Automated Soil Testing System For Agriculture With IOT.

Miss Lamkhade Pallavi Annasaheb
Amrutvahini Polytechnic Sangamner 422605

Miss Diwate Swati Balasaheb
Amrutvahini Polytechnic Sangamner 422605

Prof. Borhade G.L
Amrutvahini Polytechnic Sangamner 422605

Miss .Gunjal Sakshi Gorakh
Amrutvahini Polytechnic Sangamner 422605

Miss Shelar Varshda Ashok
Amrutvahini Polytechnic Sangamner 422605

Abstract –
Monitoring of environmental factors is very important over the last few decades. In particular, monitoring agricultural environments for various factors such as temperature ,Conductivity along with other factors can be of more significance. A traditional approach to measure these factors in an agricultural environment meant individuals are taking measurements manually and checking the mat various times. In India, every state around 9 to 10 lakes soil samples have been revived in laboratories and it is very difficult to test all the soil samples in the stipulated. But soil analysis is the major role for farmers to cultivate and produce the proper crop. In this paper the soil condition and nutrients level is analyzed by the controller.

Keywords –
monitor environmental Factor, soil Analysis, Traditional approach

I. INTRODUCTION

Automated soil testing device is an electronic device which can be used to measure moisture, temperature values to ensure the fertility of soil in the field of agriculture to select the suitable crop and also the type of fertilizer to be used .the ionic particles present in soil sample are sensed by
sensor and the output of sensor is processed by signal conditioning circuit. The microcontroller is used to compare the pre-stored value with the actual values and the measured values are displayed on LCD. The wireless trans-receiver transmits the data to a mobile or designated authority in the agriculture department for further analysis and suggestions. Automated soil testing device is a portable device which can be used either in laboratories or on the identified spot selected for farming so that the farmer need not take the pain of visiting the soil testing labourites which are normally located in district headquarters. Automated soil testing device is a simple and user friendly device so that any person can test the soil without the presence of an operator, it is an economical device and thus a common man can easily afford it.Nowadays, awareness about implementing technology for agricultural environment has increased into the industries. Manual collection of data for desired factors can be sporadic, not continuous and produce variations from incorrect measurement taking. This can
cause difficulty in controlling environmental important factors .wireless distinct sensor node scan reduce time and effort required for monitoring the environment

OBJECTIVE:-

- Grouping of soil into classes relative to the nutrient level.
- Predicting the probability of getting a profitable response to the fertilizers.
- To provide a basis for fertilizer recommendation.

METHODOLOGY:

HARDWARE USED:

- PIC18F4550 Microcontroller
- Transformer

Temperature sensorLM35

- Soil test sensor
- Conductivity sensor

r• Power supply

- GSM /Wi-Fi
- LCD display
- LED's

Diode

PIC18F4550

Microchip technology introduced 8-bit, 16-bit and 32-bit portable microcontrollers called PIC18 microcontrollers with nano-watt technology to perform a huge range of tasks. These are used in many electronics applications and industries due to their high performance and low power consumption.PIC18F4550 is an 8-bit microcontroller manufactured by Microchip with nano-Watt technology with enhanced flash, USB, and high-performance. It is a 40-pin microcontroller that comes with several features such as memory endurance, self-programmability, extended instruction set, enhanced CCP module, and addressable USART and 10-bit ADC.

Liquid Crystal Display:

A Liquid Crystal Display is a low cost, low power device capable of displaying text. The LCD controller receives control words from the arduino; it decodes the control words and performs the corresponding actions on the LCD.
Once the initialization sequence is done, it
displays the soil parameters.

ADC:

Arduino requires input in digital form, For this Purpose analog to digital converter is used to convert the output of signal conditioning, which is in analog, to digital signal.

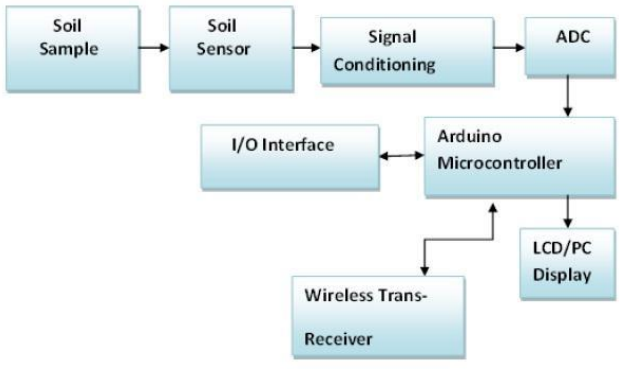
Signal Conditioning
Signal conditioning converts output signal from the sensor, which is a weak signal,into a strong signal.

Sensor:
Sensors are hardware devices that produce a measurable response to a change in a physical condition like temperature or pressure. Here copper electrodes are used as sensors which measure the ionic particles present in the soil and convert it into electrical signals.

Arduino
The arduino controller operates at40 MHz at 5V D.C. The arduino plays a key role in processing data received from the sensor, where it compares the data already pre-stored with the sensor output signal.

GSM/ WI-FI :-
SIM800A QUAD BAND GSM/GPRS SERIAL MODEM
This GSM modem has a SIM800A chip and RS23interface while enables easy connection with the computer or laptop using the USB to Serial connector or to microcontroller using the RS232 to TTL converter. Once you connect the SIM800 modem using the USB to RS232 connector, you need to find the correct COM port from the Device Manager of the USB to Serial Adapter. Then you can open Putty or any other terminal software and open a connection to that COM port at 9600 baud rate, which is the default baud rate of this modem.

Working:
Whenever a farmer wants to analyze the soil fertility, heads to take the soil sample of about150 gm and 60 ml of water should be added to the soil sample and allow thesample to settle down the sensor will be placed in the sample. Here copper electrodes are used as sensors which measure the ionic particles present in the soil and convert it into electrical signals. The electrical signal is amplified using signal conditioning and this amplified signal is sent to the microcontroller in the form of digital signal from ADC. The microcontroller plays a key role in processing data received from the sensor, where it compares the data already pre-stored with the sensor output signal. The microcontroller after comparison gives the output and the values are displayed on the LCD display. The output not only provides the information on fertility present in the soil but also suggests crops to be grown on that soil. The



II. PAGE LAYOUT

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Your paper must use a page size corresponding to A4 which is 210mm (8.27") wide and 297mm (11.69") long. The page margins can be set as moderate or set as follows:

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- Bottom = (0.35")
- Left = Right = (0.75")

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III. PAGE STYLE

All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

1. Text Font of Entire Document

Type your main text in 10-point Times, single-spaced. Do **not** use double-spacing. Your paper must be in two column format with a space of 0.2" between columns. Be sure your text is fully justified—that is, flush left and flush right. Please do not place any additional blank lines between paragraphs.

2. Title and Author Details

Automated Soil Testing System For Agriculture With IOT.

First Name	Last Name	Affiliation
Lamkhade	Pallavi	Amrutvahini Polytechnic Sangamner
Gunjal	Sakshi	Amrutvahini Polytechnic Sangamner
Diwate	Swati	Amrutvahini Polytechnic Sangamner
Shelar	Varsha	Amrutvahini Polytechnic Sangamner
Borhade	Ganesh	Amrutvahini Polytechnic Sangamner

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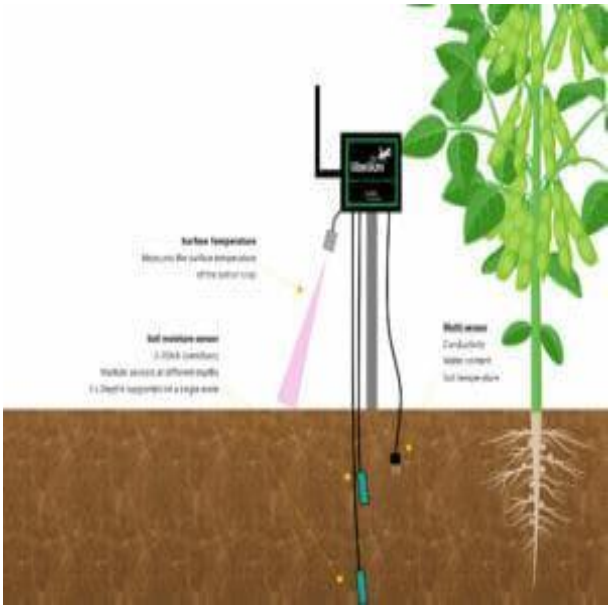
4 APPLICATION :-

- Early detection of Unwanted particles in soil
- soil analysis is the major role for farmers to cultivate and produce the proper crop.
- Flood control
- Since the project is a prototype that was developed under some limitations and in short time, there are some tasks that should be done in the future and would develop the system into a more mature state.
- The most important and useful job that has to be done is the real field testing for extended time and with several sensor platforms and sensors deployed in fields. This will provide feedback that could be meaningful for the further development of the system and would include the user's insights and real needs.
- Water usage audit of household, industrial sector and agriculture.



5 FutureScope

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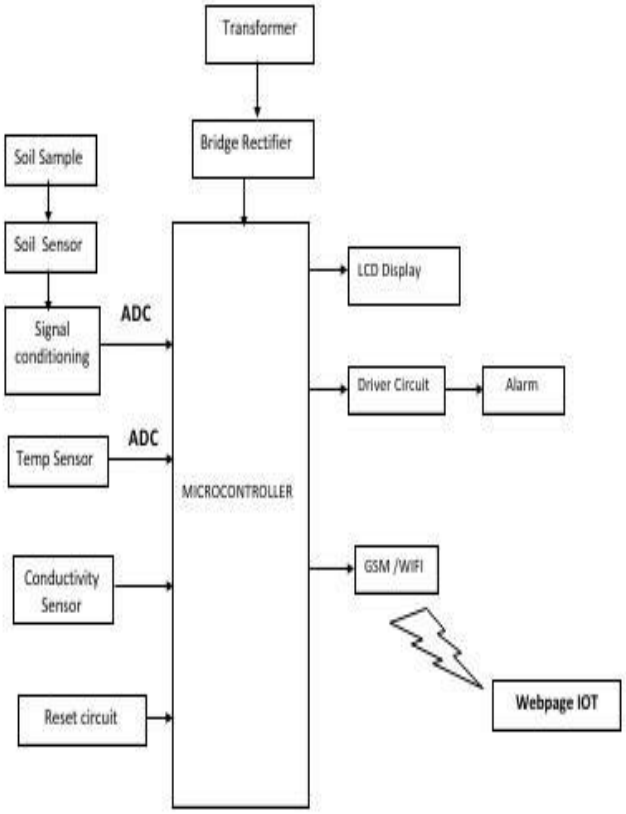
Flood control

Water usage audit of household, industrial sector and agriculture.

6 .Result

Automated Soil Testing in Agriculture", has been developed for soil testing of agricultural farms. The moisture content, humidity, temperature and pH values vary from one type of soil to others .The parameters of the soil are compared with pre-stored values received from the agricultural department .The system also provides the information about the crops that can be grown in respective soils. Wireless communication system has been incorporated for interacting with the experts



VI. Conclusion

The regular updates provide knowledge about the field in terms of water contained in soil. Wireless monitoring over iot along with low power consumption. The wireless trans-receiver transmits the data to a remote location or designated authority in the agriculture department for further analysis and suggestions. Nowadays, awareness about implementing technology for the agricultural environment has increased into the industries. Manual collection of data for desired factors can be sporadic, not continuous and produce variations from incorrect measurement taking. This can cause difficulty in controlling environmental important factors. Wireless distinct sensor nodes can reduce time and effort required for monitoring the environment. The logging of data allows for reduction of data being lost or misplaced. Also it would allow placement in critical locations without the need to put personnel in hazardous situations.

APPENDIX

The heading of the Appendix section must not be numbered. Appendixes, if needed, appear before the acknowledgment.

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