Automated mess service based on user's location PART-2

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Abstract - This paper discusses Android based system to develop online mess ordering system in which the application identify and locate nearby mess providers which have registered via our application, User can order food and rate their service experiences via this application by reviewing and rating. Our application opens ways to business for mess providers and customer satisfaction for users who use our application to order food. User can search for different varieties of mess providers and sort them according to price, ratings or type of food prior to their location. This application provides an ease and friendly way towards digital commerce. This could light up new ways of entrepreneurships and opportunities for today's competitive world.

Key Words: Android, mess services, maps, GPS (Global Positioning System), online ordering, food, and travel.

1. INTRODUCTION

Android OS have a greater importance in our society due to its progress leaps and bounds acquiring 87.7 percent of global market share. Android is free and an open platform built on Linux. It is an open source solution for mobile devices offering a complete software stack including operating system, middleware, and key mobile applications. Apart from its speed, scalability, and performance, there are many other advantages of Android application development Mobility is at the core of every enterprise's digital strategy for this ever-growing number of enterprises is adopting Android to build custom mobile apps to considerably boost their revenues and attain tremendous business growth.

Basically our application tends to digitalize mess service to fully automated service which will be guided by each instances of the application. Our aim is to create user-friendly and easily accessible platform to interact with mess services, nothing is better than starting an android application to do so. Traditional mess services have limited options and customers, mess service awareness and validation are main concerns to get more consumer demand. Mess and canteen services are present everywhere around us; to locate and validate their services is difficult when we are new to a place. Our android application not only validates services by taking reviews from users for giving feedback and social views to improve services. This application makes users to order food online with proper validation and satisfaction among stakeholders. Our system interact with user's location with the help of 'GPS& Geo Tagging on Android Platform' [3] [5] on android maps API to mark mess providers. By using this application user can give their review based on their order history which will validate

good service practices among mess to compete for higher ratings. Our also system provide platform for advertise various food providers and discounts for loyal customers. We are using Braintree SDK for more options and security in digital commerce among mess providers and customers.

Motivation –

Nowadays, hotels services are digitally active were as traditional mess services lag behind, mess services don't have a platform for advertisement and make themself aware among the busy crowd. People, who travel to new place for job, study, work, etc., usually face the problem in finding mess services around their place. Even finding good services is difficult in many places so, we decided to develop an android application to ease this problem.

Product Function:

This application would have the following basic functions.

1.1. User Management Module:

User management module enables to add user information such as passwords, email, contacts, etc. which are used to authenticate user before validating services.

1.2. Mess Profiling Module:

Mess providers use this module to edit their mess, i.e. upload mess photos, mess name, address, contact, and other details. By using this module our application locates the mess and pinpoints it on map so that customer can identify and place order.

1.3. Location Module:

Today android smartphones are very much common and GPS 'Global Positioning system' [1] are present very where creating a higher feasibility to use it in our application. [3] We use Google map API 'Application Interface' for getting detailed geographical information for identifying mess around the user over a fixed radius. [2] Along with it we use dijikstra algorithm to track and identify the nearest mess service. Since we are working on android smartphones which has limited power supply and while using GPS along with WIFI will drain smartphone battery to a larger extent. [5] By using several LBSs 'Location Based Services 'running in parallel could be beneficial from each other's positioning information.

1.4. Review and Rating Module:

It's important to give customer validation in mess service and encourage good service to improve the standards and quality of services. We use review and rating in this application so that user would prefer better services based on rating given by customers from their order history. Reviews are the way to give feedback and views of user experiences. Based on the review we rate the mess and are triggered to show top ranked mess services [6], creating a positive completion among mess service providers to provide good service to customers.

1.5. Menu Module:

Mess provider places their food items within category in the menu so that the customer can easily access the menu and view items that mess offers along with price. Our application supports latest material design patterns giving more user-friendly and attractive design [8] in performing various operations with menu, such as mess provider uses this module to add, edit and delete items and customer uses it to view and select items.

1.6. Payment Module:

In the application we use brain tree SDK integration for payment. Braintree is a full-stack payments platform that makes it easy to accept payments with support of various payment methods including Credit/Debit Cards, PayPal, Apple Pay, Google Pay, Android Pay, etc., [9] with security features such as manage fraud, take control of chargebacks, streamline PCI DSS compliance validation.

1.7. Notification Module:

Notification in our application makes alerts of current order requests and ordering status for both users. Notification is part of android application which reminds alerts so that users can take appropriate actions at appropriate time.

2.1 Existing system:

This system was primarily design to develop an Online Booking System where users can search for different varieties of hotels and are able to sort them according to their price, number of stars or their location distance to any particular place in the city. Once the hotel is selected, Users are able to guess the fastest routes to all the tourist attraction places and restaurants nearby each hotel using Dijkstra algorithm. [2] The system is more designed to help Iraqi tourists to prior explore and reserve rooms during peak times. But it is limited to small groups of hotels which are registered and booked via its web application.

2.2 Current System:

Current system is based on android application in which mess data is mapped with Google's map API via markers on the other hand the customer get mess marked prior to customer's location making easy to locate required mess and access their services. Our application gives root for customer as well as mess provider by using the same application which is bounded to communicate between different varieties of android phones at real time. [1] This system is design to overcome disadvantages of previous system by providing access to various mess providers to start their business by using our application, we use more convenient payment module and integrating accessibility of the entire system by just using a single application. We use android platform and Google maps API so to ensure high flexibility as GPS (Global Positioning System) and smartphones are very common and wide spread around the world today.

2.3 Backend:

- **Firebase:**

Firebase is a Google provided API for database storage and syncing into your android, iOS or web application. [10] A real-time database is one which stores data to database and fetches data from it very quickly but Firebase is not just a real-time database, our system uses firebase as a database backend for your android application development. Google firebases [10] have many features like Authentication, database, storage, hosting, notification, etc.

- **Database:**

Firebase Real-time Database builds rich, collaborative applications by allowing secure access to the database. [11] Real-time Database synchronizes the local data changes with the remote updates that occurred while the client was offline, merging any conflicts automatically.

The Real-time Database is a No-SQL database and as such has different optimizations and functionality compared to a relational database. [11] The Real-time Database API is designed to only allow operations that can be executed quickly. This enabled us to build a great real-time experience that can serve millions of users without compromising on responsiveness.
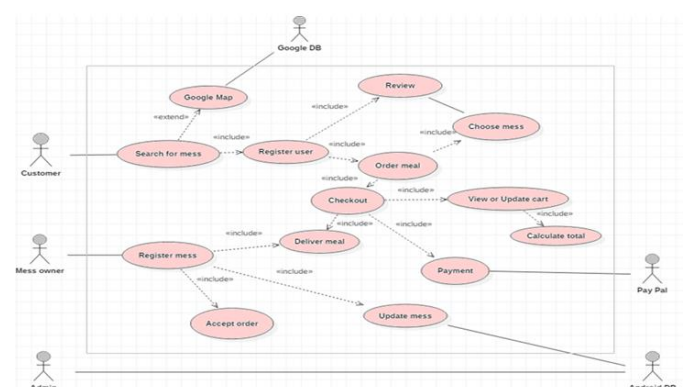
2.4 System use-case:

Fig 1

The above diagram shows the overall structure of our application. Here, customer, Mess owner and Admin are live actors in which customer searches nearby mess, selects food items from menu of respected mess and proceeds to payment, while mess owner uses application to accept orders from customer.
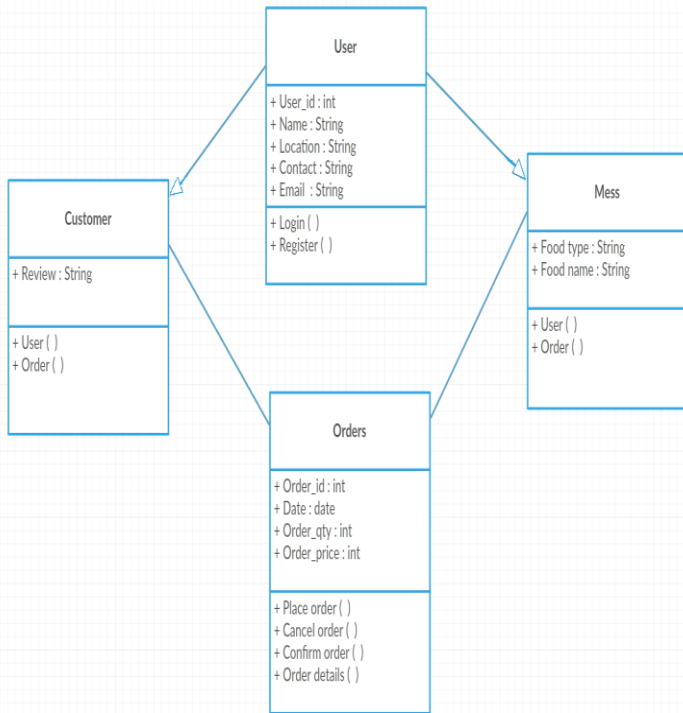
2.5 Class diagram

Fig 2

'A class diagram is an illustration of the relationships and source code dependencies among classes in the Unified Modeling Language (UML). In this context, a class defines the methods and variables in an object, which is a specific entity in a program or the unit of code representing that entity.' Our system is defined under the principles of UML designs. The above class diagram shows the inheritance of customer and mess classes from parent user class

2.6 Activity Diagram:

Activity diagram describes the operations of system represented in a flowchart view to represent the flow from one activity to another activity. Such a control flow explains how our application works from initial state to its destination or termination.
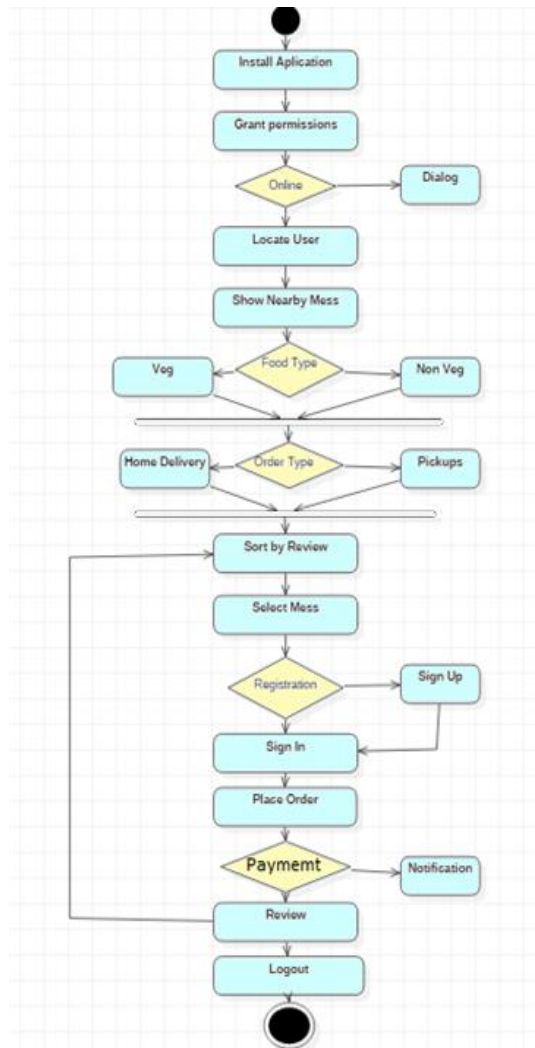

Fig 3

2.7 Requirements:

Implementation phase:

This section lists the minimum hardware and software requirements needed to run this application on android smartphones efficiently.

- **Hardware Requirement:**

  o Android Smartphone
  o Touch Screen
  o 1GB plus of RAM
  o Network support

- **Software Requirement:**

  o Android version 4.1 and above
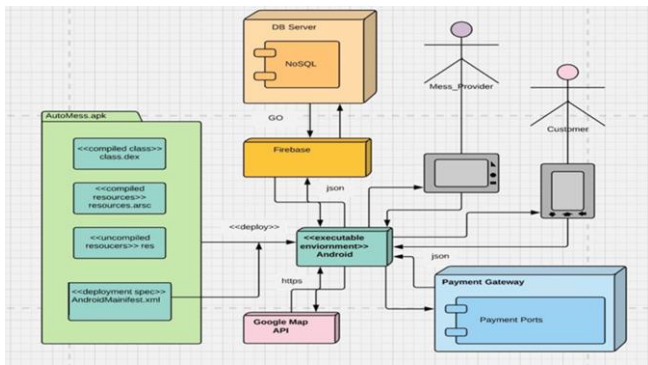 o Material design support

2.8 Deployment:

Fig 4

Deployment diagram is a basically structure diagram which shows architecture of the system as deployed or distribution of software artifacts to deployment targets. Artifacts such as classes, resources, java and xml codes represent concrete elements in the physical world that are the result of a development process. The above diagram illustrates the deployment of our application

2.9 Testing

We have conducted various testing and test cases on our application to find and fix bugs and errors, our application passed in unit testing where individual components are tested along with integration testing system and acceptance testing in which groups of component and their integration to one application is tested and checked if it works as per requirements.
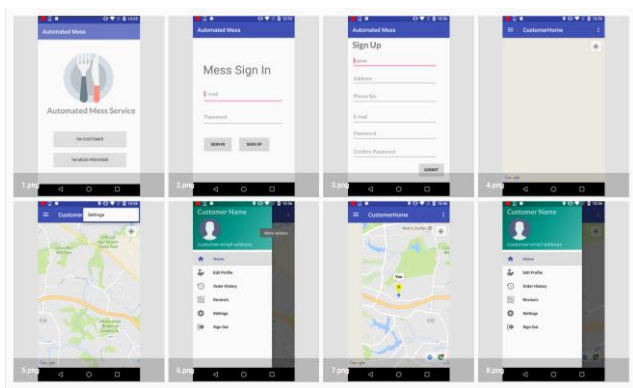

Fig 5

The above screen shots were taken while performing GUI [Graphical User Interface] testing of our system under robot testing done at test lab support in Firebase.

3. Results:

Our online food ordering system shows high flexibility as resources needed to operate our application efficiently are easily available, i.e. network, GPS, android smartphone, are very much common nowadays as they exists everywhere. This application supports all major android devices and

those with android version of 4.1 'Jelly Bean' onwards to latest current version, which results in covering a very large range of users to engage with our application. And also we use Firebase as our backend integration, Firebase offers accessibility support with our application and easy compatibility with various android devises. Firebase support tools helped us to develop more efficient and crash free application.

Fig 6

The above graph shows the result of performance testing conducted on Nexus 5 device of android version 7.0 and it states that our application uses less memory of about 200k-600k and less 40% of CPU utilization with around 2M of data transfer rate. Which overall suggests that our application have good results by consuming less battery life and efficiency in resource usage.

3. CONCLUSIONS

This paper is review of our previous paper 'Automated Mess service based on User's location', where we have researched on developing an android application to evaluate views in that paper. Our project now can allow mess providers to create their mess profile and add items which can be viewed and ordered by customer. Customer can now rate and review their services and use more secure and user friendly payment methods which would engage users to use digital commerce. This would automate mess services and encourage more and more users to engage with online mess services which would eventually help small scale entrepreneurs to enrich their business

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