**INHOUSE PROJECT**

**Real Time Monitoring of Environmental Parameters in Precision Agriculture using Wireless Sensor Network**

**SYNOPSIS**

**SUBMITTED TO**

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**BANGALORE**

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**PROBLEM STATEMENT**

Agriculture is one of the industries which have recently diverted their attention to the newly emerged wireless sensor network (WSN), seeking this cost effective technology to improve its production and enhance yield optimization. The wireless sensor network can be used in monitoring agricultural environment for various parameters such as temperature, humidity and soil moisture.WSN makes use of sensor nodes which are essential devices for precision agricultural applications.

**ABSTRACT**

Wireless sensor network is one of the newly emerged technologies that are spatially distributed autonomous sensors, which is spread rapidly into various multi-disciplinary fields. WSN for agriculture is similar to those used in other industries such as Industrial controls, Building automation and Security systems. WSN system requires centralized control unit with communication gateways, user interface, routers, power elements and most important –the sensors. Using sensor nodes one can monitor the physical or environmental conditions, such as temperature, humidity, soil moisture and to cooperatively pass their data through the wireless technology to a sink node.

Precision agriculture is a farming management concept based on observing, measuring and responding to inter and intra-field variability in crops. Traditionally, agriculture is done by performing the task such as planting or harvesting, against the predetermined schedule. But by collecting the real time data on weather, soil, crop maturity and even labor cost and availability, predictive analytics can be used to make smarter decisions.

The simulator being used for monitoring of environmental parameters along with WSN is done using Agricultural Production Systems Simulator (APSIM) which is internationally recognized as a highly advanced simulator of agricultural systems. It contains a suite of modules which enable the simulation of the systems that cover a range of plants, animals, soil, climate and management interactions. This paper describes implementation of wireless sensor network using LEACH protocol in agriculture sector and monitoring the various environmental factors such as temperature, humidity, soil moisture along with other factors which can be of significance.

**INTRODUCTION**

Wireless sensor networks are widely used in agriculture in countries to increase the productivity and monitor the crops more efficiently. Wireless sensors are deployed in fields and are divided into clusters such that each cluster contains every type of sensor. We use various type of sensors performing various tasks like water monitoring, keeping track of soil moisture and climate change effects.

Sensors of one cluster do not communicate with each other, they communicate with the head node or an access point. They are connected to the base stations through a network. Base station is connected with local management by network gateway to control and monitor the crops and field conditions. This type of farming is called precision farming. Precision farming is the ability to handle different types of problems in productivity, increase financial return and reduce waste by using automated data collection and implementation using sensing, controlling and communication technology.

For precision farming we use grid topology. Sensors are connected with access points that work as nodes. Each node works independently to record information. All nodes in the field are connected through a single network. Data of sensors are sent from one node to another node using routing algorithm.

**REQUIREMENTS**

**SOFTWARE REQUIREMENTS**

* Agricultural Production Systems Simulator **(**APSIM**)**
* Visual Studio 2010
* Programming language: JAVA,C++

**HARDWARE REQUIREMENTS**

* 1 GHz CPU
* 512MB RAM
* Windows XP / Mono 2.10 for Linux
* Quad Core 3GHz + CPU
* 4GB RAM

**CONCLUSION**

A newly trending technology has been developed for the benefit of farmers in various countries. This advancement in technology gives the power to monitor and control various factors that affect crop production in an agricultural field. Farmers can now use their resources as per requirements and can control the environmental conditions in their fields. This helps in maximizing financial gain and results in high quality crop production.