ESPY: Application for Facility Mapping of Smart Cities

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Abstract— Lack of awareness about the various facilities provided by the government is one of the reason why government schemes aren't successful. To keep the common public up-to-date about the existing government amenities which are available for their use, we are providing a platform in form of an android app which will map the amenities by facility mapping and store detailed information about them. Along with this the GPS information of the place and the real time image is captured and all this information is kept ready for user access. Our app will provide an easy, cheap and efficient way to get information about government assets and to add new assets information too.

Key words: ESPY, Facility Mapping

I. INTRODUCTION

A lot of government assets are present for different functions to help the public in all ways possible. But due to their unrecognized existence many time they are under-utilized. For the proper utilization of facilities provided to the common people by the various government assets, it is necessary that they have access to information about them easily. If they know where what is situated, what it functions for and how to use it they will be using it more often. For example if a person is looking for an ATM nearby and he gets information about all the ATMs situated nearby on an app it will prove useful for him. Similarly say if someone is looking for government hospital and an app gives him that information he can use government facility which is cheaper and more reliable than privately owned services. So to provide this facility we are developing a Smartphone application which will use the concept of facility mapping. Facility mapping of asset provides useful insights like the population covered, area under control etc. Mapping can also see the availability of infrastructure, staff, equipment, etc. [5]. This mapped facility along with its geo-referenced location and real time image will prove a great source of information which can be accessed with the help of our app. It will give the facility of viewing all the assets sorted by category, subcategory etc. in specific regions on the map. Also common people can add new amenities which existed but were unknown so that others can use it. Also the urban local bodies will have ease in mapping all the assets under their jurisdiction if a proper database with real time information is available. Urban local bodies can also modify information about existing facilities to keep it up-to-date and relevant.

II. LITERATURE SURVEY

Lots of efforts have already been taken for mapping of the assets running under the administration of urban local bodies. For efficiently and economically managing urban facilities Yang Liu, Mingyi Du, Guoyin Cai developed an up-to-date and detailed database of municipal facilities called municipal facility management system (MFMS) which included the electronic city map, geometry, topology information of municipal facilities and their attribute information [1]. Another approach uses geo-referenced attributes data containing features, administrative units capacity etc. [2]. But both requires a separate mobile mapping system for capturing images of facilities.

Some researchers collected only the data about the facility after their mapping such as their details of population, physical infrastructure, staff, services provided, utilization of funds etc. which gave a broad view about all of them [3]. Snowball sampling was also used for collecting the data about the facilities [4] but this didn't helped the common people in knowing about the facilities. In our approach common people will get to know all the information at the tip of their finger without requirement of any external hardware. For the geo-tagging of images, where the images will be labelled with the location where they were taken Mei-Yi Wu, Chuan-Chi Hsu and Jia-Hong Lee gave the method of image steganography [6]. In it the location information is collected by means of latitude and longitude, then it is implanted in the exif area of the jpeg header. For doing this with the help of in-built features of the smartphones an application was developed which was solely for the purpose of geo-tagging of images [7]. It used the GPS and the orientation sensors of the Smartphone for collecting GPS information. Our approach will try to overcome limitations of existing approaches.

III. PROPOSED SYSTEM

The working of the application is as described in figure. User requires to register himself to authenticate that he is an authorized user. After that he can log-in with his login credentials and can access the functionality of the app. If the user has to view all the assets of government, he can select the view option to view all the assets with detailed information on the map. To add new asset he can capture location co-ordinate of that place, click real time image of that place, add information about it and upload it. If internet connection is not available, rather than uploading all information it can be saved in user's device and sent later in the availability of internet connection.

IV. SYSTEM ARCHITECTURE

The overall applications consists of following modules,

A. User Module

In user module, the user's information and his login credentials is maintained. While using the application for the first time, user needs to enter his details which will be stored as his profile and a username and password will be provided. After that whenever the user logs-in to the system his authenticity is checked and on confirmation he is directed to the respective interface.

B. View Module

In view module, user has the option to view the facilities which are running under urban local bodies on the map along with their appropriate details. When user selects the view option, he is directed to the list of all the amenities which are available after mapping. He needs to select the category, sub-category, name of asset which he wants to view. On the map, all such assets which are available will be shown. If the user clicks on any specific asset then all the information regarding it along with its geo-tagged image is fetched from the database and user gets all the details required.

C. Mapping Module

In mapping module, new facilities or the ones which have not yet been mapped and are running under the urban local bodies are added to the database. This module helps in building the photo image database of assets along with its connection is not available, rather than uploading all GIS information. When user clicks the mapping option, he is prompted to agree to know his location. Using the GPS enabled Smartphones the location of that user is extracted and camera starts to click the real time image of the asset. User needs to add all the details related to that asset like the category it belongs to, subcategory, name, etc. in the provided fields. Even though User should fill the details this step is optional as User may not always know the details of the assets. Once the user clicks send all this information gets stored to the database and a new asset is added successfully.

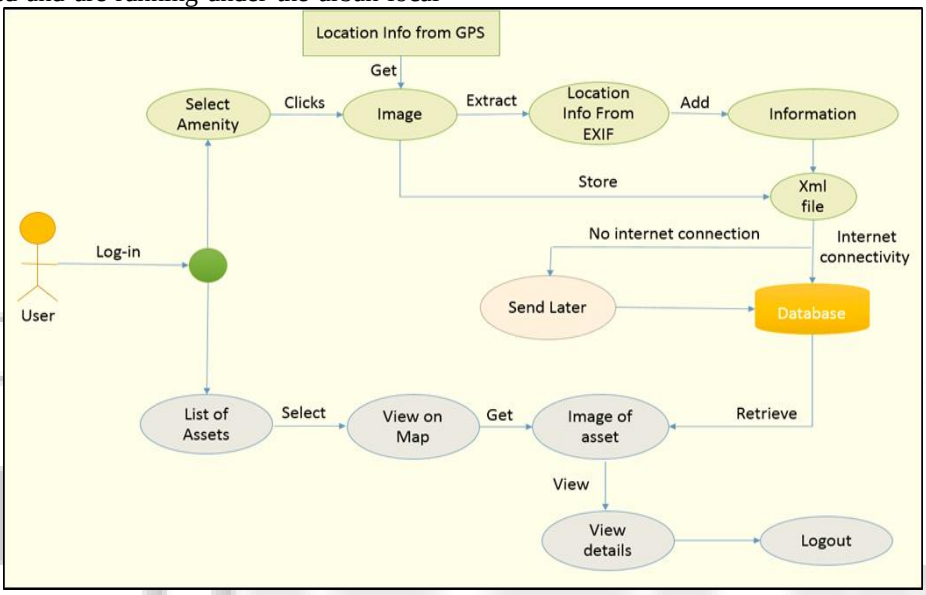

Fig. 1: Working of the proposed system

D. Send later Module

In mapping module user requires internet connection to add a new asset. In some cases when the internet connectivity is not available user has the option to store it as xml file to send later. In send later module, User has option to send the saved facilities information. If now he clicks send information get stored to database and saved asset is added.

E. Database Module

MySQL is used by the application as its database for storing and retrieving all the information. Authentication credentials, Details about the amenities, their GIS information, and their real time images etc. are stored in database. During the Access of View Module, information about all the assets is fetched from the database and displayed to the user.

V. Conclusion

Our application will provide a way for common people to know about all the facilities running under the jurisdiction of urban local bodies. It is cheap, reliable and easy to use way of availing all the benefits provided by government. Also real time image database will serve a great source of information to locate the assets. Our application does not require any external hardware to capture location co-ordinates and utilizes the inbuilt features of GPS enabled Smartphones.

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