CLASSIFICATION OF GERMS DEVELOPMENT CONDITIONS AND IRRIGATION FOR REMOTE SOIL MOISTURE PARAMETER MONITORING, LOGGING

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Abstract: The ability to monitor environmental conditions is crucial to research in fields ranging from climate variability to agriculture and zoology. Being able to document baseline and changing environmental parameters over time is increasingly essential important and researchers are relying more and more on unattended weather stations for this propose. A GSM Based Smart Sensing Platform for Monitoring Environmental Parameters has been designed and developed. The smart weather station consists of microcontroller based measuring units which collect the value of the temperature, relative humidity, and soil moisture. These units send their wireless data to a central station, which collects the data, stores and them into a database. In this project a few more sensors and a few more weather stations has been provided.

Keywords: **Monitoring system, Wireless Sensor Network, GSM Technology etc.**

1. INTRODUCTION

In the last few years, the occurrences of natural Changes in atmosphere is a have been becoming the cause for the Fungus, Bacterial attacks on the agricultural. If such changes are not aware in time to us the precautions cannot be taken and there will be bad effect on the agricultural production In this project, we present a system that can be used to monitor various parameters like Temperature sensor, Humidity sensor, Soil moisture sensor and again supporting to this we are providing the facility for remotely ON/ OFF of the Motor.

We are using a wireless sensor network based on GSM is utilized as a weather station network sending weather information. This research focuses on developing devices and tools to manage, display and alert the weather/disaster warnings using the advantages of a wireless sensor network system.

In case of soil moisture reaches a critical level farmer is intimidated via SMS using GSM modem and as per the feedback from farmer irrigation can be started. Based on moisture sensed and changes in moisture over a period of time soil is classified into different types that shows how fast moisture level changes.

But in our irrigation system by knowing the status of moisture and temperature with the use of moisture and temperature sensors, water flow can be controlled by Microcontroller and a farmer is informed about the status of water pump (irrigation system) by message through GSM. Since the systems are automatic, they do not require continuous monitoring by labor.

2. LITERATURE RIVIEW

1.1 Development of Environmental Monitoring System with Wireless Sensor Networks.

A.ghobakhlou[1], S. zandi[2], P. Sallis[3]`s paper investigated the recent advances in remote wireless sensor devices, and how WSN of these devices could be combined with the internet and used in vineyard operations, such as management decision making, by monitoring environmental conditions. The proposed system architecture was developed and prototype hardware was built. The baseline of the proposed system architecture was implemented with the capability of monitoring environmental data from twenty five base stations in five countries. Power management need to be improved by introducing more intelligent and efficient algorithms to reduce unnecessary up-time and redundant data transmissions. Future work will employ more field installation of nodes with powerful base station to provide robust long-term monitoring of vineyards conditions. The network data security will also be taken into account in our future work.

1.2 Development of a Wireless Sensor Network for Monitoring Environmental Condition on a Farmland.

Ganiyu R.A.[1], Arulogun O.T.[2], Okediran O. O.[3] said in conclusion, it can be deduced that the project which is the design and construction of the wireless sensor network for agricultural set-up was designed considering some factors such as economic application, design economy, availability of components and research materials, efficiency, compatibility and portability and also durability. The project factored into its implementation, the use of sensors, transceivers, and power supply unit. The performance of the project after test met design specifications. However, the general operation of the project and performance is dependent on

the user who is prone to human error such as entering wrong timing. Also, the operation is dependent on how well the soldering is done, and the positioning of the components on the Vero-board. If poor soldering lead is used, the circuit might form dry joint early and in that case the project might fail. Also if logic elements are soldered near components that radiate heat, overheating might occur and affect the performance of the entire system. Other factors that might affect performance include transportation, packaging, ventilation, quality of components, handling and usage. The construction was done in such a way that it makes maintenance and repairs an easy task and affordable for the user. The designed wireless sensor network for monitoring environmental condition on farmland involves research in both microelectronics and embedded system design. And **recommended** for the purpose of the future research, development of a wireless sensor network on agricultural environment to monitor environmental conditions on a given farmland can be improved upon. The following areas were highlighted for this purpose.

i) A higher scale integrated circuit can be used so that other means of authentication could be used to cut
across to the less privileged in the society (for example, visually impaired individual).
ii) It can also be recommended that the future research should be geared towards evaluation and simulation of three environmental parameters under consideration.

1.3 Smart Wireless Sensor Network for Monitoring and Agricultural Environment.

Prof. Mrs. S. S. Patil [1], Prof. V. M. Devande [2], Prof. J. J. Mulani [3] found Zigbee-based agriculture monitoring system serves as a reliable and efficient system for efficiently monitor the environmental parameters. Wireless monitoring of field not only allows user to reduce the human power, but it also allows user to see accurate changes in it. This research focuses on developing devices and tools to manage, display and alert the weather/disaster warnings using the advantages of a wireless sensor network system.

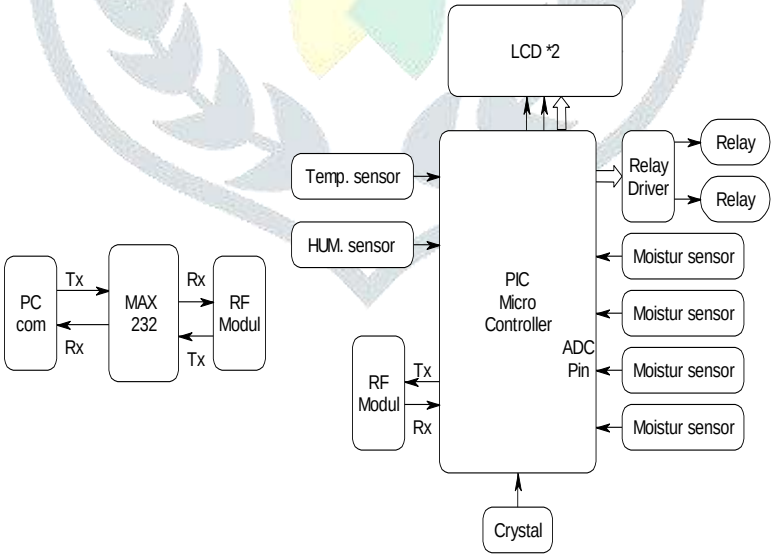
3. PROBLEM DEFINITION

The common plant diseases that have attacked field crops, vegetables, fruits, turf, and ornamental plants in Illinois in past years are likely to be present this year. The extent of disease development, however, depends on the combination of weather conditions during the growing season. Weather is a term used for the aerial environment. It includes light, temperature, snow, rain, humidity, dew, cloudiness, sunshine, wind, air currents, evaporation, and atmospheric pressure. Any one or some combination of these elements may affect disease occurrence.

For example, In an apple orchard air movements that are either wind or eddy currents may lift scab fungus spores from old leaves on the ground up to moist leaves and fruit on the trees.

4. METHODOLOGY

4.1 Block Diagram:



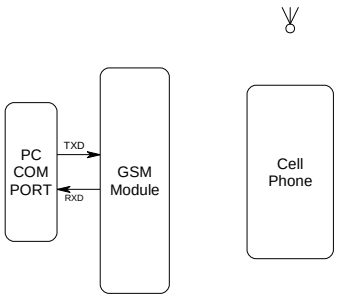


Fig.1. Block Diagram

4.2 Hardware Components

4.2.1 **Soil Moisture Sensor:** Soil moisture sensors estimates the soil volumetric water content based on the dielectric constant (soil bulk permittivity) of the soil. The dielectric constant can be thought of as the soil's ability to transmit electricity. The dielectric constant of soil increases as the water content of the soil increases. This response is due to the fact that the dielectric constant of water is much larger than the other soil components, including air. Thus, measurement of the dielectric constant gives a predictable estimation of water content. It consists of a pair of electrodes to measure the resistance of the soil. Greater the resistance, lower the moisture content of the soil.

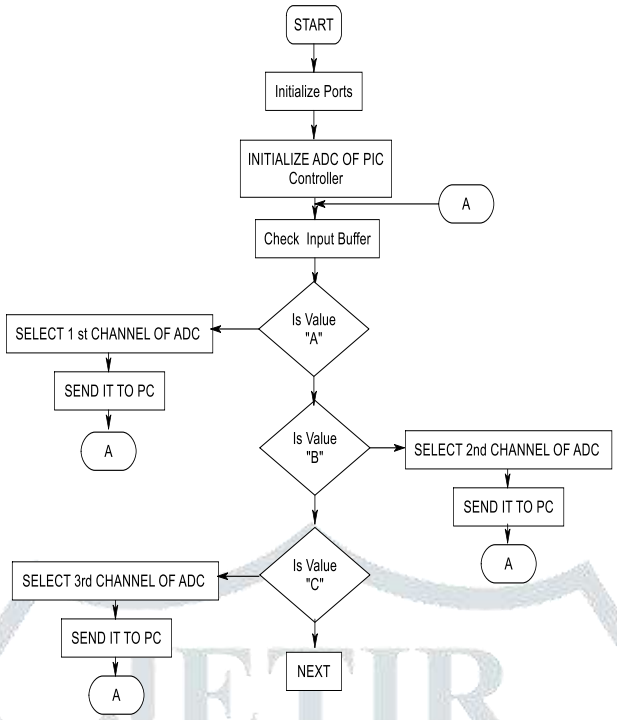
4.2.2 **Relay:** A **relay** is an electrically operated switch. In this project we are using a two relay as an on off motor controller. First relay is used to indicate the LTP and UTP level of average moisture level when the moisture goes down at that time the first relay will be ON. Second relay will be ON when the germs conditions are developing on the crop otherwise the relay will be OFF or where several circuits must be controlled by one signal. The first relays were used in long distance Telegraph circuits as amplifiers they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

4.2.3 **Temperature Sensor:** The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full -55 to +150°C temperature range. Low cost is assured by trimming and calibration at the water level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry easily.

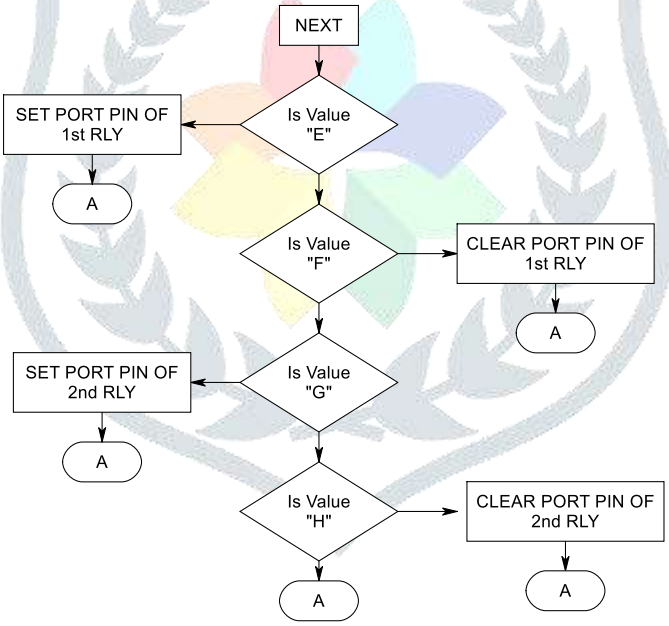
4.2.4 **Humidity Sensor:** This module converts the relative humidity to the corresponding output voltage. Operating humidity: 30 –90%RH, standard output: DC 1980mV (at 250C, 60%RH), accuracy: +/-5%RH (at 250C, 60%RH)

4.2.5 **GSM Module:** At present the GSM module is used for Remote Control activities such as Gate Control, Temperature Control etc. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB) for computer. The MODEM is the soul of such modules. They generate transmit or decode data from a cellular network, for establishing communication between the cellular network and the computer. These are manufactured for specific cellular network (GSM/UMTS/CDMA) or specific cellular data (GSM/UMTS/GPRS/EDGE/HSDPA) or technology (GPS/SIM). They use serial communication to interface with the user and need Hayes compatible AT (Attention) commands for communication with the computer (any microprocessor or microcontroller system). An RS-232 port was standard feature of a personal computer for connections to modems, printers, mice, data storage, un-interruptible power supplies, and other peripheral devices. The limited transmission speed, relatively large voltage swing, and large standard connectors motivated development of the universal serial bus which has displaced RS-232 from most of its peripheral interface roles. Many modern personal computers have no RS-232 ports and must use an external converter to connect to older peripherals. Some RS-232 devices are still found especially in industrial machines or scientific instruments.

5. FLOWCHART



A: Temperature
B: Humidity
C: Average Moisture Value of Four Sensors



E ≤ LTP Value Average Moisture level.
F ≥ UTP Value Average Moisture level.
G: Germs conditions are developing on crop.
H: Germs development conditions are controlled.

Fig2: Flowchart

6. CONSEQUENCE

GSM-based agriculture monitoring system serves as a reliable and efficient system for efficiently monitor the environmental parameters. Wireless monitoring of field not only allows user to reduce the human power, but it also allows user to see accurate changes in it. This research focuses on developing devices and tools to manage, display and alert the weather/disaster warnings using the advantages of a wireless sensor network system. By knowing the status of moisture and temperature with the use of moisture and temperature sensors, water flow can be controlled by Microcontroller and send a message to our mobile about status of Relays connected to water pump. Since the systems are automatic, they do not require continuous monitoring by labor.

Efficient water management is a major concern in many cropping systems in semiarid and arid areas. Distributed in-field sensor-based irrigation systems offer a potential solution to support site-specific irrigation management that allows

producers to maximize their productivity while saving water. This paper describes details of the design and instrumentation of variable rate irrigation, a wireless sensor network, and software for real-time in-field sensing and control of a site-specific precision linear-move irrigation system. Field conditions were site-specifically monitored by six in-field sensor stations distributed across the field based on a soil property map, and periodically sampled and wirelessly transmitted to a base station.

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