Farmer Safety Security and Weather Acknoledgement for Better Farming

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ABSTRACT
With the advances in electronic and information technologies, various sensing systems have been developed for specialty crop production around the world. Accurate information regarding the spatial variability in fields is very important for precision farming of certain crops. However this variability is affected by a number of factors such as crop yield, soil property and nutrients, crop nutrients, crop canopy volume and biomass, water content and pest conditions (disease, weeds and insects).These factor can be measured using various types of sensors and instruments. Sensing techniques for soil properties and nutrients are most advanced and can provide the data required for better crop production. This paper presents a review of how these sensing technologies are used for precision agriculture and crop management.

Keywords
Precision agriculture; sensing;

1. INTRODUCTION
India is home to the fourth largest agricultural sector in the world. The current practices in farming does not give any information to the farmer regarding the quality and quantity of fertilizers required for their soil and the best suited crops for their soil.

We aim to help the farmers get this information using sensors. The sensors analyze the soil and send the required collected data to agriculture specialists via satellite network monitored by controller. The specialist carry out necessary calculations on the received data and send back the conclusion to the farmer.

In addition to this, to avoid labor problems specially configured robots can be used. Robots can be used for other horticultural tasks such as pruning, weeding, spraying and monitoring.

2. SENSORS REQUIRED
There are various sensors available for analyzing soil. Some of them that can be used are

1. ELECTROCHEMICAL SENSOR[4]
Electrochemical sensors are amperometric of potentiometric devices that produce a voltage or signal relating to a chemical state or reaction. A large number of electrochemical sensors have been developed for a range of chemical properties suited to soil sensing (e.g. pH, NO3-, Na+, K+, Cl-, Ca+, Mg+ etc). There are two types of electrochemical sensors that can be used.

1. Ion Sensitive Field Effect Transistors (ISFETs) are pH sensors based on a Field Effect Transistor (FET). The gate insulator (oxide) of the FET is left exposed to the measured electrolyte so that current flow is regulated by proton interaction, and therefore pH of the solution.

2. Chemically modified ISFETs (CHEMFETs) are identical to the ISFET but with membrane layers applied to the gate oxide surface so sensitivity can be targeted at a specific ionic species (e.g. NO3-).

These sensors can be used for pH measurement and continuous monitoring of nutrient status.

2. MOISTURE SENSOR[5]
Soil moisture sensors measure the water content in soil. soil moisture sensors measure property, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for moisture content. The relation between the measured property and soil moisture must be calibrated and may vary depending on soil type. Reflected microwave radiation is affected by the soil moisture and is used for remote sensing in hydrology and agriculture.

Measuring soil moisture help farmers manage their irrigation systems more efficiently. Not only are farmers able to generally use less water to grow a crop, they are able to increase yields and the quality of the crop by better management of soil moisture during critical plant growth stages.

3. TEMPERATURE SENSORS[7]
Thermistors, thermocouples, thermocouple wire, and averaging thermocouples are standard soil temperature sensors that are available. Campbell Scientific dataloggers are capable of measuring most commercially available soil temperature sensors.

4. ION-SELECTIVE SENSORS
Ion-selective sensors have been developed to detect a variety of ions. ISE sensors have been developed to monitor nitrogen ions in the soil and crops, such as potatoes and vegetables for fertilization management. Concentrations of ions, such as iodide, fluoride, chloride, sodium, potassium,and cadmium, in plants or soils have been measured by ISE sensors to investigate plant metabolism, nutrition, and toxicological effects that heavy metals may have on plants.

5. IR-360 OMNI DIRECTIONAL SENSOR[8]
The omnidirectional sensor is the image sensor that can observe 360-degrees at a time.Surrounding scenery is reflected to the omnidirectional mirror, and it takes a picture of the image with the camera upward installed.

Vertical view is upper side 10-15 degree and lower side about 55 degree

6. MOTION SENSOR[9]
It is common for stores to have a beam of light crossing the room near the door, and a photosensor on the other side of the room. When a customer breaks the beam, the photosensor detects the change in the amount of light and rings a bell.

Many grocery stores have automatic door openers that use a very simple form of radar to detect when someone passes near the door. The box above the door sends out a burst of microwave radio energy and waits for the reflected energy to bounce back. When a person moves into the field of microwave energy, it changes the amount of reflected energy or the time it takes for the reflection to arrive, and the box opens the door. Since these devices use radar, they often set off radar detectors.

3. METHODOLOGY

The basic methodology involved in the project is as follows. The sensors are mounted on the agricultural field. Firstly the sensor collects data of the soil and temperature from the surroundings. This data is transferred to a specialized controller placed separately within a shed in between the field. This is done by ZigBee transceivers. The controller compares this data with the data previously stored in the database and sends the corresponding messages to the farmer.

Fig 1: **Electrochemical Sensor**

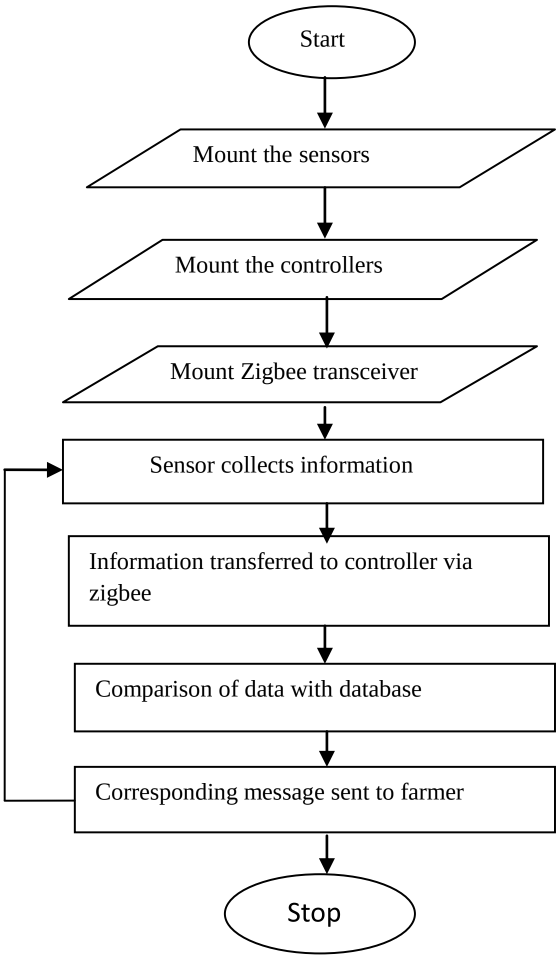

Fig 2: Flow chart of methodology

4. CONCLUSION

From this analysis we observe that this model is appropriate for rural areas,so that this model can be handled efficiently by the farmer and they don't require any specialist for handling the system and can be used efficiently.

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