



Android Application for Agriculture Using Flutter

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ABSTRACT

Agriculture farming being an industrious work, is misunderstood by many, being said that can change the perspective within the construe what it really means. FARMERS being the main contributors to the agriculture community. It has the ability to mark a big change on the green environment, by manually interfering with the results. The era marked by the technological advancement can be manipulated in terms of agriculture farming. The spear-head being the IoT and sensors that enable them to get accurate real-time information on greenhouse conditions such as lighting and soil condition. Nowadays, with the help of smart technology, Farming can be done more efficiently. This application is a solution. So, this android application is planned to develop based on client requirements.

INTRODUCTION

Mobile Application Development

Mobile Application development is the process of creating software applications that run on a mobile device, and a typical mobile application utilizes a network connection to work with remote computing resources. Hence, the mobile development

Process involves creating installable software bundles (code, binaries, assets, etc.), implementing backend services such as data access with an API, and testing the application on target devices. Mobile app development is rapidly growing. From retail, telecommunications and e-commerce to insurance, healthcare and government, organizations across industries must meet user expectations for real-time, convenient ways to conduct transactions and access information. Today, mobile devices—and the mobile applications that unlock their value—are the most popular way for people and businesses to connect to the internet.

Internet of Things

The Internet of Things (IoT) describes the network of physical objects “things” that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. These devices range from ordinary household objects to sophisticated industrial tools. With more than 7 billion connected IoT devices today, experts are expecting this number to grow to 10 billion by 2020 and 22 billion by 2025. Over the past few years, IoT has become one of the most important technologies of the 21st century. Now that we can connect everyday objects—kitchen appliances, cars, thermostats, baby monitors—to the internet via embedded devices, seamless communication is possible between people, processes, and things.

By means of low-cost computing, the cloud, big data, analytics, and mobile technologies, physical things can share and collect data with minimal human intervention. In this hyper connected world, digital systems can record, monitor, and adjust each interaction between connected things. The physical world meets the digital world—and they cooperate.

LITERATURE SURVEY

Yuanyuan Zhou, Qing Xia, Zichen Zhang, Mengqi Quan, Haoran Li

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In recent years, greenhouse development has been innovative in agriculture based on information systems guidance with accelerated growth. The IoT provides an intelligent system and remote access technologies such as green infrastructure. The usability of information systems for effective training and producing intelligent systems and predictive models in organisational real-time based on machine learning and artificial intelligence (AI). Therefore, a Remote Sensing Assisted Control System (RSCS) has been proposed for improving greenhouse agriculture requirements. This proposed method utilises artificial intelligence and machine learning technology for the green development potential industry's ability to manage economic resources and increase innovative agriculture product development patterns. Thus, the key preconditions for increasing healthy food choices and promoting local and global organic farmers' potential development are straightforward suggestions for developing an effective marketing strategy.

Technologies, T., 2019. Why Should Android App Developers Consider

Flutter.[Blog]Think Future Technologies. Available At: Accessed on: Sep. 29, 2022

- Flutter is Google's open source Technology for creating mobile desktop and web applications with a single code base.
- Flutter works with existing code used by developers and organisations around the world and is free and open source.
- Flutter consists of two important parts:

→ An SDK (software development kit): a collection of tools that are going to help you develop your application. This includes tools to compile your code into native machine code (Code is for iOS and Android).

→ A framework (UI library based on widgets): A collection of reusable UI

elements that you can personalise for your own needs. As we know that there are lots of mobile applications which are used nowadays. To develop these applications the developers work their best to provide a good experience but they also face a lot of difficulties. One of the major problems faced by the developers is to select the

OS which is either Android and iOS. For instance, if a developer wants to develop an application then the choice that is to be made is that if the application is to be developed for both the OS or for only one. Majorly, the application is developed for both the OS. Now to develop the application for different OS, the code should also be written in a different

language. The code for Android is written in java and for iOS, the code is written in Swift language. This is a bit difficult for the developer to learn 2 different languages and use them to the full extent to develop the same application but for a different OS. It is very time consuming, as code is to be written in java and swift, this development of application in the different platforms is known as cross-platform development.

Ramachandran, V., Ramalakshmi, R., Srinivasan, S., (2018). An Automated Irrigation System for Smart Agriculture Using the Internet of Things. 2018 15th International Conference on Control, Automation, Robotics and Vision (ICARCV), Singapore, (210-215) IOT (Internet of Things)

IOT Application in agriculture provide several applications domain and sensors and smartphone based application field briefly discussed IoT based system provide total monitoring facility. A cost-effective design is also important consideration in IoT based on monitoring system. Utilizing IoT, cloud based aggregate with store information , where the goal was to the optimal parameters for agriculture. Esp 22 monitor system with different parameter aspects. In this project we are focused to monitor two important parameters namely soil moisture sensors and light sensors by utilising Iot technology.

Tanu Saha, Ashok Verma, "Automated Smart Irrigation system using Raspberry Pi", International Journal of computer applications, Vol 172-No.6, August 2017

Uses of Sensors

We have used two types of sensors in this project. One is the soil moisture sensor and other one is a light sensor.

Soil Moisture Sensor

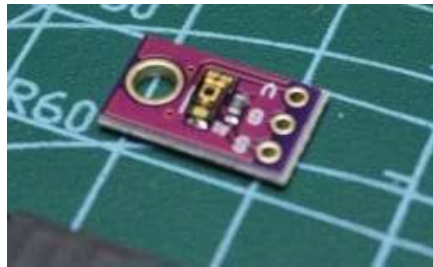
The Soil Moisture Sensors (SMS) is a sensor connected to an irrigation system controller that measures soil moisture content in that active root zone before each scheduled irrigation event and bypasses the cycle if the soil moisture sensor is a used defined set point. Soil moisture sensors, like rain sensors are considered rain shut off devices but while rain sensors measures evapotranspiration rates, likewise soil moisture sensor measure real time soil Moisture. Measuring soil moisture is important for agricultural applications to help farmers manage their irrigation system more efficiently.



Light Sensor

Light sensors detect light and convert light energy to an electrical signal output. Once

converted into electrical energy, the radiant energy within the infrared to ultraviolet light frequency spectrum sources can be measured. Another variety of light sensor ,photoelectric sensors , consist of devices used to detect the distance, absence, or presence of an object by using a light transmitter and a photoelectric receiver. Photoelectric sensors are employed in commercial and residential lighting as well as in security applications.

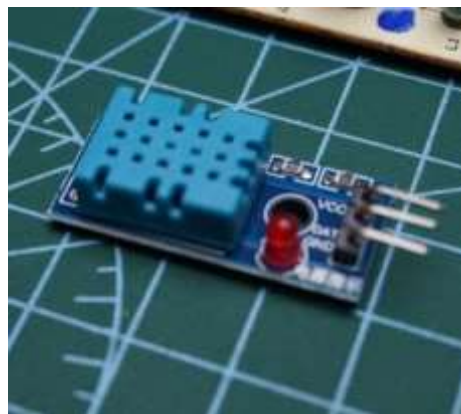


Temperature and Humidity

A temperature and humidity sensor are low cost-sensitive electronic devices that detects, measures and reports both dampness and air temperature. The proportion of moisture noticeable all around to the highest amount of moisture at a specific air temperature.

It is one of the most important devices that has been widely in consumer, industrial, biomedical, and environmental etc. applications for measuring and monitoring temperature and humidity to a specific location especially in a data center or a server room.

In most industries, temperature and humidity measurement is important because it played a role for a safety of all crucial equipment that may affect the whole operation.



ESP 32

This is an Open Source development board with a firmware that runs on ESP32

Module. The ESP32 module is a wireless programmable microcontroller board. The ESP32 WiFi board is SOC with integrated TCP/IP protocol that can give any Secondary microcontroller access to a Wifi network.



Motivation

The IoT, acronym for the Internet of Things, is a coordination of interconnection digital and mechanical devices, people, animal or objects that have been offered with the talent of sharing information without the assistance of human to machine communication, with the help of unique identifiers. The IoT has faced remarkable victory in the fields of business, medicine, defence, smart city and many more. Agriculture is a main sector that has a vast functional potential while considering IoT. In order to generate environment states that are compatible for the growth of plants and animals, protected agriculture uses artificial devices and modern development to manipulate best suited climatic behaviors. In this study, the main focus will be on the recent problems, and suitable solutions faced by the agricultural sector and provide prospective high tech and modern IoT applications, structures and technologies.

Methodology

Methodology refers to the overarching strategy and rationale of your research project. It involves studying the methods used in your field and the theories or principles behind them, in order to develop an approach that matches your objectives. An analysis applied to the methods in any application or research field is called methodology. It is a systematic and theoretical process so that all the methods and principles associated with the field of knowledge is explored well.

This process collects information and data about the particular subject and ponders it well, analysis is made and methods to find the solution is found.

It explains the definition of the process and how it is carried out; hence, the user knows about the process well. It explains the way to reach the result is as important as the result.

Existing system

India still use the traditional way of farming, farmers are reluctant to use advanced technologies while farming because of either the lack of knowledge, heavy cost or because they are unaware about the advantages of these technologies. Lack of knowledge of soil types, yields, crops, weather, and improper use of pesticides, problems in irrigation, erroneous harvesting and lack of information about market trend led to the loss of farmers or adds to additional cost. Overall losses in the agriculture processes starting from crop selection to selling of products are very high. As per the famous saying "Information is the Power", keeping track of information about the crops, environment, and market, may help farmers to take better decisions and alleviate problems related to agriculture. Technologies like [block chain](#), [IoT](#), [machine learning](#), deep learning, cloud computing, edge computing can be used to get information and process it. Applications of [computer vision](#), machine learning, IoT will help to raise the production, improves the quality, and ultimately increase the profitability of the farmers and associated domains. The Precision learning in the field of agriculture is very important to improve the overall yield of harvesting. Blockchain technology, cloud computing, internet of things (IoT), machine learning (ML) and deep learning (DL) are the latest emerging trends in the computer field. It has been already used in different domains like healthcare, cybercrime, biochemistry, robotics, metrology, banking, medicine, food etc. to solve the complex problems by the researchers. Many applications of machine learning, IoT in different domains are presented. Deep learning algorithms are making machine learning more powerful and accurate. By using automated machine learning (Auto ML) one can cut the demand of ML experts, automate the ML pipeline with more accuracy.

Proposed System

Breadboards are one of the most fundamental pieces when learning how to build circuits. You can use a breadboard for any project that involves electronic circuits. They are easy to connect to things like a sensors as well as microcontrollers such as esp22. The sensor data and test data are collected using the e.g., soil moisture sensor, light sensor, temperature and humidity, pH, etc. These real-time values of process variables are important for process monitoring and setting of manipulated variables.

The data pre-processing phase is the most challenging and time-consuming part of data science, but it's also one of the most important parts. If you fail to clean and prepare the data, it could compromise the model.

