

MOBILE APPLICATION DEVELOPMENT: AN AGILE APPROACH

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Abstract— Nowadays, the use of mobile phones has been expanding at an extensive rate as the mobile applications field has been introduced. Mobile Applications play a very important role in mobile devices as they provide immense functionalities that will carry out useful purposes such as booking tickets, making a voice call, sending GPS location, purchasing groceries, etc. In today's smartphone world, mobile application development is becoming very competitive in the market because the creation of mobile applications has much of its roots in traditional software development. To make sure of the efficiency of your application in a certain complex scenario, an approach is needed to be followed to make a successful application development. Along with desktop applications, programmers must create software applications that can function on a smaller platform of hardware. That is where mobile devices are introduced. But at some point, the hardware in the mobile devices or tablets does not match with the desktop computers [6]. So, the intention of mobile applications must bring the most beneficial outcome to meet the optimal performance. In this paper, the issues in the existing process are examined. Also, the possible ways to overcome the problems are suggested with the implementation as a sample application scenario.

I. INTRODUCTION

In this new generation, the invention of mobile applications has boosted the software development field in various aspects. As the technology is taking turns, mobile application development has raised its demands in the market. At the initial phase, the internet was new to this market. Checking and reading emails was daily usage. The circle has been growing and the usage of mobile applications has been expanded to marketing, advertising, healthcare, education, and several other purposes. There is an observation analysis that the rise of mobile application development has encouraged the research community in various situations by examining the functioning of software altogether [7]. At the time of development of a particular app, it is necessary to solve the issues of performance on any device

irrespective of the specifications of the hardware. This includes designing the code that will be implemented on a mobile device specifically. It is important to be sure about the software platform as mobile apps run based on the type of OS. For instance, for iOS devices, the versions of iPhone and iPad are examined to realize the universal usability and overall performance. For Android devices, the versions of the OS vary according to the hardware systems as the apps run based on the ranging versions of OS. The development of mobile applications is not only the major aspect also, it requires deployment. One of the major tasks is when the product meets the customer. Mobile developers must concentrate on the deploying period when the application is released on time and within the budget limit. Budget estimation is the crucial part of the mobile app development as is required for building confidence in developers and stakeholder's relationship.

There are several perspectives used for software development that are adapted by mobile application development. The following papers have been chosen for the review:

Paper 1 –“**Software Engineering Issues for Mobile Application Development**”[5]

Paper 2 –“**Mobile Application Development: A comprehensive and systematic literature review**”.[1]

Paper 3 –“**Mobile Application Development: All the Steps and Guidelines for Successful Creation of Mobile App.**” [2]

Paper 4 –“**A Practical Approach to the Agile Development of Mobile Apps in the Classroom.**”[3]

RESEARCH OBJECTIVES

The purpose of this research is to review the different approaches and strategies to develop mobile applications on different platforms. To develop mobile applications, we need a specific approach where there is a faster development process with fewer risks. So, to overcome the challenges, agile methodology is introduced. Agile Methodology is the process of mobile application development where a

combination of tasks is divided into small tasks so that it is easy to accomplish on time. The basic policy of the Agile process is that it values the interaction which takes place during the development process that helps both the clients and the app developers to implement the application effortlessly [11].

Also,

- Explore the different mobile development strategies and their implications.
- Support various mobile devices, manufacturers, and browsers.
- Create a touch-friendly interface, while retaining the worth and functionality of the appliance and providing an enticing mobile experience that would be applied to other applications.

II. LITERATURE SURVEY

While software development generally is often more efficient with agile methodologies, software development for mobile devices, specifically, thinking about using agility because of the possible benefits from its implementation. Some surveys say that response to the changes in software development over following a plan is a good practice. For example, within the literature, some research suggest that the development of mobile applications shouldn't be accomplished with a standard methodology supported documentation or time-consuming processes, but should pursue the rapid accomplishment of a functional product considering the features of mobile applications. Although agile software development appeared before mobile software development with its actual platforms, its principles are often used easily within the development of this particular sort of software.

[3]. The Mobile Application Development approach is optimized for a team of developers working during a co-located office space aiming at delivering a functional mobile application during a short time frame. consistent with the survey and research wiped out the paper, mobile development tools and framework are mostly focused on the individual developer to make an application as quickly as possible [1]. Below 3.1 and 3.2 sections describe the issues that were raised and respective solutions in the Mobile Application Development process.

III. EXISTING ISSUES

The best practice suggested by the author was to follow an agile methodology that will quickly adapt to changing user requirements and to follow development guidelines published by various platforms.

The main factor in mobile app development is the interaction of applications between one another on the same platform. There are numerous applications on the mobile device from various sources which tend to interact with one another. Another point is about the sensors that handle the hardware and software components both equally. The accelerometers help the devices in their movements tracking with the use of touchscreen gestures, microphones, GPS that are hidden within it on a device.

For all this support we need to look into the hardware and software integrity issues of the mobile device. Any application which tends to run on a smartphone needs accurate hardware as well as a software platform. For instance, talking about the screen resolution, the display screen must be clear to focus on each entity that appears on the screen. Additionally, the operating systems keep releasing their versions just to be on track so that the embedded mobile devices do not complicate the process.

To be assured there must be a complexity testing criterion just to be sure about the software execution. According to few survey and research papers, there are some issues raised by the author:

- Developers need to figure out the version of the mobile device so that the traditional application should be compatible with the platform.
- Experts must look into the reusability of the code concept during the designing stage due to versions of the operating system.
- To examine if the user interface of the app is attractive and user-friendly because it depends on the different set of use cases.
- To determine the client-server computing techniques for better synchronization among the software tasks [4].
- To figure out the facility of supply of battery backup. The battery life of mobile devices should be adequate so that the application can run with ease.

To minimize these issues that are mentioned above, the author follows the agile methodology that will quickly overcome and adapt the changes that have been applied in the mobile application.

IV. PROPOSED SOLUTION

There are few points to consider as a solution that stood out. The points are mentioned below:

- **Formation of Ideas**
Start by finding the matter with ideology of the project. The main target is on knowledge collection instead of its availability on a mobile device. The appropriate plan to start initializing

the app. Next, the features of your app should be set. The more features it provides, the more are more that users getting fascinated by the application and using it more frequently and efficiency of device must be observed. The developers must not build a mobile app just for the sake of user's attention. The interest depends on the efficiency and functionality of the application in given situation. It must be more "look and feel" approach to drag the interests of end-user.

- **Design the Application**

The difference between good app and bad app depends on the interface design. The design is the main factor for the fulfilment of an app. It is indirectly proportional to the usability of the app. The UI design should catch the attention of the user so that the user is engaged in exploring throughout the application. It creates a sudden impact within the mind of the user with help of quality of designing elements. The interface should be in such a way that it should reveal more options while using the applications. Due to this the user can be persuaded by the overall creativity. Creative Design may be a sum of the interface (UI) and User Experience (UX) [2].

- **Develop a Prototype**

After deciding on the approach, a prototype or the sample should be developed. It is the technique for turning your concept into a software with a few fundamental functionalities. Choosing the appropriate coding language will enhance the functionality of the application at a higher level. It allows the users to observe the advantages that your app offers instead of just reading the descriptions of it. Hands-on experience is necessary to test any application. With the help of prototype, you will be able to point out and test the essential functions and operations of the appliance using the smallest amount of cost and time possible. According to the test case results the decision to deploy the mobile application is based.

- **Deploy the software**

Deploying the application means making the application available to the users. It is important to plan properly before releasing the app to the live and testing environments. The use cases of the working of application must be analysed before deploying. The main aim of the first release must be to check out the user experience. There might be some issues which can lead to failure, faced by the end-user in the beginning. Though simultaneous integration is possible to build a new

app, continuous deployment to end-users is not possible due to how the app store works. Frequent updates should be done if required. The Software Development Kits (SDKs) and cloud services may hold few of the libraries and interdependencies between third-party service providers and other teams within an organization. Cooperation and interaction are needed between developer and end-user.

- **Upgrade the App**

To improve the functionality of the application, it becomes important to keep the software up to date periodically. There can be a boost in new innovative features and enhancements in the application. Revamping the App Features might take you towards a major update so that you may also combine with other implementation strategies that follow. Also, the applications must be updated on a daily basis to repair the faults and error of the prevailing application. If there is no growth in the app then no user would like to continue to operate an existing application that has errors in it. To keep the user engaged with the application and increase the efficiency of the appliance, there should be rise in updates without any bugs or errors.

V. METHODOLOGY

Agile methodology is one of the foremost commonly used strategies in Mobile application development in today's time. The agile methodology for mobile application development seeks to supply an alternative to traditional methods of project management like the waterfall methodology [8]. The Agile methodology could also be a development methodology supported by incremental and iterative approaches, i.e., an agile methodology for mobile application development starts by focusing on the users and preparing documentation on a scope of problems, opportunities, and values to be addressed. This approach provides the requirements and solutions to evolve through the combined effort of the event team and therefore the customer. It assists with adaptive planning, evolutionary development, and continuous improvements throughout the phase. This iterative and versatile approach is often utilized in complex projects where the customer requirements change frequently. Any project is often divided into smaller parts and agile methodology is often applied to each of those small parts [9].

VI. IMPLEMENTATION

For the past few years, the influence of mobile application development has been making a change in various scenarios. For instance, groceries to health care software applications have helped the system very efficiently. As a practical approach, we have been developing a fitness application that can help users to enrol at the gym centres at anytime from anywhere. Most of the paperwork will be reduced by the online registration process. The customers can interact with the trainers easily. As the survey done previously, the growth of fitness apps has amplified since 2014 witnessing quite a one-half increase in its usage within six months. As compared to other apps, fitness apps grow 85% faster than others [12]. The ideology of the fitness apps came with advanced features such as person-to-person interactivity. It includes all the physical activities of the customer like running walking diet as well with the help of sensors and analyses the report at the end of the scheduled period. The subscription schemes for fitness gyms have been provided like online transactions, notifying the dues of each person.

As mentioned in the 3.1 section, issues, the area of performance, the size of payloads should be determined based on various platforms of Mobile App Development. Today, 2 main platforms are largely used in the Mobile Development market i.e., iOS and Android.

The comparison of these two platforms is mentioned in below table [10]:

| Key Aspects | iOS | Android |
|------------------------------------|--------------------------------|--|
| Development language | Swift | Java, Kotlin, Dart |
| Integrated development environment | Xcode | Android Studio IntelliJ IDEA Visual Studio Code |
| Simulator | iOS SDK bundled | Android Virtual Devices (AVDs) Android Physical Device. |
| Graphics | OpenGL (support for 2D and 3D) | OpenGL (support for 2D and 3D) |

VII. SUMMARY AND FUTURE WORK

Mobile applications have changed our lifestyle. It has made our vision and thinking tendency broader than before. The varied functionalities that they provide in our daily routines is undeniably tremendous that we won't get time to think for a moment that what will

be our life without these machines and software applications. How would the life be? Would it be easy to survive? What about the growth which it has brought in the technological world? The developers who have built these appliances have been through challenges to appraise the application in the present technologies.

To develop a successful mobile application, all the rules must be properly considered and followed appropriately to avoid the danger of crashing the app and also losing users. Developing new and innovative apps will cause an opportunity for serious revenue.

VIII. CONCLUSION

The era of mobile application development as just started and there is a long way to go. As the technology is expanding, there are several innovations taking place day by day. For a successful implementation of mobile development, it is necessary to keep the approach as simple as possible. The process needs interactivity, structural support, feedback support, quality affirmation and so on. What's more, challenges like security, UI/UX, and execution v/s battery need to be defeated to form the appliance successfully. Next challenges can be regarding working on artificial intelligence and Virtual Reality as there are applications which have been developed. But near future these features will be implemented as a common usability among each other.

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