

Implementation of Business Register Record Application on Android Platform

B. Smitha

Computer Science and Engineering, Post Graduate Scholars, Sreenidhi Institute of Science and Technology, T.S, India

K. Shirisha, PhD

Computer Science and Engineering, Professor, Sreenidhi Institute of Science and Technology, T.S, India

ABSTRACT

At present with rapid progress in mobile technology, every sector in the government is moving towards mobile era, with a rich and fast user experience. Business Register app is to manage and maintain the information of all the Industries in the state, to cater the needs of the directorate and its services as per the national standards of e-governance. Business Register is a list of all establishments pursuing various economic activities. This paper focuses on the implementation of android app to establishing business profile for specific area, updating the business records, and viewing reports, graphs and tasks to different level of users (Mandal and District). Technologies used to develop this app are Java, Web services (RESTful) and databases are SQLite & PostgreSQL and tools used are Net Beans and Android studio.

General Terms

Business Register

Keywords

Android, mandal user, district user, PostgreSQL, Java, SQLite, web services

1. INTRODUCTION

Smartphones have become explosively dominant for commercial and also for private use in recent years. According to data from the International Data Corporation (IDC) Worldwide Quarterly Mobile Phone Tracker, the smartphone market is increasing 13.0% year over year. The rapid progress in mobile technology has created a new area with different operating systems blackberry, IOS and Android. As smartphone have become a way of life with evolving technologies, the Government of Telangana State is planning to transform major part of the Web-Based application to Mobile-Based application to reduce administrative burden and improving efficiency in system. The proposed application is developed using Android operating system as penetration rate of Android OS is 70 percent.

Previously, the business records are monitored through web based application which has many drawbacks like lack of infrastructure, time consumption, by considering such limitations, came up with a solution to develop mobile application. This app is built to cater the needs of DES officials from the root level. Android app is better solution as it is user friendly, reduces paper work and compile the data from root level, provides easy registration process.

Business Register application is developed with suitable privileges and accessible to all for Private Entrepreneurs and the Government the data at root level [1]. In this application, SQLite database of android is used for storing constant data and rarely changeable data by providing updates.

PostgreSQL is an object-relational database management system (ORDBMS), used as a database server in this app to store data securely and to manage large workloads ranging from small single-machine apps to large Internet-facing applications with concurrent users. It also allows for retrieval at the request of software applications [5].

2. PURPOSE

The Business Register so developed would reduce burden on respondents and in turn induce respondents to provide item information which are not yet collected under registers and reduce cost of survey and also provide useful information for statistical administration at the lowest level of administration, which is needed for inclusive development of the country.

The application includes the generation of various reports at mandal, district and state level. The data may thus be made readily available to any interested department / organization via the Internet.

3. ARCHITECHURE

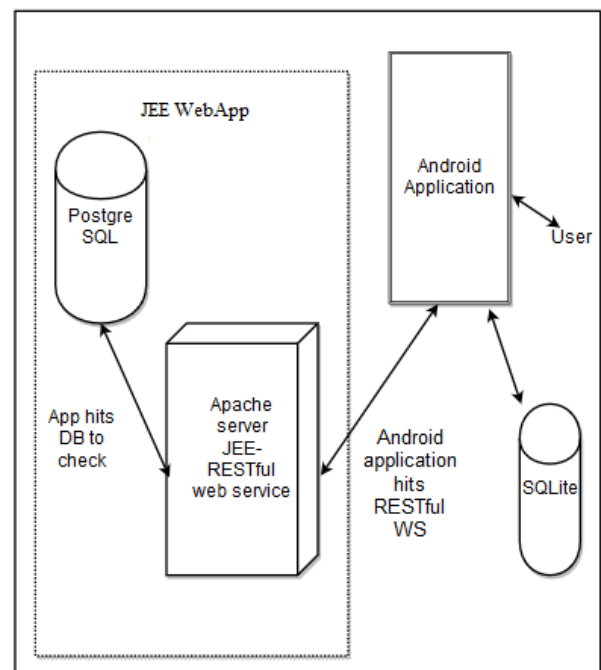


Fig 1: Architecture of Application

The following Figure 1 shows the complete architecture of application layout. User interacts with android application for performing different tasks. To execute the tasks, app hits the server using restful web services or uses SQLite database.

4. SYSTEM FLOW

Figure 2 is to describe the overall framework of the project where a search activity and login is provided.

User can search for establishment details which are registered with government using establishment name. In this searching activity, while entering text, autosuggestions are provided.

Only authenticated users can perform their respective activities. Depending on the user login details, they are navigated to respective activities. Activities are connected to PostgreSQL server for retrieving and storing the data.

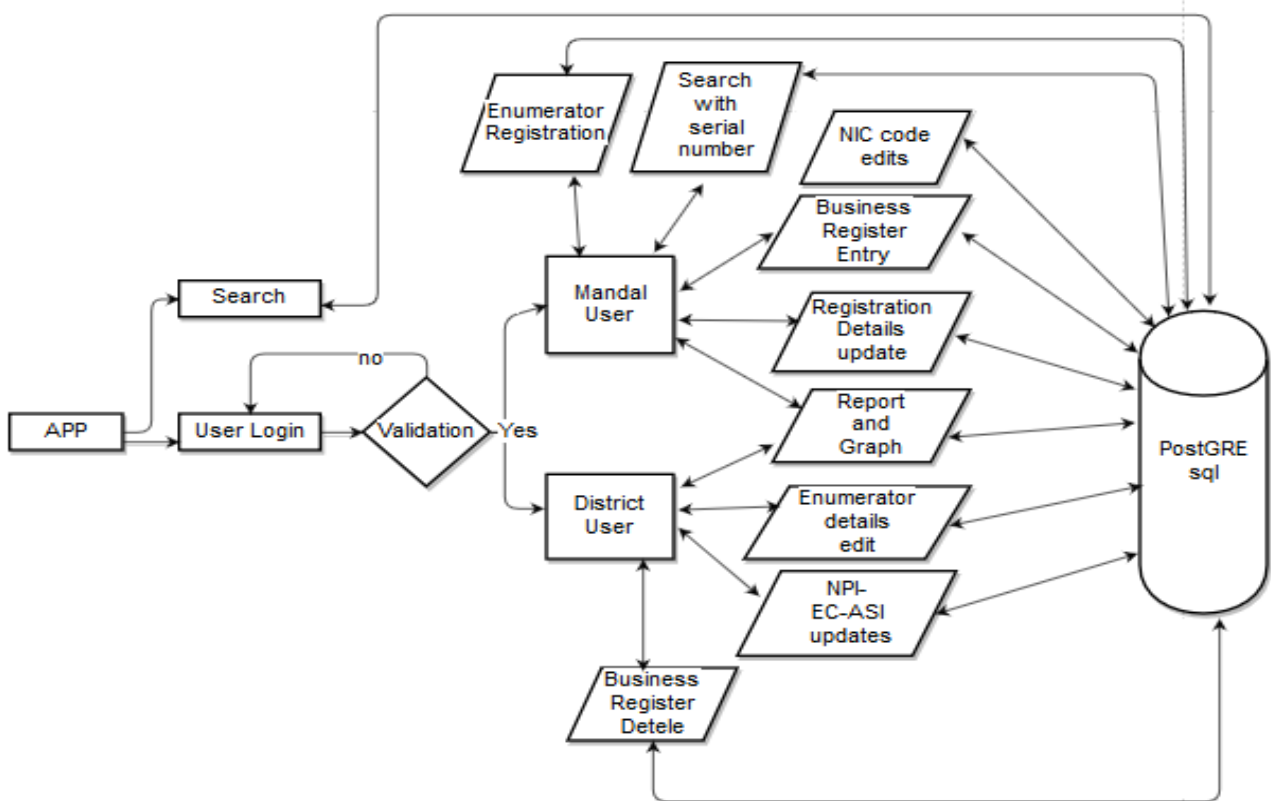


Fig 2: System Flow

5. IMPLEMENTATION

Business Register Record Android application is designed to manage the establishments in a Telangana state through mobile. The requirements and technologies used and the permissions needed in developing this app are as mentioned below:

5.1 Technologies and Permissions

5.1.1 Server Connection

This android-based mobile application is connected to server by using RESTful web services. AsyncHttp request and response is used in this app, and data is transferred as JSON objects and arrays [9]. The AsyncHttp functionalities are accessed using following dependency:

'com.loopj.android:android-async_http:1.4.9'

And to connect and accessing the Internet, following permissions are registered in Android Manifest file[7].

```
<uses-permission android:name="android.permission.INTERNET"/>
```

To check network state application require the android.permission.ACCESS_NETWORK_STATE permission[7].

```
<uses-permission android:name="android.permission.ACCESS_NETWORK_STATE"/>
```

5.1.2 Databases

In this app, the two databases used are SQLite and PostgreSQL. The database, PostgreSQL is used as server for complete data which is maintained by National Data centre. PostgreSQL is connected to RESTful web service with help of dependency JDBC jar file (postgresql-9.4-1206-jdbc4). The SQLite database is used at application end for storing the constant data and rarely changeable data in order to avoid frequent interactions with server.

A SQLite Database Helper [4, 8] class is created extending with SQLiteOpenHelper, used to build bridge between android and Sqlite. SQLiteOpenHelper class has two abstract methods: onCreate() and onUpgrade().

5.1.3 Graph jar

For developing graphs, GraphView is used as the dependent jar in this project. This jar 'com.jjoe64:graphview:4.1.0' is compiled to access the functionalities of the graph view [8]. Major part of statistics is shown using bar graph with single and multiple bars.

5.2 Modules

The following are the modules in the application which shows the complete functionalities of rainfall statistics android application.

Before Login, the app facilitates the user to search establishments with establishment name. In this search activity, an edit text, extending AutoComplete Text view is given which shows complete suggestions for the sub-string of the text where the user is typing instead of necessarily for the entire thing.

5.2.1 Login

Every user should login into application for accessing the functionalities. Depending on the login details (designation) of user, directed to their respective activities. In this app, SHA-1 hash technique is used to encrypt password, which is then compared with stored encrypted password which gives authentication to user.

5.2.2 Mandal user

Mandal user is primary user of this application. Mandal level officers' tasks like registration of business, updating record, viewing reports and generating graph can done using this app. Activities provided for mandal user are as follows:

5.2.2.1 Business Register Entry:

The business registration form contains important parameters such as name and address of the establishment, number of workers, major economic activity and registration number of the establishment with registration authority. This complete form is divided into four number of steps (activities) where each activity data is carried using bundle and is saved to the server database directly.

Bundle object is used to pass the data between activities, is essentially a hash control that stores key value pairs.

```
Bundle bundle = new Bundle();
```

```
bundle.putString("value", key);
```

The following syntax is used to retrieve bundle data in next activity,

```
Bundle bundle = this.getIntent().getExtras();
```

In this form business register serial number and location code are generated automatically, based on the location where the establishment located.

5.2.2.2 Search for Industry details

A search criteria is provided where user can search for establishment details by entering the business register serial number.

5.2.2.3 Enumerator Registration

In this activity, enumerator or user can register their details like name, address and designation.

5.2.2.4 Registration Act Edit List

In this activity, a table is provided with editable fields where user can update specific fields.

5.2.2.5 View reports

- Industry count Mandal-wise – the total number of establishments in villages/municipal of that particular Mandal will be displayed.
- Daily Progress Report Mandal-wise – the number of old establishments with status working, existing, closed, not-traced and total and the number of new establishments with working, closed/no-trace and total in village/Municipal of that particular mandal data are displayed.
- NPI-EC-ASI Abstract Report – the total number of establishment based on NPI, EC and ASI frames in village/Municipal of that particular mandal data.
- Establishment Status Report – this report gives the total number of working, closed, not-traced, working-closed, working-closed-not-traced establishments in rural, urban and total in villages/municipals of that mandal.

5.2.3 District user

District level officers can update and delete the data of all respective mandals. District user can view and edit mandal user's complete profile.

5.2.3.1 NPI-EC-ASI Edit List

In this activity District user can update the NPI, EC and ASI frame details.

5.2.3.2 Business Register Delete Detail

This activity is to delete the particular establishments from the record.

5.2.3.3 NPI-EC-ASI Detail List

This shows the details like NPI, EC and ASI frame details of working establishments, so that user can know which establishments comes under those categories.

5.2.3.4 Enumerator Edit List

In this activity, district officer can update the enumerator details of that particular district.

5.2.3.5 View Report/Graph

Reports at district level includes mandal-level, district-level and state-level Reports.

- Industry count Mandal-wise – the total number of establishments in mandal of that particular District will be displayed.
- Daily Progress Report Mandal-wise – the number of old establishments with status working, existing, closed, not-traced and total and the number of new establishments with working, closed/no-trace and total in District of that particular mandal data are displayed.
- NPI-EC-ASI Abstract Report – the total number of establishment based on NPI, EC and ASI frames in mandals of that particular District data.
- Establishment Status Report – this report gives the total number of working, closed, not-traced, working-closed, working-closed-not-traced establishments in rural, urban and total in mandals of that district.

- **State-wise Reports**
- Industry count Mandal-wise – the total number of establishments district-wise of that state will be displayed.
- Daily Progress Report Mandal-wise – the number of old establishments with status working, existing, closed, not-traced and total and the number of new establishments with working, closed/no-trace and total in District of that state are shown.
- NPI-EC-ASI Abstract Report – the total number of establishment based on NPI, EC and ASI frames in district of that particular state.
- Establishment Status Report – this report gives the total number of working, closed, not-traced, working-closed, working-closed-not-traced establishments in rural, urban and total in district of that state.
- Ownership code wise establishments: this report gives the total number of worker and total number of establishments in rural, urban and in both with respect to ownership code.
- 3 Digit NIC code Report: this report is to show the number of working establishments in rural urban and both based on old 3 digit NIC code. In this report, activity description, 3 digit NIIC code, establishments count in rural, urban and total is shown.
- 5 Digit NIC code Report: this report is to show the number of working establishments in rural urban and both based on old 5 digit NIC code. In this report, activity description, 5 digit NIIC code, establishments count in rural, urban and total is shown.
- **View graphs:**
- Count Graph - Bar graph which shows the total number of establishments in each district (count vs. district code) in state.
- New Establishments - Bar graph with multiple series (working, closed and not traced status) shows the total number of new establishments in state.
- Old Establishments - Bar graph with multiple series (existing, working, closed and not traced status) shows the total number of old establishments in state.
- Ownership code wise establishments: this report gives the total number of worker and total number of establishments in rural, urban and in both with respect to ownership code.
- Establishment Status Report – Bar graph with multiple series/bars the total number of working, closed, not-traced, working-closed, working-closed-not-traced establishments in rural, urban and total in district of that state (district code vs. count).

6. RESULTS AND DISCUSSIONS

The output screens of the application are presented below which represent the work done by the different users (mandal and district users) in this application.

The screenshot (Figure: 3) show the Abstract report with the number of establishments which falls under NPI, EC and ASI frames. This report is also represented in bar graph with multiple bars.



Fig 3: NIC-EC-ASI abstract Report

The Figure 4 shows the searching page of application in which auto suggestions is provided for the sub-string entered by the user

Mandal Level users can update the Registration Act details. Upon Selecting village or town, it shows the spinner with village names or municipal name.

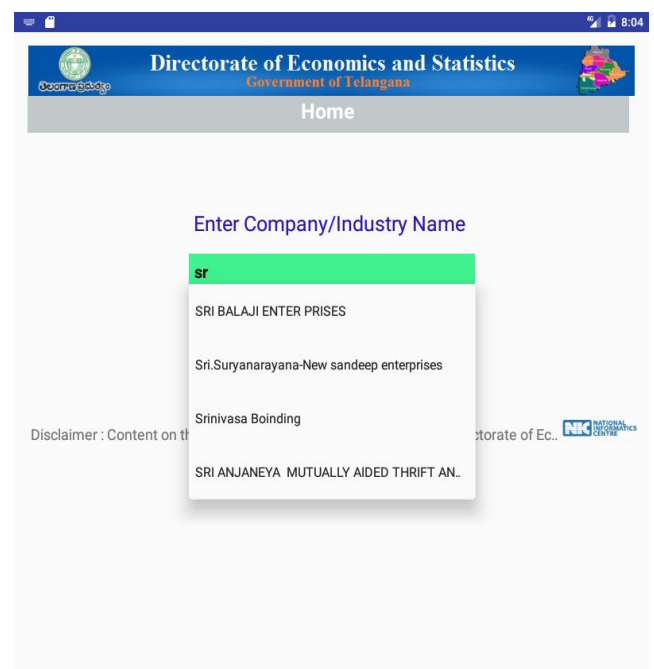


Fig 4: Search

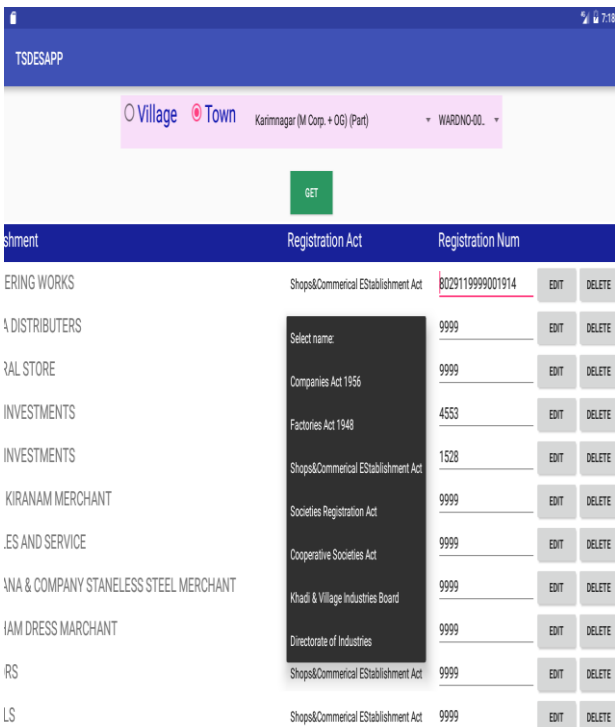


Fig 5: Registration Act Edit List at Mandal

The Figure 5, screenshot represents Establishments details for mandal user, where user can update Registration Act details.

In Figure 6, first bar graph represents the number of establishments based on Ownership Code in rural, urban and both rural and urban. Second bar graph represents number of establishments vs. Ownership-code in rural, urban and both rural and urban(as total).

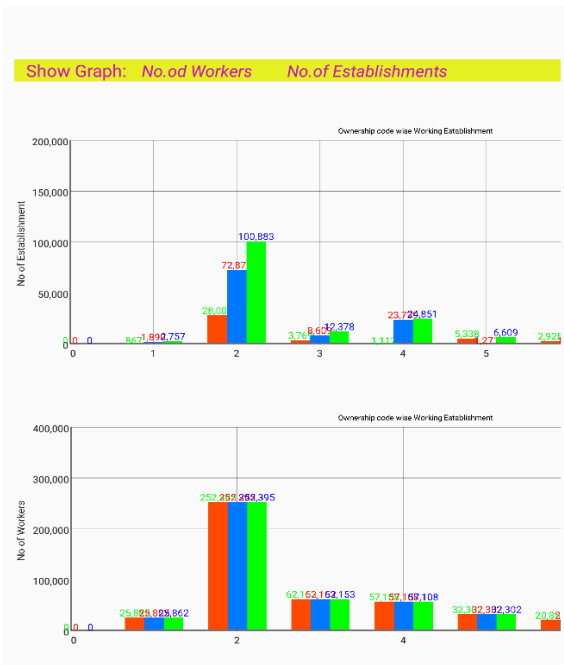


Fig 6: Ownership code wise Graph

Figure 7 represents the number of establishments depending on the status (working, closed- not-traced). Working status conditions are given in spinner where user can select required

condition. On click show graph button, it also shown a graph for district code vs. number of establishments.

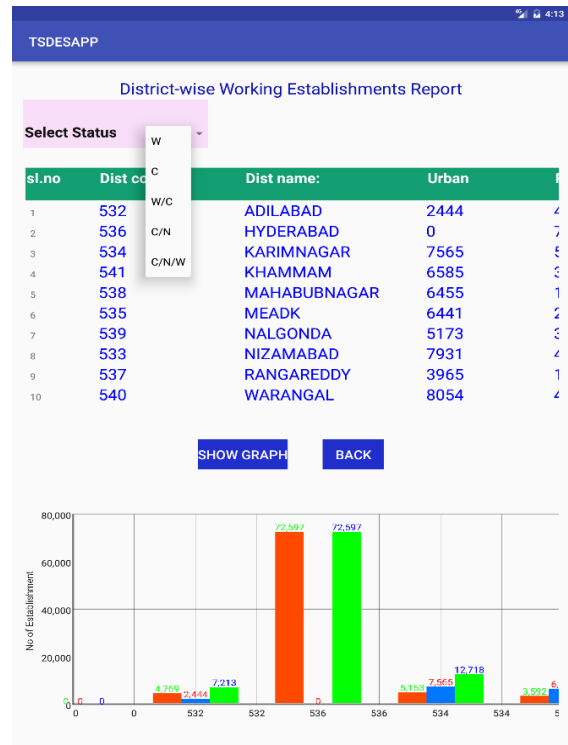


Fig 7: District wise working establishments

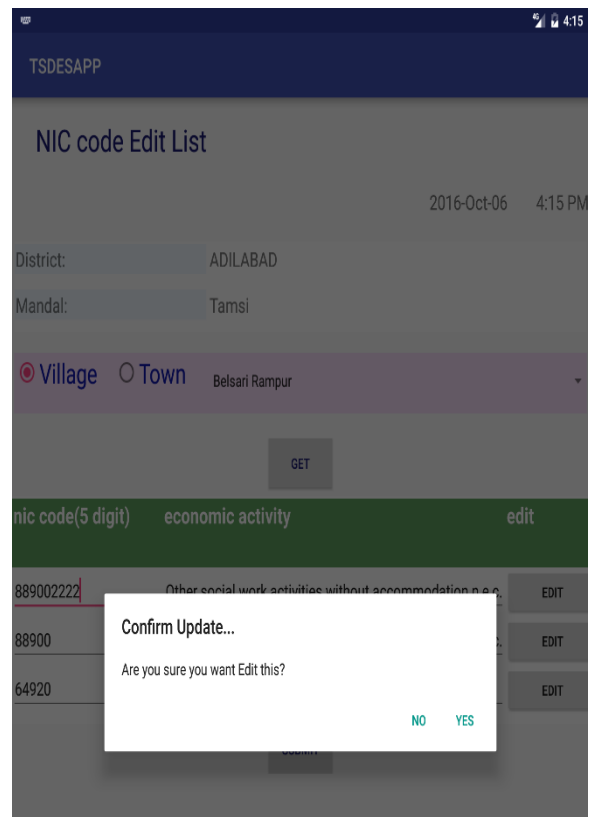


Fig 8: NIC Code Edit List

Figure 8 represents the activity for updating NIC codes, in this a dynamic table is shown with details like serial number, establishment name, economic activity and NIC code field which is editable.

7. CONCLUSION

The Business Register record android application is a fast, reliable and user friendly application developed for accomplishing the activities. By this application different level users' needs (reading, updating and deleting) are accompanied. Establishment list is provided based on the location selected by user, he/she can perform their respective activity. The statistical analysis reports of the establishments are shown in tabular and graph form. To understand the report easily they are represented using graphs. Reports and graphs from this application helps for various development activities in the state.

The developed app is online based, but there will be areas with no internet signal, so offline entry of data is added as future application enhancement. At present viewing of reports and graphs can be performed, so app can be enhanced with features like add downloading of graphs and reports in pdf or word or excel format as future work.

8. REFERENCES

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