E-Government for Modern Municipal Corporation

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Abstract

Android is an Operating System that is more powerful supporting a large number of smartphones. Android applications are developed using Java, and so it can be easily ported to the new platform. The primary aim of introducing PHP Android application is that the extension of data storage from SQLite to the MySQL. Here the PHP is used to fetch the data from the MySQL database at the web server. The PHP page will use JSON parsing for reading the data from the database. Here there will be communication between PHP and Android application. The PHP page will contact MySQL database and will fetch the data and returns the result. Our e-municipal is designed to automate the activities of Municipal Corporation that deal with different day to day general public amenities. The primary aim of this application is to ease the user to communicate with Municipal Corporation via a handheld Android application. The general user can easily register themselves and quickly send a petition to the municipal corporation regarding the problems they face in Metro water connection, sanitation and electricity maintenance. They can quickly record the birth and death and also can check their complaint status. The user can also view the tender which is applied by the municipality and can apply for it. Corporation officers and employees can see all the complaints from different users on different problems. Only the admin have the power to change all the data from the user. Here the tender allocation was based on spatial data mining algorithm rather than traditional clustering algorithm.

Keywords: Android, MySQL, PHP, JSON, Spatial data mining Algorithm

1. Introduction

It occupies a prominent place in the municipal urban variety and importance of carrying large municipal information system regarding evaluating and adjusting data on cities and their inhabitants. Enjoy the software is composed systems of the Unit of Computing, the unit presidency, the unit clean environment, ad group and promote, unit property, and evaluation unit, water treatment, and the unit overall assessment, the unity of the collection, evaluation unit and other imports, the accounting unit, the unit of movable property systems, and unit staff, and unit statistics, and unit employees 'salaries, the unity of workers' salaries, and the control unit immovable property. The unit follow-up services through the internet, unit parking lot and thanks to the operating mechanism resulting from the integration of all these groups together gives municipalities the ability to monitor system imports and accounts within the organization and ensure that the administration and supervision department properly and access to imports, and its report and provides a way for employees to work on the computer, making the employee leads his works correctly and fast and get to the old information as soon as possible, increases the effectiveness of the employee's work providing services responsive to the demands of society. [1-2] Our aim of this work is to minimize the paper works and the manual works and to ensure progress and development of the municipality which increases the citizens' confidence in the city and report all the information and documentation of statistical data. Usually, people need to reach the municipal office directly for their needs and to submit their complaints. The employees collected these charges and stored as paper records for a further process which is done manually. [3] This may also lead to some serious problems like missing of records and delay in work completion, this project is to help the public in

knowing their place details and getting their problems solved in online without going to the office regularly until the problem is solved. [4-5]

2. Implementation Modules
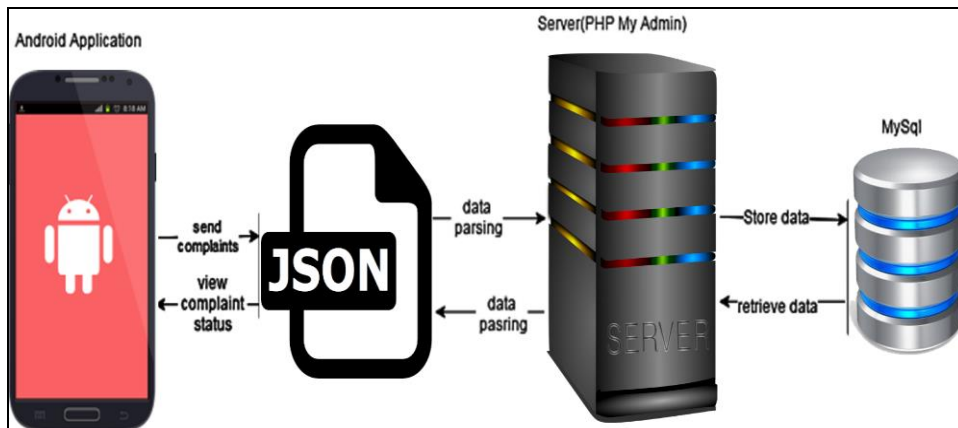
2.1 Main Architecture

Figure 1. Our Main System Architecture

The main Architecture of our Application project. Here the PHP MyAdmin server acts as the E-Governance server. Before the data from android application reached to the server, it is parsed with the help of JSON. Then with the help of the server data is stored and retrieved from the database. This process repeats for all the services included in this project.

2.2 Android Modules

2.2.1 Services

Here the user can get rid of reaching the municipality directly for their needs. [6] He/she can register themselves, and they can apply the request through online. In Which JSON parsing is used and the data is stored in MySQL. He/she can apply for the death and birth certificates by giving their particulars. Also, they can post their requirements based on sanitation and metro-waters.

2.2.2 Status

Once the petition is successfully applied, the admin can take it to the next process. He can decide whether to approve it or reject it. Thus, the decision made by the admin will be updated to the database, and the user can easily track their petition status through online.

2.2.3 Tenders

This process completely involves the tendering process governed by the municipality.
(A) Apply for tenders: The admin will post the recent bids and its details. These sub-modules deal with using tenders with the given details. Only the admin can view the applied tenders and can proceed with it.
(B) Check Tender Status: The user can also check their tender status. The admin will select the best tender from the applied list, and this will be updated for further viewing by the user.

2.3 PHP Modules

PHP modules include the process done by the user. Only the admin side process is depicted in this module.

2.3.1 Services

The admin will view the registered users details about the application, and he\she will do the approval. Only the admin has the authority to accept or reject the proposal given by the user. Before accepting or rejecting the admin will view all the details provided by the user.

2.3.2 Tenders

(A) Post Tender: Here the admin will post the tender on their wall. It includes the tender name, tender amount and the date from and to along with the required details.

(B) View Tenders: In this sub module the admin will view the list of application received from various users. He will accept the best one depending on some criteria's. For this Process, we use the basic algorithms.

3. Algorithm Implementation

In this e-municipality project, we are using a spatial algorithm to overcome the disadvantages of cluster algorithm. [7] Cluster algorithm, which is also called as the aggregate algorithm is only used to process raster data which is not suitable for E-municipality Application. On analyzing the usage of cluster algorithm with our project, it is clear that the algorithm is probabilistic, and its calculation depends on the each combination of data point and the classification. Compared with the traditional clustering algorithm, the spatial algorithm has many merits. [8] This algorithm has a better efficiency that it analyzes the database only once.

Here the clustering algorithm is not used to process the raster data as the results were negative. We use cluster algorithm to separate the tendering information from the database and showing them based on their separation.

3.1 Mathematical Implementation

3.1.1 Spatial Algorithm

The numerical implementation includes two various steps. They are Estimation and Maximization.

The tenders will not only be allocated based on their quoted amount but also by checking the probability of another two more fields, *i.e.*, Already applied candidate validation and the number of times approved validation.

The parameter of Gaussian mixture Distribution can be used to check the probability for the fields given above.

The Probability density function is given below:

$$n_i\left(\vec{x},\vec{\mu},\Sigma i\right) = \frac{1}{\sqrt{(2\pi)^m|\Sigma i|}} exp\left[-\frac{1}{2}(\vec{x}-\vec{\mu})^T \Sigma_i - 1\,(\vec{x}-\vec{\mu})\right] \qquad (1)$$

The prior Probability meets,

$$\sum_i \pi_i = 1 \qquad (2)$$

The maximum likelihood estimation is:

$$p\left(\vec{x}\right) = \sum_{i=1}^{k} \pi_i \, n(\vec{x}; \vec{\mu_j}, \Sigma j) \tag{3}$$

The Probability formula for sample is given by:

$$l(X|S) = \sum_{i=1}^{n} \log \sum_{j=1}^{k} \pi_j \, n_j \, (\vec{x}; \vec{\mu_j}, \Sigma j) \tag{4}$$

The above three parameters computed are repeated until $l(X|S)$ meets the condition that there is no more increment possible.

3.1.2 Clustering Algorithm

Cluster algorithm involves grouping or segmenting a collection of objects into subsets or clusters. In this paper, we use hierarchical clustering algorithm which means not clustering data into particular partitions, but series of partitions takes place.

Average similarity across all the pairs within the cluster groups to measure the similarity of the two clusters. It is done successfully by the given formula.

$$sim(c_i, c_j) = \frac{1}{|c_i \cup c_j|(|c_i \cup c_j| - 1)} \sum_{\vec{x} \in (c_i \cup c_j)} \sum_{\vec{y} \in (c_i \cup c_j): \vec{y} \neq \vec{x}} sim(\vec{x}, \vec{y}) \tag{1}$$

The sum of the vectors in each cluster is given by

$$\vec{s}(c_j) = \sum_{\vec{x} \in c_j} \vec{x} \tag{2}$$

3.2 Diagrammatic Implementation

3.2.1 Spatial Algorithm

The tender allocation will be based on the spatial algorithm. Here the original data will be materialized with the help of spatial mining process. Then with the assistance of the mining results further process will be done.
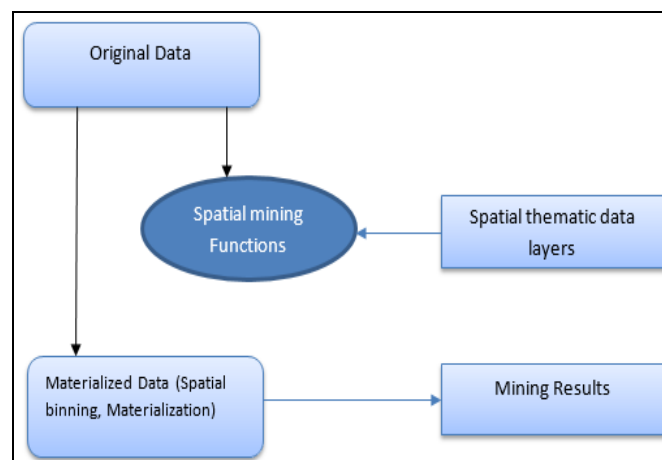

Figure 2. Diagrammatic Implementation

The spatial algorithm is more efficient than traditional clustering algorithm because it analyze the database only once.

3.2.2 Hierarchical Clustering Algorithm

In hierarchical clustering algorithm, we use an agglomerative method which is preceded by a serried of fusions of the objects into groups. This method is most commonly used and implemented in XLminer. Representation of Hierarchical algorithm in two dimensional diagrams is given below which is named as a dendrogram.
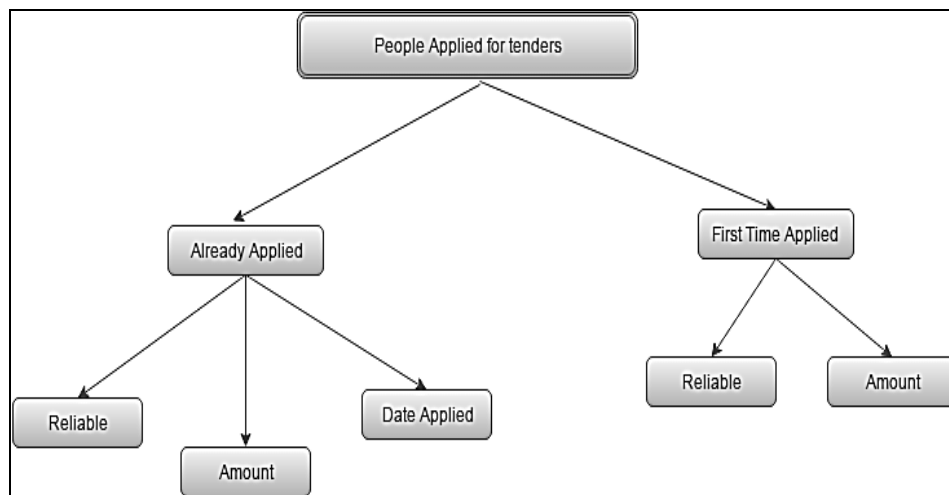

Figure 3. Hierarchical Diagram

4. Code Implementation

4.1 Android

In the android heart of the code includes the JSON data parsing to connect to the server. The code used for this purpose is shown below.

```
try {
// check for request method
if(method == "POST"){
// request method is POST
// defaultHttpClient
DefaultHttpClient httpClient = new DefaultHttpClient();
HttpPost httpPost = new HttpPost(url);
httpPost.setEntity(new UrlEncodedFormEntity(params));

HttpResponse httpResponse = httpClient.execute(httpPost);
HttpEntity httpEntity = httpResponse.getEntity();
is = httpEntity.getContent();

}else if(method == "GET"){
// request method is GET
DefaultHttpClient httpClient = new DefaultHttpClient();
String paramString = URLEncodedUtils.format(params, "utf-8");
url += "?" + paramString;
HttpGet httpGet = new HttpGet(url);
```

```
HttpResponse httpResponse = httpClient.execute(httpGet);
HttpEntity httpEntity = httpResponse.getEntity();
is = httpEntity.getContent();
                              }
```

3.3.2 PHP

In PHP, the heart of the code will include the approval and cancel section.

```php
<?php
 $response = array();
// include db connect class
require_once 'db_connect.php';
// connecting to db
$db = new DB_CONNECT();
$usernam=mysql_real_escape_string($_GET['usernam']);
$pending = "Approved";
mysql_query("UPDATE products4  SET status = '$pending' WHERE
name='".mysql_real_escape_string($_REQUEST["usernam"])."'");
//mysql_close($con);
     echo("<script type='text/javascript'>alert('successfully approved')
window.location='get_all_products4.php';
  </script>");
?>
================================
<?php
$response = array();
// include db connect class
require_once 'db_connect.php';
// connecting to db
$db = new DB_CONNECT();
$usernam=mysql_real_escape_string($_GET['usernam']);
$pending = "cancel";
mysql_query("UPDATE products4  SET status = '$pending' WHERE
name='".mysql_real_escape_string($_REQUEST["usernam"])."'");
//mysql_close($con);
echo("<script type='text/javascript'>alert('certificate cancelled')window.location='get_all_products4.php';
  </script>");  ?>
```

5. Output and Experimental Setup

We implemented E-Government for Modern Municipal Corporation as a Mobile application system using Java language with PHP pages. The Mobile application interface for our system forms used open-source JavaScript library; we used MySQL for saving our data information details. All experiments were run using Android system for the mobile application and machine with Intel Core 3 CPU @2.9GHz, 4096 G main memory, and running on Windows 8.1 Pro.
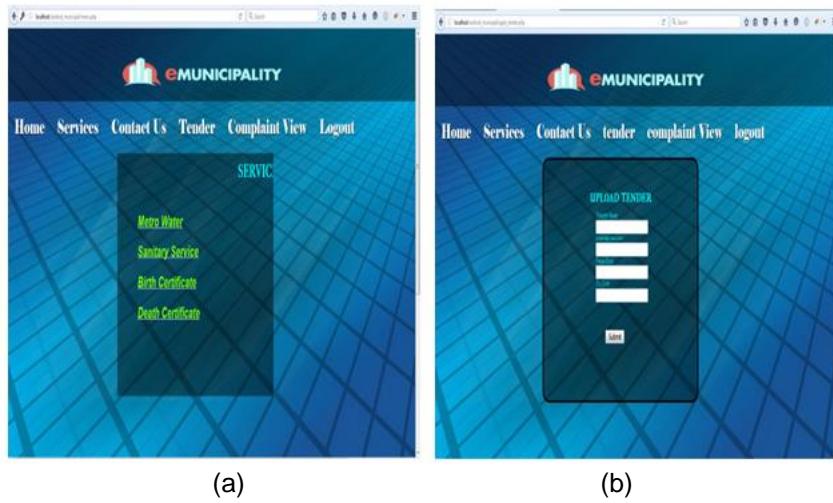
4.1 PHP Modules

(a)   (b)

Figure 3. a. Services Page of our PHP Module, b. Admin Upload his/her Tender
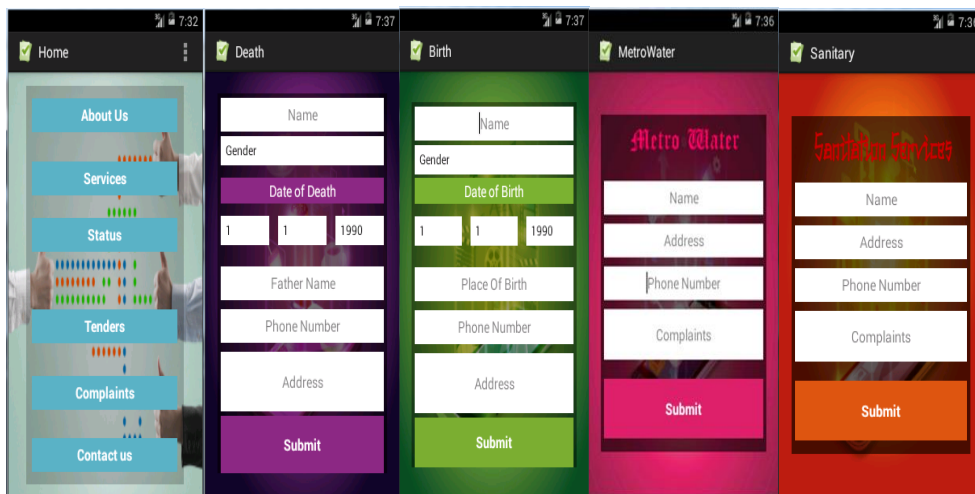DetailsTthrough this Page

4.2 Android Modules

**Figure 4. a. Main Page of Android Application Having all the Services
Provided by them, b. Page for Applying Death Certificate, c. Page for
Applying Birth Certificate, d. Page for Posting a Petition on Problems with
Metro Water, e. Page for Posting a Petition on Problems with Sanitation
Around the City**

5. Future Scope

In this project, we tried to minimize the paper works in a municipality and further balancing good communication between the user and the municipal employees. Thus, the manual errors will be reduced. [6-7] Further, we can also include extra security for the data that is stored in the database and for the tender details. That is if a person is viewing their tender status rather than others, it should show only theirs. We can also move this to the next step by giving some more definitions.

6. Conclusion

(1)We successfully build a bridge between the Municipal Corporation and ordinary people through our application. (2)Here the data's were successfully mined deeply using spatial data mining algorithm which leads to significant progress in our application. Also, some more ease was given to the users through the Android front-end development. (3)The minimization of the manual errors in the municipal department was the major part of our project which is successfully depicted.

Acknowledgment

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