



## ANDROID AND IOT BASED AGRICULTURE SYSTEM

Prof. Megha Yaligar<sup>BE,M.Tech</sup><sup>1</sup>, Shalini H Nagur<sup>2</sup>, Nehaparveen Binkadakatti<sup>3</sup>, Pavitra Gokavi<sup>4</sup>,  
Mouneshwari Shinde<sup>5</sup>

<sup>1,2,3,4,5</sup> *Computer Science and Engineering, AGMR College of Engineering and Technology, Hubli,*

**Abstract:** The main aim of this project is improving the agriculture performance. This project is used for providing the agriculture related information and solving the problem related to agriculture. REST API agriculture will be useful to build client or server application. To design a smart wireless sensor network(WSN) for an agricultural environment. The WSN is designed for supervising and controlling the various factors such as humidity, soil, moisture, temperature, routers that propagate the network over larger distances and a coordinator that communicates with the computer, which in turns illustrate the data and transmit it using internet of things, which can reduces the human labour. User can able to grow more numbers of plants in their home by using this information. User should need proper guidance information to cultivate their agricultural land. Android platform is the most popular operating system in the world. Using this application user can save money and time in creating application for own news application.

### I. INTRODUCTION

“ANDROID AND IOT BASED AGRICULTURE SYSTEM” is a detailed analysis of agriculture system. It is used to providing the agriculture related information and solving problem related to agriculture area. There are three types of modules used to develop the proposed system such as information gathering, information sharing, page designing. The agriculture system contains the details of fertilizer, soil, crop rotation, generic manipulation of crop plants. If any user wants to clarify their query then we should provide communication between the user and the admin. User can able to grow more numbers of plants in their home by using the agriculture information. User should need to give proper guidance information to cultivate their agricultural land. Android platform is the most popular operating system in the world . Using this application user get more benefits such as user can save money and time in creating application for own new application.

In this application wireless sensor networks(WSN) are used, sometimes these WSN is called wireless sensor and actuator networks(WSAN), WSAN is a distributed autonomous sensors to monitor physical or environmental conditions, such as sound ,temperature, pressure, etc. The data transfer take place between the network to a main location. The more modern networks are bi directional, also enabling control of sensor activity . The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial , agricultural and consumer applications, such a industrial process monitoring and control, machine health monitoring, agricultural greenhouse monitoring and so on.

### II. LITERATURE REVIEW

A literature survey is a text of scholarly paper which includes the current knowledge including substantive finding as well as theoretical and methodological contribution to a particular topic.

[1] V Praveen, A. Jenifer, T. Kiruthika, R. Akalya, Dr. P. Gomathi, “Modern Agriculture Development System Using Android Application”, The main objective of this paper is focused in improving agriculture performance. It is mainly used for providing the agriculture related information and solving the problem related to agricultural. Rest API agriculture will be useful to

build client server application. REST API will be good agricultural option to do the communication between the app and the server. The work of fertilizer in agriculture production has been key to the development of these practices. It contains all the information to grow plants. The information is divided into category wise such as cattle, crop protection, vegetables, grains and etc. User can login to the application with social media face book, twitter , Google+.

[2] Krishna Chaitanya S, K. T. Ilayarajaa, Koti Muni Teja Reddy,” Android Based IOT for Agriculture Automation”, An automation irrigation system is developed to minimize and maintain water quantity usage for farming. The system will have required sensors of our interest like, temperature, moisture, humidity, sensors placed in crop field at roots of plants. A micro-controller based relay is used for controlling water supply. Automation is done through IOT is a shared network that can interact with objects through internet connection. This smart work helps in effective usage of resources like water, fertilizer, electricity. The system is developed for monitoring and maintaining the situation at farm field with sensors. Mobile networks with smart phones have made tremendous growth in technology.

[3] Constantina Costopoulou, Maria Ntaliani, Sotiris Karetos,” Studying Mobile Application for Agriculture”, Agriculture continues to be main activity of the rural people of Thoothukudi District. It is the main occupation of 70% of the people of the District. The major crops loan in the District are paddy, bajra, maize, black gram, green gram, etc. State Bank of India is the lead bank of the District. The research classify the agricultural borrowers into crop loan, allied agricultural loan borrowers and other agricultural loan borrowers. In this paper, the research attempts to study the signature of various parameters with respect to the borrowers.

[4] Anusha P, Dr. Shobha K R,” Design and Implementation of Wireless Sensor Network for Precision Agriculture”, The newly emerged wireless sensor network(WSN) technology has spread rapidly into various multi disciplinary fields. Agriculture and farming is one of the industries which have recently diverted their attention to WSN, seeking this cost effective technology to improve its production and enhance agriculture yield standard. This report on the application of WSN technology to tomato crop production. Water is one of the largest renewable natural resources but fresh water is expected to emerge as a key constraint to future agriculture growth.

[5] A. P. Azad, A. Chockalingam,” Mobile Base Stations and Energy Aware Routing in Wireless Sensor Networks”, Increasing network lifetime is important in wireless sensor/ad-hoc networks. We are concerned with algorithms to increase networks lifetime and amount of data delivered during the lifetime by developing multiple mobile base station in the sensor network field. Specifically, we allow multiple mobile base stations to be deployed along the periphery of the sensor network field and develop algorithms to dynamically choose the locations of these base stations so as to improve network lifetime.

[6] G. Sushant, S Sujatha, “IOT Based Smart Agriculture System”, Smart agriculture is an emerging concept, because IOT sensor are capable of providing information about agriculture fields and then act upon based on the user input. The feature of this project includes development of a system which can monitor temperature, humidity, moisture and even the movement of animals which may destroy the crops in agricultural field through sensors using Arduino board and in case of any send a SMS notification as well as a notification on the application developed for the same to the farmer’s smartphone using Wi-Fi/3G/4G.

[7] Amogh Jayaraj Rau, Ashok R Mohan, “IOT based smart irrigation system and nutrient detection with disease analysis”, Agricultural remains the sector which contributes the highest to India’s GDP.

But, when considering technology that is deployed in this field. We have devised a means for cost-effective automated irrigation and fertigation along with MATLAB based image processing for identifying the rice diseases and nutrient deficiencies. Here we are focusing on two important nutrients.

### III. METHODOLOGY

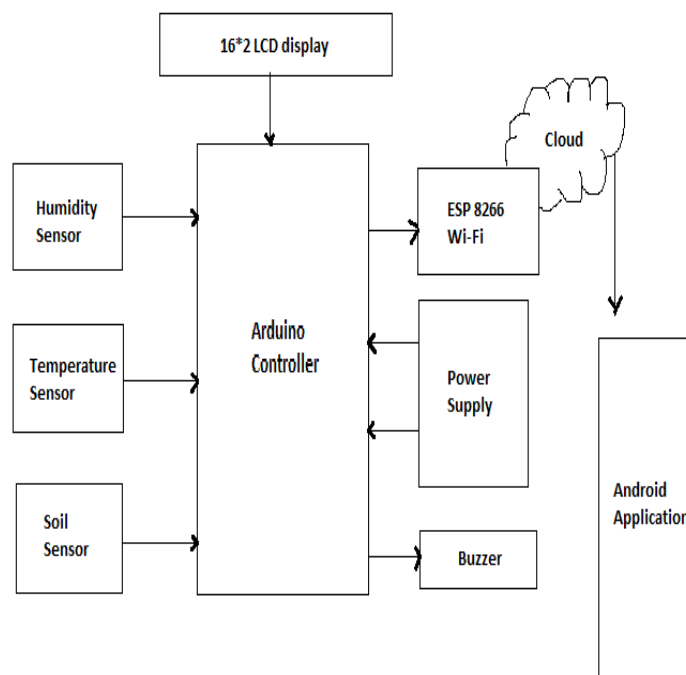


Fig 1. System Architecture

#### A. Modules Description

- **Arduino Controller:**

Arduino is a microcontroller board based on the ATmega328p. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started, you can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

- **Soil Sensor:**

The soil moisture sensors measure the volumetric water content in soil. Since the direct gravimetric-measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity. Reflected microwave radiation is affected by the soil moisture and is used for remote-sensing the hydrology and agriculture. Portable probe instruments can be used by farmers or gardeners.

- **Humidity Sensor:**

Humidity is the amount of water-vapor present in the air. Water vapor is the gaseous state of water and is invisible. Humidity indicates the likelihood of precipitation, dew, or fog. Higher humidity reduces the effectiveness of sweating in cooling the body by reducing the rate of evaporation of moisture from the skin. This effect is calculated in a heat-index table or humidex. The amount of water vapor that is needed to achieve saturation decreases as the temperature increases. As the temperature of a parcel of water becomes lower it will eventually not reach the point of saturation without adding or losing water mass. The difference in the amount of water vapor in a parcel of air can be quite large. For example, a parcel of air that is near saturation may contain 28 grams of water per cubic meter of air at 30 °C, but only 8 grams of water per cubic meter of air at 8 °C.

- **LCD(Liquid Crystal Display):**

Screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special and even custom characters, animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In thus LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

**B. Proposed System:**

The proposed system provides information about the agriculture such as growth rate of plant production. User can get the information about the fertilizer, crop rotation, soil, temperature, humidity and genetic manipulation of crop plants.

Comments and reviews are added to know how long it was reached the user. Through voice recognition also user will get information. This application provides the YouTube integration. Information sharing is possible through the social media.

#### IV. SYSTEM IMPLEMENTATION

The agriculture related information's are available through many applications, But in one application only limited amount of information's are available. In our project we are using the three different sensors, such as soil sensor, humidity sensor and temperature sensor. using sensors also user can get the information. In our proposed system it gives the so many agriculture related information's. In our application if new user wants to fetch the information then user should create a new account. After creating new account user can login. After login user can get the current values of the soil, humidity and temperature sensors. User can view the history of the sensors values.

If soil is dry then buzzer starts alarming or notification to user. Using this notification user came's to know that soil is dry user should put a water to soil. All the information's are stored in the cloud. From cloud user can fetch the information through a android application.

#### V. CONCLUSION

In agriculture development system the user can get the information as step by step procedure. Our application uses sensors which provides us the information about Soil, Temperature, Humidity. And that collected information will stored in Google cloud using ESP Wi-Fi module. Wi-Fi module that collected information can be fetched through android application. This system is used to provide suggestion to the user about the agriculture and also user can gather the information to increase the production. Through voice recognition also user will get the information.

## **VI. FUTURE WORK**

- The future scope of this project will be with respect to its scalability. More efficient methods can be applied for every module of operation.
- High and sophisticated graphics can be utilized for user interface development.
- User interaction should be provided If the user want to know some suggestion about the agriculture cultivation ,then user can verify their suggestion as query format through email.

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