DRIZZLY-An Android Application of Unmanned Motor Starter for Agriculture Region

J.Sangeethapriya[1], M.keerthika[2], R.Shivasri[3], S.Sukhi[4], N.Shardhapriyadharshini[5]
[1, 2, 3, 4, 5] Saranathan college of Engineering, Trichy 620 002, TamilNadu, India

Abstract- *Indian agriculture is at crossroads and one of the major challenges is to reverse deceleration in agricultural growth. Main reason for deceleration in agricultural growth is declining irrigation to overcome that this application works with your phone, named Drizzly to identify soil properties such as moisture, temperature and salt content those properties are checked to perform automatic motor starter for irrigation purpose [1]. Among those properties soil moisture measurement is important for disciplines such as hydrology and climatology in which Global Navigation Satellite System-Reflectometry (GNSS-R) technique has been already demonstrated to be an effective tool to sense soil moisture content (SMC) but in this application panel sensing zigbee plays the role of GNSS-R this zigbee not only senses SMC but also senses temperature, salt contents and updates this details to database and further updation to Server board [4]. The design and implementation of our application is based on fetching those properties from the server board it checks with default value which was preloaded and sends notification to the server board via firebase whether to start up or shut down the motor automatically [3].*

Keywords- Zigbee, Agriculture, Android App, Motor Starter.

I. INTRODUCTION

Agriculture is the art and science of cultivating the soil, growing crops and raising livestock. It includes the preparation of plant and animal products for people to use and their distribution to markets. Agriculture provides most of the world's food and fabrics. India's agriculture is composed of many crops, with the foremost food staples being rice and wheat. Indian farmers also grow pulses, potatoes, sugarcane, oilseeds, and such non-food items as cotton, tea, coffee, rubber, and jute. Agriculture plays a crucial role in the life of an economy. It is the backbone of our economic system. Agriculture not only provides food and raw material but also employment opportunities to a very large proportion of population. Industrial agriculture based on large-scale monoculture farming has become the dominant agricultural methodology. Agricultural engineers must have a wealth of knowledge and skills to function effectively in the multiplicity of the agricultural and agribusiness industries. The agricultural engineer helps to make farming sustainable, safe, and environmentally friendly. They analyze agricultural operations and weigh the use of new technologies and methods to increase yields, improve land use, and conserve resources like seed, water, fertilizers, pesticides and fuel. The engineer recommends strategies to protect the health, safety and security of worker's, animals and agricultural products [1]. Nowadays, Due to the rapid advancements in technology all the information is available one hand in the form of smartphones. Instead of using traditional form (i.e websites) for communication, newer form such as mobile technology can be used for quicker and easier access. This had led to the evolution of mobile applications Mobile Application development is a term used to denote the act or process by which Application software is developed.

Hand held devices, such as personal digital assistants, enterprise digital assistants or mobile phones. These Application can be pre-installed on phones during manufacturing platforms, or delivered as web Application using server-side or client-side processing (e.g. Java Script) to provide an “Application-like” experience within a Web browser. As part of the development process, Mobile User Interface (UI) Design is also an essential in the creation of mobile Apps. Mobile UI considers constraints & contexts, screen, input and mobility as outlines for design. The user is often the focus of interaction with their device, and the interface entails components of both hardware and software. Mobile UI design constraints include limited attention and form factors, such as a mobile device’s screen size for a user’s hand(s). Overall, mobile UI design’s goal is primarily for an understandable, user-friendly interface [3]. The UI of mobile Apps should consider user’s limited attention, minimize keystrokes, and be task-oriented with a minimum set of functions. This functionality is supported by Mobile enterprise Application platforms or integrated development environments (IDEs). Thus to provide all those information at ease, this project is aimed at developing a drizzly android application to perform unmanned motor starter through panel sensing zigbee connected to server board. In this panel sensing zigbee senses moisture, temperature, salt content and updates to database and further Updation to server board from database. This App will fetch the content from the server board it includes moisture, temperature and salt content values which will be updated from server board to android App. Then

it checks with default value (suitable for crop forecasting) which was preloaded in the App (i.e) if the updated value is greater than or equal to the default value then it sends notification that no need to start up the motor else if the updated value is less than the default value it notifies that the motor should be started up. This notification message says "no need to start up the motor", "need to start up the motor" will be sent to server board via firebase. Then the server board will notify automatically to start up or shut down the motor according to the notification [4].

1. ANDROID

Android is a mobile operating system developed by Google, based on the Linux Kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android user interface is mainly based on direct manipulation , using touch gestures that loosely correspond to the real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with the virtual keyboard for text input. In addition to touchscreen devices, Google has further developed Android TV for televisions, Android wear for watches, each with a specialized user interface. It is also used in other electronic gadgets too. Android has the largest installed base of all operating systems of any kind. The success of Android has made it a target for patent litigation as part of the so-called "smart phone wars" between technology companies.

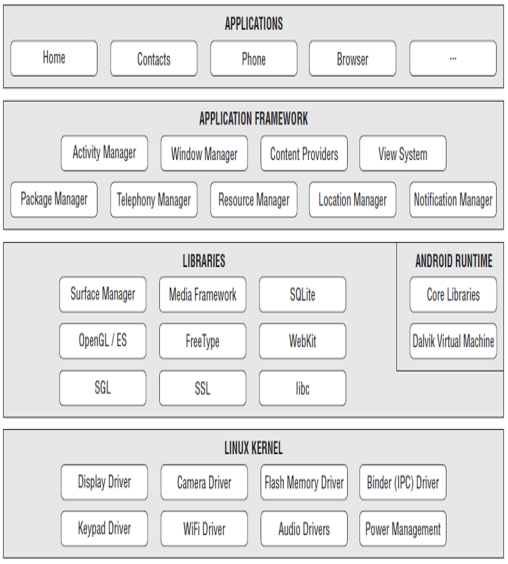

Figure 1. Android Architecture

The following are the features of Android it have native support for multi-touch which was initially made available in handsets such as the HTC Hero. Multitasking of Application, with unique handling of memory allocation, is available. As of Android 4.1 Google has expanded Voice Actions with ability to talk back and read answers from Google's Knowledge Graph when queried with specific commands. Android supports connectivity technologies including GSM/EDGE, Bluetooth, LTE, CDMA, and WiMAX. Android supports tethering, which allows a phone to be used as a wireless/wired Wi-Fi hotspot. Most Android devices include micro SD card slots and can read micro SD cards formatted with the FAT32, Ext3 or Ext4 file systems.

II. OBJECTIVES

The main objective of this project is aimed at developing a drizzly android application to perform unmanned motor starter through panel sensing zigbee connected to server board by sending push notification via firebase.

The following are the main features of this application

1) Automatic starts up and shut down of motor.
2) No need any human interaction.
3) Periodic updates.

III. PROPOSED SYSTEM

In proposed system, the system proposes to develop an unmanned motor start up for an agriculture region. It overcomes the disadvantages of an existing system is that an existing application has been developed to start up and shut down motor was just by switching on the motor by making a call and it can be switched off by an assumption i.e after some time duration. There is no indication for switching off the motor automatically. Motor is used for irrigation purpose. Irrigation is the method in which a controlled amount of water is to be supplied to plants at regular intervals for agriculture. This App works based up on the values such as temperature, moisture and salt content values are being uploaded to the database of an irrigation field which are then updated to the server board. These values in turn are sent to the android application i.e regular periodic updates [2]. App checks the above three values with the default condition which has been preloaded in the app. Based up on the conditions this Android App will sends push notification to server board whether to start up and shut down the motor via firebase. Thus server board controls the motor automatically. These processes occur without any human interaction or pre assumption. The drizzly application has 4 main modules in it. They are

1) Updation.
2) Fetching.
3) Checking condition.
4) Sends notification.

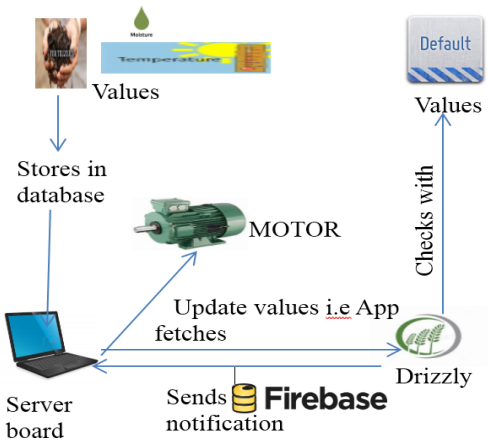

Figure 2.

IV. IMPLEMENTATION

MODULE 1: Updation

In this panel sensing zigbee senses moisture, temperature, salt content values and updates to database which in turn those values are again updated to server board i.e) once if the panel sensing Zigbee retrieves moisture, temperature and salt content values it periodically updates those values to database connected to it. In which there by starting the server board the values which is present in database gets updated to server board using UDP/IP protocol socket where the server board is designed in java platform since it is one way communication. Thus the values are updated to server board [1].

MODULE 2: Fetching

Drizzly App will fetch the content from the server board it includes moisture, temperature and salt content values which will be displayed in GUI page of the android App. i.e) those values will get displayed in separate edit text bar which states that temperature, moisture and salt content values gets updated periodically from database to server board which automatically transfers content values to app. Here in the part of fetching TCP/IP communication protocol is used to transfer content values from database to server board [4].

MODULE 3: Checking:

In this module the updated values in the app is checked with default value (suitable for crop forecasting) which was preloaded in the App (i.e) if the updated value is greater than or equal to the default value then it sends notification that no need to start up the motor else if the updated value is less than the default value it notifies that the motor should be started up. Thus the condition was being checked accordingly [2].

MODULE 4: Sends notification:

This notification message says whether “no need to start up the motor” or “need to start up the motor” will be sent from app to server board via firebase. In which the notification content will be sent as push notification thus the server board will automatically start up or shut down the motor according to the notification received this controls the motor whether to ON or OFF without any human interaction. This is achieved because aurdino was connected to the server board for automatic control to perform ON or OFF operation [1].

V. CONCLUSION

The summary of this Android project is to focus on the development of a mobile application for Agricultural region that supports human less interaction which reduces the time and energy of the farmers as well as water for further irrigation. There is a need for the development of mobile App services for agriculture using which farmers are able to retrieve information at anytime and anywhere. This application is to know information regarding the salt, moisture and temperature content values periodically. This makes a better relationship between the Agriculture field and farmers. The data is stored in an efficient and secure manner so retrieval of information is possible wherever required. Notifications will be send to the server board which controls the motor automatically reduces the time consumption and work burden. Hence this will be simple, efficient and adaptable to all farmers.

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