



# Cross Platform Development using Flutter

Madhuram. M<sup>1</sup>, Ashu Kumar<sup>2</sup>, Pandeymanian. M<sup>3</sup>

Department of Computer Science

SRM Institute of Science and Technology, Ramapuram, Chennai, India

## Abstract:

Cross-platform mobile development today is full of compromise. Developers are forced to choose between either building the same app multiple times for multiple operating systems, or to accept a lowest common denominator solution that trades native speed and accuracy for portability. Flutter is an open source SDK for creating high-performance, high-fidelity mobile apps for iOS and Android. Few important features of flutter are - Just-in-time compilation is a way of executing computer code that involves compilation during execution of a program – at run time – rather than prior to execution. Most often, this consists of source code or more commonly bytecode translation to machine code, which is then executed directly. Ahead-of-time compilation (AOT compilation) is the act of compiling a higher-level programming language such as C or C++, or an intermediate representation such as Java bytecode or .NET Framework Common Intermediate Language (CIL) code, into a native (system-dependent) machine code so that the resulting binary file can execute natively. Flutter's hot reload feature helps you quickly and easily experiment, build UIs, add features, and fix bugs. Hot reload works by injecting updated source code files into the running Dart Virtual Machine (VM). After the VM updates classes with the new versions of fields and functions, the Flutter framework automatically rebuilds the widget tree, allowing you to quickly view the effects of your changes. With Flutter, we believe we have a solution that gives you the best of both worlds: hardware-accelerated graphics and UI, powered by native ARM code, targeting both popular mobile operating systems.

**Keywords:** Cross-Platform Mobile application development, IDE, Android development, iOS development, Flutter, Dart.

## I. INTRODUCTION

Versatile application advancement as of late is developing exponentially. Today every single individual in this world has an advanced mobile phone in his pocket. Cell phone's consolidate a scope of capacities, for example, media players, camera and GPS with cutting edge processing capacities and contact screens are getting a charge out of consistently expanding prevalence Cell phone's assistance us to accomplish a scope of undertakings through something known as applications or Apps to short. As indicated by Gartner [3], Google's Android, Apple's iOS and RIM's Blackberry all have something like a 10 percent piece of the pie. For finishing this survey paper and learn about this subject an aggregate of four research papers were utilized which comprehended reasonable and ebb and flow situation of Cross-stage versatile application advancement. MCIDER is fundamentally a working framework similarity engineering that can run applications worked for various versatile biological systems ideally iOS and Android together on the equivalent Smartphone or tablet. Fundamentally in less difficult terms CIDER had the capacity to run unmodified iOS parallels on the Android subsystem with no kind of alteration. Juice accomplishes the assignment of expanding the limit of home Android portion by at the same time utilizing the home part and the slave piece which is the application double interface for our situation. Client space of the slave part gets in contact with the Cider empowered bit in the very same ways as the slave bit. That is, the iOS applications get in to Linux based bit approach as though they are dealing with a home part of iOS subsystem which is running on a run of the mill iOS based gadget. Example of a remote part, and reuse and run unmodified outside client space library code. Presently going to the design of these two working frameworks. iOS keeps running on ARM CPUs like Android, yet has an altogether different programming biological system. iOS is based on the XNU[8] A cross breed

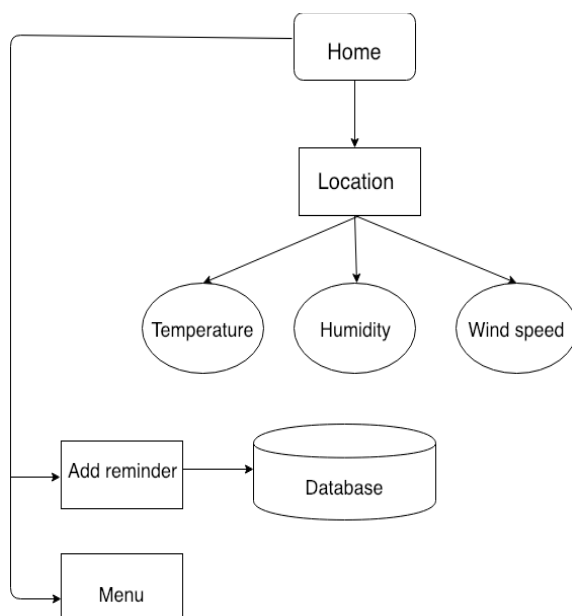
mix of a solid BSD part and a Mach microkernel [5] running in a solitary bit address space. When we talk about Android, Each Android application is ordered into Dalvik[4] byte code (dex) arrangement, and keeps running in a different Dalvik VM example.

## II. EXISTING SYSTEM

Examination of most recent cross-stage mobile application improvement approaches which are at present accessible in the market. A portion of the cross-stage versatile application advancement approaches are Phone Gap, Titanium and so on. The recognize approaches that utilize a run-time condition and those that create stage explicit applications from a typical code base at incorporate time. The last mentioned, generator-based classification incorporates display driven arrangements and cross-gathering. Up to now, there are no generation prepared arrangements of this class. Consequently, till this sorts of methodologies are focuses on cross-stage arrangements that consolidate the source code of an application with a runtime domain. A portion of the instances of cross-stage application improvement instruments are Phone Gap, which is a Hybrid system and Titanium. The most noticeable mixture structure till date for cross stage application improvement is Phone Gap. Telephone Gap was initially made by Nitobi Soft-product, which has been procured by Adobe. The improvement presently happens in the Apache Cordova undertaking of the Apache Foundation, of which Phone Gap is a dispersion. Telephone Gap a well known cross-stage versatile application improvement apparatus is inexact founded on jQuery which is an exceptionally quick library change device. This exploration paper investigated how unique devices which are as of now accessible in the market work and associate with each other. Also the advancements on which cross-stage versatile application improvement apparatuses which are at present accessible in the market are right now dependent on a

portion of these advances which care as of now famous are HTML5, Java script and open source libraries, for example, jQuery and jQtouch. In this way designers can utilize an incredible piece of their abilities to create portable applications. Portable web applications will be applications which utilize an example of versatile internet browser to run the application. These are appropriate for portable sites like m.yahoo.com, m.facebook.com. These applications are created utilizing cross-stage SDK's and open source libraries, for example, jQuery, jQtouch, and so forth. The (UI) is created in HTML5 and rationale is characterized by JavaScript. The last deliverable is a lot of records that can be facilitated on a web server and the application can be gotten to utilizing any internet browser which could be from a PC, Android gadget, iOS gadget or a Blackberry gadget. Cross breed portable applications are a mix of the past two application types. These applications are created utilizing open source libraries yet in addition approach a portion of the local capacities of a gadget, for example, Camera, GPS and so on. So in straightforward words, cross-stage portable improvement by taking case of HTML5 based web-application which can be gotten to from any kind of Mobile Browser.

### III. SYSTEM ARCHITECTURE DIAGRAM



**Figure.1.**

The application developed on flutter for farming solution contains several fetures that help farmers plan their crop cycles and accordingly decide the optimum time or climate for growing any crop. The main objective of this app is to provide farmers with a complete solution to help maximize their yield and resolve their queries. The app consist of multiple features each dedicate to fulfilling a specific requirement of the user i.e. the farmer. The key features of the app are:

1. Weather monitoring and real time alerts
2. Land preparation techniques
3. Optimal conditions for seed sowing
4. Amount of irrigation and fertilizers required
5. Best harvesting time
6. Cultivation methods and crop cycle to follow
7. Real time information from sensors in the field
8. Connecting farmers to the market
9. Easy access to government distribution sites
10. Creating a blog to help farmers understand and practice more efficient methods of cultivation

### IV. PROPOSED SYSTEM

The home page of the app will display the weather updates which include the wind-speed, temperature, humidity. This is displayed on the screen using icons which helps make the app more user friendly. On the home page the farmer can enter his/her location and accordingly the weather conditions of that particular region. The farmer can even set reminders on their app and design a schedule for themselves which can help them better manage their crops. These reminders are set with the help of Google Firebase which is used to store all the data on a cloud storage. The home page can also be used to access the menu which contains multiple features designed to serve as utilities and guidance to the farmer.

#### Utilities and Guidance:

Utilities and guidance contain a list of features that help the farmer decide an optimum crop and the best method to cultivate it. When the farmer clicks on this option he/she will be provided with a list of crops that are most suitable to grow in the selected region based on real time weather conditions. The farmer can choose any given crop on the list. Utilities and guidance offer a lot of features such as land preparation techniques, seed sowing methods, amount and method of providing irrigation, fertilizers to be used and best harvesting method. Based on the selected crop the farmer will be given advice on the various methods to help maximize his yield.

#### 1. Land Preparation:



**Figure.2. Land Preparation:**

The app is even designed to help the farmer maintain the soil's rich mineral composition by choosing a crop cycle that is most compatible to the soil type of the selected region. The farmer will be advised on the best ploughing method and tools that they can use for land preparation.

#### 2. Seed Sowing:



**Figure.3. Seed Sowing:**

The farmers are also advised on the type of seed and sowing methods to be implemented. The app will also decide the most suitable time to perform sowing and accordingly set a reminder for the farmer.

### 3. Irrigation:



Figure.4. Irrigation

Each crop requires a different irrigation method to supply different amounts of water, some crops such as rice require huge quantities of water where as other crops like wheat require relatively less water. The irrigation feature of the app helps the farmers decide which the best method to perform irrigation is.

### 4. Fertilization:



Figure.5. Fertilization:

The app will assess the soil based of the selected region and accordingly let the farmer know the which is the best fertilizer to be used based on the soils mineral composition and the crops previously grown. The app also helps connect farmers to local producers and distributors of fertilizers.

### 5. Harvesting:



Figure.6. Harvesting

The harvesting feature helps the farmer decide the best time to harvest and and the appropriate harvesting techniques to be implemented.

### 6. Mandi Prices:

The app will allow easy access to government grain and vegetable distribution sites which displays detailed information on daily market reports and price trends.

#### IoT Devices used:

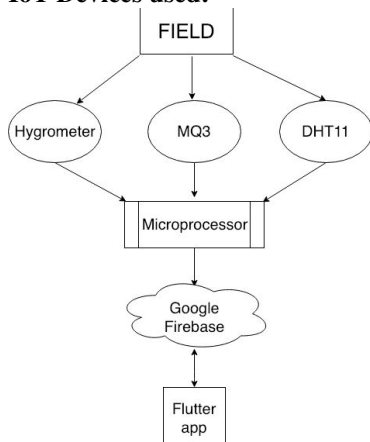


Figure.7. IoT Devices used:

The system involves the use of multiple IoT devices that are used deployed into the fields to measure various parameters such as temperature, humidity and soil moisture content. This information is sent to the Firebase database from where it is accessed by the flutter app and displayed to the user.

#### Temperature and humidity sensor:

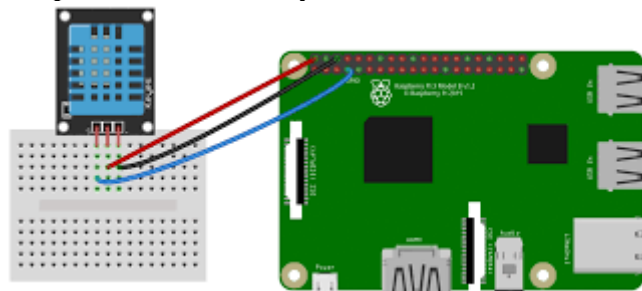


Figure.8. Temperature and humidity sensor

To measure the temperature we use the DHT11 which is interfaced with a Raspberry pi. The DHT11 measure the temperature and humidity levels and with the help of the Raspberry pi this data is wirelessly transmitted to the database. This device can also be used to detect sudden rise in temperatures which can indicate a forest fire.

#### Soil moisture sensor:

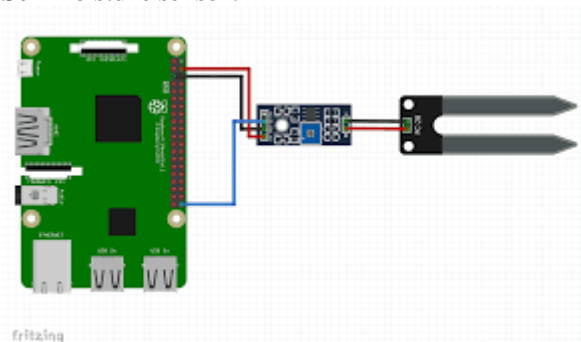


Figure.9. Soil moisture sensor

The Hygrometer is interfaced with a Raspberry pi which is used to detect the soil moisture content of the field. This allows efficient irrigation by letting the farmer know when there is too much or too little moisture in the soil. This data is wirelessly transmitted to the database from where it is accessed by the app.

## V. ADVANTAGES OF THE PROPOSED SYSTEM

There were a few focal points found by auditing distinctive calculation. In the first , we have examined about the similarity working framework design which was gotten from CIDER, can all the while run Android and iOS applications in the meantime on a similar gadget. It helped us to accomplish a troublesome errand of running unmodified iOS parallels on the Android subsystem. The execution estimation benchmarks likewise shown that CIDER performed betterly than the default Dalvik Compiler Machine. Dalvik Compiler Machine is a kind of byte-code age device which aggregates the application source code before the execution of an application. The CIDER compiler was observed to perform superior to Dalvik. And furthermore the best approach to comprehend the different parameters through which we can recognize different cross-stage portable application advancement devices which are at present accessible in the market a portion of these parameters were dispatch time, sort of GUI, security execution

and so on. This exploration paper likewise helped us to see how these cross-stage portable application improvement apparatuses perform and on what advances they depend on. One of the ways by giving a profound understanding on the most recent innovations on which cross-stage versatile application improvement apparatuses. A portion of these advancements were HTML5, jQuery, jQtouch, HTML5 and CSS are utilized to configuration web applications which are stage autonomous.

## **VI. FUTURE SCOPE**

### **This project can be further improved by**

- i. Making the app available in multiple regional languages.
- ii. Creating a blog for farmers that will allow them to interact and share ideas.
- iii. Allowing the farmers to directly sell their product via the app by connecting them to distributors and local markets.
- iv. Install features that help monitor livestock and grain storage.

## **VII. CONCLUSION**

The main objective of this project is to provide farmers with a complete solution to help them obtain the maximum yield and resolve queries. This projects aims to revolutionize agriculture in India by introducing farmers to smart and simple solutions much like this app that allows farmers to adapt and implement new methods that help them better manage their crops and obtain a profitable yield.

## **VIII. REFERENCES**

- [1]. Arduino Website - <https://www.arduino.cc>
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- [3]. Dart Packages- <https://pub.dartlang.org/>