Implementation of an Android Application for Management of a Housing Society

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Abstract: *A housing society and its functions are a part of our everyday lives. Members of the managing committee are those who take charge of all the chores involved here. Residents often feel edgy regarding undone jobs and most even lack time to keep track of all these happenings. But, there's no avoiding the fact that these chores and all the housing society members are inseparable. This paper presents the design and implementation of an Android based society maintenance application.*

The elements of this system comprise of (1) an Android application which will be accessed by both managing committee and residents (2) database server that will contain information entered by the users as well as generated for the users and (3) business logic that will interconnect and pass information between the application and the database server. Our application is developed in Eclipse.

Thus, our application will help users improve the management of their community and the tasks related to it.

Keywords: Android application, MVC architecture, database, housing society management.

1. Introduction

The Android operating system powers all Android devices. Since its inception, Android has developed into a resilient and independent operating system designed for mobile devices. Research reveals that over 1.5 million Android cell phones are sold every day. Android platform phone sales have shown a steady growth in recent times. This indicates the increasing popularity of Android operating system.

Our project is thus based on the Android platform and is meant to better manage the functions of a housing society. The functions of a housing society include solving members' grievances, collecting maintenance, issuing receipts for the same, appointment of service providers and the list goes on. These functions are mostly entirely manual and are managed by the managing committee of that housing society.

Large directories are to be maintained which results in a huge amount of paper consumption in today's time where almost everything is possible electronically. Residents are often left restless because of the lack of communication and that they are unaware of where the society funds are utilized. The inevitable feature called transparency is absent. Besides, a majority of people are hardly even aware of the society laws. Housing society laws suggests that one or two meetings be held every year. And it's very unlikely that these couple of meetings completely achieve their goals.

Proper management of the above tasks thus requires functionality based and automated mobile application. Productivity will experience a rise and there will be a subsequent fall in time and efforts of the managing committee. Members can have access to their housing society day or night irrespective of their remoteness.

The application designed automatically generates the financial report for a housing society describing the incoming funds and their utilization. The periodic transactions and updates are done by the managing committee members. This allows the society residents to be assured as to where the funds are employed.

The application produces maintenance for its members and also keeps a track of received and not received dues. The managing committee members enter one time charges for the flats to automate the process or they may manually generate the bills periodically.

The application also integrates other dimensions of the functions of a housing society that includes so12ciety notice board for sharing information, notifying members about the events to be held, easy discussion of members' grievances and convenient communication within the society members.

Thus, the goal of the project is to develop an Android application that will assist the housing society members to play their roles more effectively. This means separation of the responsibilities at the user level, viz. committee member or housing society resident. Committee members act as administrators who will create data for their housing society which includes registration of the society on the application,

one time entry of maintenance charges and keeping a track of incoming and outgoing funds. Whereas, residents register themselves with their apartment details and access the services like viewing maintenance charges and financial reports thus keeping transparency intact.

This paper is divided into the following sections: Section I introduces the concept and functions of the application. Section II describes the aim of creation of this application. Section III presents the literature review of some of the technologies that were developed for a similar purpose, their strengths and weaknesses have been illustrated as well. Section IV gives the system design and methodology used in the development of the application. Implementation is described in section V. Section VI mentions the conclusions.

2. Problem Definition

The functions of a housing society are an inevitable part of our lives. There are chores here which unknowingly take up a considerable amount of our lives. Managing committee often gets tired of maintaining multiple email groups; excel sheets containing members' contact information, vehicle details of owners and at the same time addressing the grievances of the housing society residents. Worse is the case where technology remains unused. Also, residents get restless that issues are not getting resolved despite reminders and no one knows the status of the complaint raised.

Such issues and many more are common in most housing societies. With no appropriate tools, managing a residential complex takes too much of time, effort and money with a lot of inefficiency.

As times have changed, most of us have strived to combine technology with our daily chores irrespective of the field. Thus, changing the way of maintaining the society information will also prove to be beneficial, improve efficiency and save us time.

3. Existing Technology

A combination of website and mobile application called ApartmentADDA[1], founded in 2008, tries to serve similar functionality but in an inconvenient fashion. It uses cloud platform, SMS gateways and individual web portals for each housing society. One of the major shortcomings of it is the division of the admin and the resident side, for which separate applications exist. This clearly means that majority of the functionality is not applicable to the managing committee members, including acceptance of maintenance bills. Another impractical function is the visitor and attendance tracker which is accessed only by the admin, who would then have to monitor the visitors as well. Buzzar[2] and Subgroups constitute the other unnecessary features. Buzzar seems a futile attempt in a society maintenance mobile application. Whereas, Subgroups simply adds to the application's load which could have been better served by linking it to another chat application. Thus, ApartmentADDA shifts its aim from solely being a society maintenance application by including irrelevant features. Besides, in every residential community, there exist users who are not web savvy and will find this application uncomfortable.

4. Proposed System Design and Methodology

4.1 System Architecture

Being mobile based, our application uses the Model-View-Controller (MVC) architecture[3] as seen in Figure 1. Separation of the functionalities of our application is implemented because of the MVC architecture, although it provides a common integrated platform to both, the managing committee as well as the residents in a convenient manner. This is made possible by separating the committee members and the residents based on their user type.

We see in Fig. 1 how model[4] captures the behavior of the application in terms of its problem domain, independent of the user interface. It includes all that which will be displayed on the interface. A view is an output representation of information. It describes the graphical design of our application. Whereas, the controller receives input and converts it to commands for the model or view. Thus, it includes the application's code. The user uses the controller, which alters the model. Model then changes the view which will be seen by the end user.
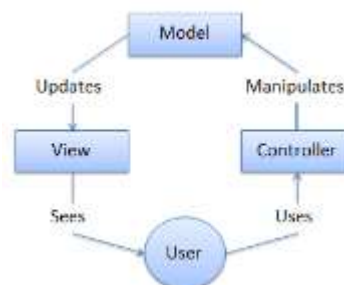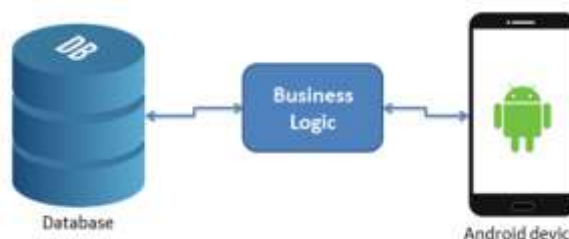

Figure 1: MVC Architecture

Figure 2: System Architecture

4.2 System Components

As represented in Figure 2, our application consists of three components. They are as explained below:

Android Application

This would be developed in Eclipse using Android programming and SQLite database. This is what the users will install on their Android device. Managing committee as well as the residents will install the same application on their phone. They will register themselves on the application and this information will be stored for that particular housing society. The users will thus be able to access the services provided by the application here.

Business Logic

As the figure suggests, it acts as a bridge between our Android application and the database server. It makes possible for the Android application to access the database server.

Database Server

This is where the data of the application will be hosted. This data is the same that will be fed by the application's users at the time of registration and at later stages of using the application's other features.

4.3 Description of the Proposed System

The system has its database stored at the server end which is basically the data entered by the application's users and the information calculated for the users by the application. The frontend consists of separate home screens for the residents and the committee members. The only difference is the inclusion of maintenance generation and financial report generation at the managing committee side. The data at the server will be accessed by the application with the help of web service.

Database Operation

The users will initially register themselves on the application by entering their respective details. This will include specifying whether the user is a resident or a managing committee member. Only after registration, the users can login with their respective credentials. If authentication is incorrect, access is denied. Depending on the features the user wants to access, he/she will be provided with data from the respective database tables. Users' registration details, maintenance calculated for the users, financial report details entered by the committee members are some of the vital details that will be saved in the database tables and will be fetched for the users according to his/her requirements.

Frontend Operation

Users of a housing society would initially install the Android application on their devices. They will then login with their credentials that were saved at the time of registration and can access the system's features. For the resident side, he/she can view the notices posted by the committee members, can view/add events to the event calendar, view/add society members contact information as well as contact information of the people providing various services to the society. The contact information and event calendar rights remain same for the resident as well the committee member side. The resident may further view his maintenance and also verify the amount paid by him/her. The maintenance is generated automatically depending upon the maintenance rates entered by the committee member. He/She may also access the financial report generated by the committee members of the housing society. The residents post complaints and suggestions whereas the committee members respond to these grievances. Figure 3 explains this flow of our Android application.

System Integration

The database and the frontend would interact with one another using ASP.NET. This means the requests and service will be managed by an asp page. Result to the user is JavaScript object notation (JSON) which is viewed by the end user.
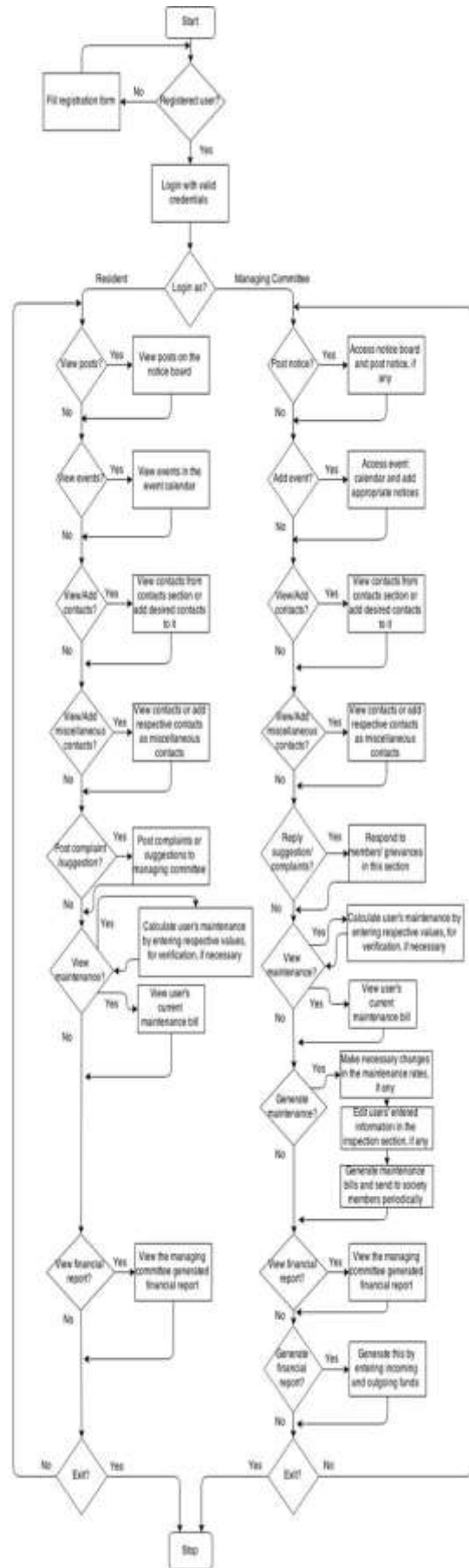

Figure 3: Workflow of Society Maintenance Application
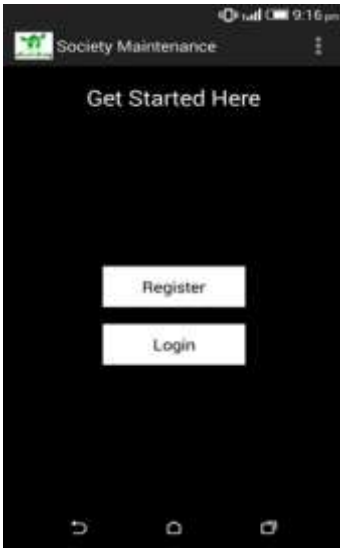
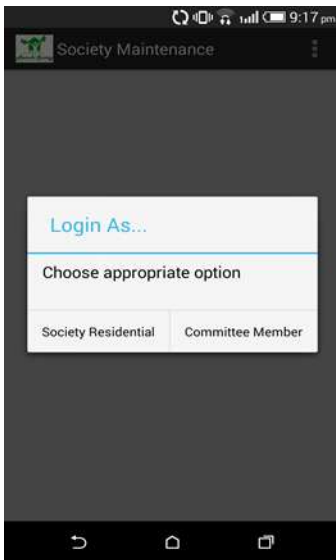## 5. System Implementation and Testing

Figure 4: Login Screen

Figure 5: Login Type Selection

Figure 6: Home Screen
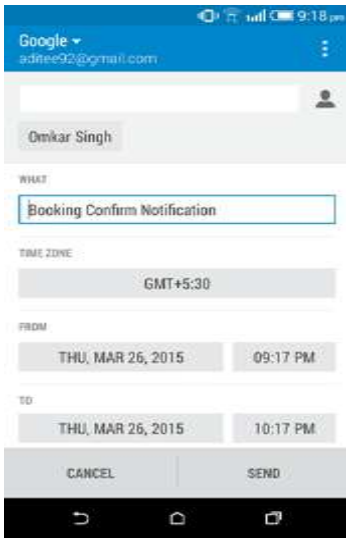

Figure 7: Notice Board Feature

Figure 10: Miscellaneous Contacts

Figure 8: Adding Event to Calendar
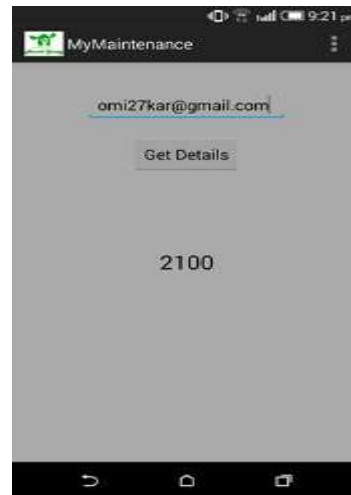
Figure 11: View Maintenance

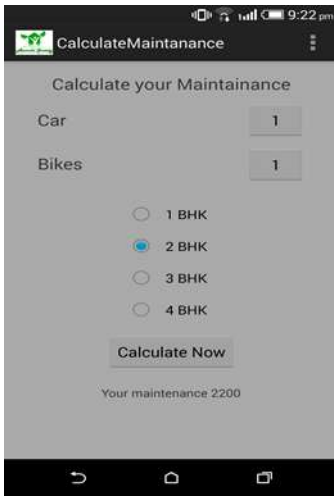**Figure 9:** Registered Users Visible as Contacts
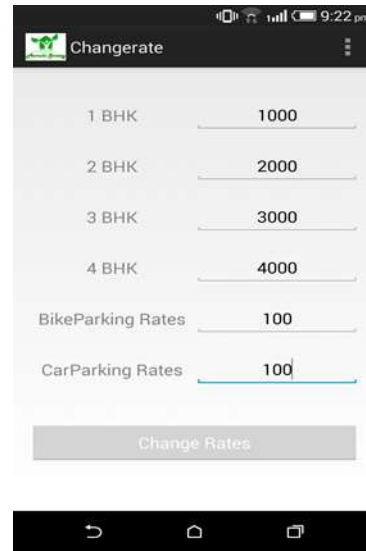
Figure 12: Calculate Maintenance

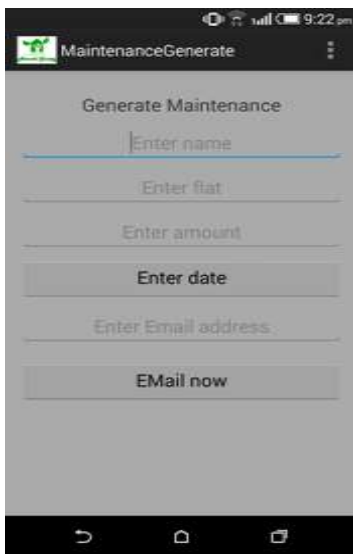**Figure 14:** Change Maintenance Rates

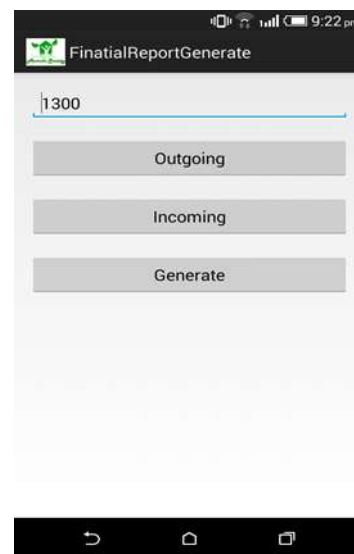**Figure 13:** Email Maintenance to non-users of Application

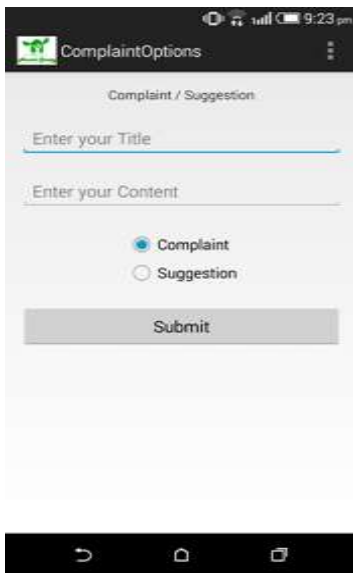**Figure 15:** Financial Report Generation

Figure 16: Complaint/Suggestion Box

The images above represent the screens that appear in our application. They include all screens of our application which includes login screen (Figure 4), login type selection (Figure 5), home screen (Figure 6), notice board (Figure 7), calendar (Figure 8), viewing contacts and service providers' contacts (Figures 9 and 10), maintenance and its generation screens (Figures 11, 12, 13 and 14), financial report (Figure 15) and its

generation and complaint/suggestion box (Figure 16).

6. Conclusion

Thus, our application tries to comfort its users with easily understandable as well as essential functionalities. Here, both managing committee and residents have the same application installed with the maintenance generation and financial report generation features disabled at the resident side. This is achieved by maintaining separate login type for both types of users. Both types of users have similar rights over remaining features like viewing and posting notices on the notice board, adding and getting notified by calendar events and accessing society member contacts and the miscellaneous contacts.

Our application is implemented to help manage the affairs of a housing society by requiring the committee member to enter and save minimal amount of information. It will allow the members of the housing society to access information about a society, its residents and the managing committee on the go. Thus, this application provides a virtual tour of the society. Concept of data mining and artificial intelligence would be worked upon as a future work for our project.

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