to spraying chemicals to avoid the insects causing diseases.

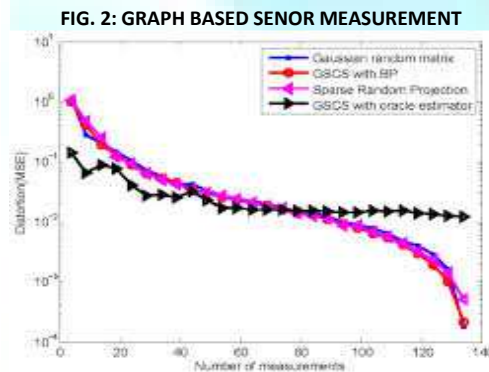
2.4. ANIMAL PROTECTIONS

Farmers have large acres to cultivate the plants. Animals are entered ,destroy his field. It causes more loss to farmer. Animal welfare is an issue of great importance in modern food production systems.

Because animal behavior provides consistent information about animal's health and benefit, modern research has expected at manipulative, monitor systems capable of measuring acres to prevent power supply through current wires, but it causes the death of animals.

2.5. FERTILIZERS

The progress has been made in the use of proximal remote measurements with handheld & tractor mounted sensors for nutrient management inerrable farming. The green pollution, high nitrate concentration collects in the safe to eat parts of these green vegetables, particularly if extreme nitrogen fertilizer has been applied. These crops are harmful to human health; thus developing a suitable approach for the agricultural application of nitrogen fertilizer is essential. Organic, inorganic, and liquid fertilizers were utilized in this study to investigate their effect on nitrate concentrations and lettuce growth.



It helps to growth of plant health and good culture to soil, destroy the insects. Because of these farmers earned more profit.

2.6. TRACTOR GUIDANCE SYSTEM

Using tractor guidance system upload Soil Type Data, Plant culture, Sheltered Machine mechanism, spraying the Chemical, manure is record in the database with sensor network. The data collection, monitoring and analyze material application to the crops allows for higher yields and lesser cost, with a smaller amount force to the surroundings.

Each area receives only what is required for its particular space, and the appropriate time and duration. Depends upon the climate condition summer to winter (6 months) and winter to summer(6 months) variations are saved into it. Farmers obtain a safety measure through messages with help of Bluetooth.

2.7. IRRIGATION

The potential of sensor technology for irrigated agriculture has been studied since standard 80's. Sol Chip is an energy-harvesting company that has developed maintenance frees Everlasting Solar Battery. The battery can deliver energy from the duration of low-power devices.

Sol Chip's technology provides a platform for disruptive applications such as precision agriculture and Internet of Things (IoT). Sol Chip's innovative technology is designed to enable autonomous operation of devices and systems powered by a Plug n' Play solar energy sources. Since then rapid development of communication technologies has been replaced with wired soil conditions monitoring systems with wireless sensor. The wireless techniques make system faster to deploy and provide flexibility. While challenges were founded in cost of sensors, Depending on staff experience in electric supply.

2.8. HARVESTING

The leading and largest event in energy harvesting and storage technologies, Sol Chip are launched its product and demonstrated the use of its technology in multiple market segments including RFID, IoT (Internet of things), agriculture, security industrial wireless sensors. In sensor, there are several methods,

- A moisture sensor,
- A Ground Speed Sensor,
- A Cut With Sensor,
- An Elevation Speed Sensor And
- A DGPS (Differential global positioning system).

Other grain field sensors are

- Mass Measurements

- Flow Measurements
- Impact Sensors and Indirect Methods

The result is that from now on, any electronic device can harvest its own energy from the surroundings and become a maintenance-free, self-directed device which contributes to a cleaner surroundings. Sol Chip's patent-protected technology eliminates the need for a solar panel area and its miniaturized solution provides perpetual power for wireless sensor and mobile electronics.

3. EQUIPMENTS OF SENSOR WITH AGRICULTURE

Our networks have already been put at use in a large variety of applications that need to have high performance and to be cost-effective; energy harvesting further increases this range of applications and the networks. Fleet management agriculture crop production consist of two main components

- Located on the vehicle
- And a software Application

FIG. 3: USING WIRELESS SENSOR TO YIELDING WITH SOLAR



Traditional equipments and automatic meter reading (AMR) plus advanced metering infrastructure (AMI), mesh networks, system control and data acquisition (SCADA), data loggers, measurement while drilling, oceanography, environmental systems, emergency/safety systems, military/aerospace systems, and more.

3.1. TELECOMMUNICATION MONITORING

The transport Telecommunication consists of a positioning system

- A keyboard for fleet management and
- A series of networked sensor nodes

Large and intensive crop production farms invest heavily in machinery. Therefore their usage and safeguarding must be efficiently planned and implemented.

Fleet management and WSN agricultural crop application can be classified into two groups

- Plant production vehicles and equipment,
- Unmanned Aerial vehicles

The field operations are soils monitoring, plants and animal's protection, insect's protection, fertilizers, irrigations and harvestings. The routers' removal means less contact overhead, as well as simple less comfortable processors, while small diversity eliminate multiple path special effects and also provides no single point of failure.

Another benefit of the new creation Virtual expansion wireless mesh network is the lower power control; they enable battery-powered application to reliably run for long years on a single cell battery.

Following the combination with Sol Chip Energy Harvester, this want for battery is now eliminated.

3.2. WIRELESS MACHINERY AND DATA

Data Centers face considerable challenges in seamless integration of telemetry and control functions. These functions are necessary to management tasks related to authority capping, cooling, consistency, unavailability, live ability, and flexibility control.

It is therefore essential to create an infrastructure of sensors that monitors the physical properties of the dynamically changing environment.

The conventional approach to support dispersed sensor data gathering and control using wired solutions are static, costly, and non-scalable.

In this paper sensors and control agents supporting this telemetry are a part of a dense and noisy network that are scattered across the data centers.

We present an alternative approach for this unique environment using wireless sensor network to improve data efficiency and real-time delivery.

The automatically collected and process operational task for agricultural machinery in real time.

1) The machinery-based unit collects

- The machine position and
- Attitude data

2) The office-based unit collects

- Data fusion to estimate the machine position correctly wireless
- Data-link layer transmits the data between machinery and organization based units.

The machinery positioning, data and sampling rate of 50 hertz. Apart from research journalism and prototyped trial, main agricultural equipment company are suitable key factors in agriculture.

FIG. 4: FARMER MAGNITUDE THE PATH



One drawback to spraying the seeds with the help of flying vehicles the plants are not in correct manner to growth. They presented an ultra low volume sprayer for a UAV helicopter.

The spraying seeds will in specific portion. Production management focused on the use of a combination of simple digital photographic cameras with spectral filters.

Successful test were performed on ten varieties of wheat grain in trail micro-plots can seen using a tractor mechanism.

The monitoring environmental and soil conditions can make farming more profitable and sustainable, for instance, through better water management and pest and disease control (It is estimated that the overall efficiency of water use for agriculture is less than 25 per cent).

Improved operation and management of Water for irrigation can lead to significant savings and to a more sustainable use of water resources, as well as improved soil efficiency.

The some following tools can be used in agricultural and soil monitoring to enhance the farming system and increase the production, which includes: Stand-Alone Sensors: These sensors measure air temperature, atmospheric pressure and humidity.

The data is further transmitted to other servers for data analysis via a wired Internet connection. A decision support system maps the temperature distribution together with other information. Based on this information, farmers can take different actions and vary the amount of fertilizer and pesticide used. Wireless sensors are further used for precision irrigation, and systems developed for remotely restricted, automatic irrigation.

Sensors assume, for example, the tasks of irrigation control and irrigation scheduling using sensed data together with additional information, e.g. weather data. Sensors are used to assist in precision fertilization.

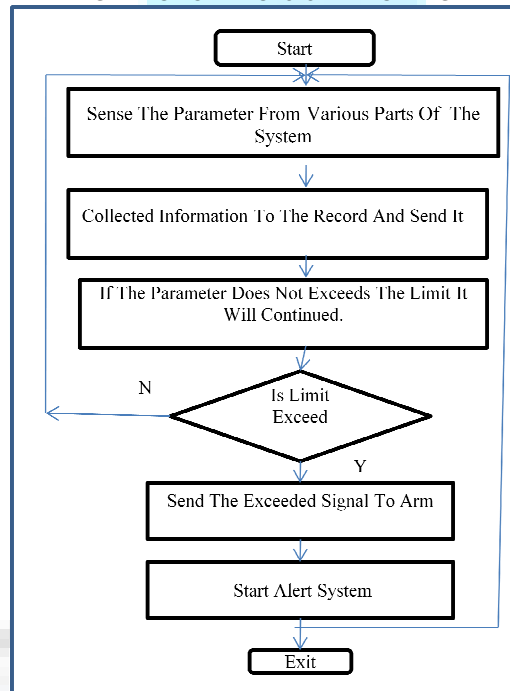
4. ALGORITHM AND WORKFLOW OF THE SYSTEM

A. ALGORITHM OF SYSTEM WORKING

- 1) Start
- 2) Detect the constraint from various sections of the sensor network
- 3) Feed the collected information to the record
- 4) Then access and procedure the data
- 5) If process parameter exceeds their boundary then send command to set alert system
- 6) Send the GPS data over GSM
- 7) If the parameter does not exceeds the limit it will continued.
- 8) Exit

B. WORK FLOW OF THE SYSTEM

FIG. 4: FLOWCHART OF SYSTEM WORKING



5. CONCLUSION

In general, sensors and sensor networks significantly contribute to a more sustainable use of natural resources. However, growth of sensors and networks for accuracy agriculture is in an early stage and sensor applications tend to be expensive. As on date, farmers only take economic benefits into consideration when deciding on whether they should rely on precision agriculture. Farmers to identify the environmental measurement by pointing out the economic benefits of improved soil and pasture quality as well as reduced applications of fertilizers and pesticides. Finally this study will helps to understand briefly on Farming methods in WSN and Applications and its Research issues.

India being an agricultural country needs some becoming increasingly concentrated on monitoring and innovation in the field of agriculture. The tractor is used for unknown thermal suitable places like forest, river, dams... etc. This can be achieves scheming the entire conservatory yielding process. During recent technologies which support computing, the necessities in the aspect of WSN based crop communication and control within devices ad solar.

WSN suit for monitoring system functions can be mainly summarized. Technologies have become a backbone for modern precision agriculture monitoring. Our people populations increase year by year.

So this WSN techniques are very helpful to the farmer to gain more cost depend on the climate situation.

After we concentrate on machineries replacement and sensor signal and also cost of machinery. By using back propagation algorithm with neural network the data are created.

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