Proposing mobile app for Buses information service using mobile technology

Monika Kohli[*], **Harmeet Kaur**[**]

[*]Assistant Professor, G.C.G Ludhiana
[**]Assistant Professor, G.C.G Ludhiana

Abstract- E-Governance facilities are used in number of Government projects to benefit the society, making government activities transparent and involvement of general public for acceptable decision in the country. The use of mobile make e-governance far easier as it is a handy tool and mobile technology is growing at a rapid speed, thus making e-governance easier. It is an innovative approach to implement e-governance. The paper introduces the features, technologies and design of the Android mobile device application, m_businfoapp GPS mobile app to allow the commuter to know the exact location of the bus by feeding the required information like selecting a particular bus no. from the provided list of buses of that route. By estimating the arrival time of the bus, reduce the waiting time of the commuter at the bus stop. It will reduce the traffic which creates chaos especially at the peak time. This service will result in good revenue too. The proposed mobile app will give exact location of the bus at any instant and thus help the commuters to get ready with the information related to the bus on the mobile device which is a handy tool and available all time and at all places.

Index Terms- Mobile-app, m_businfoapp, Google maps, GPS, E-governance.

I. INTRODUCTION

The acceptance of mobile based applications in today's world is becoming easier as the resources or devices required are economical. Mobile device is the most economical device which one can buy to have internet access. Another advantage is that it is a handy tool and the launch of services by private operator provides facilities to not only urban but to rural part of the country too. There are number of applications provided which can be beneficial to individual and to the society as a whole. There are number of e-governance projects and services for the development of the nation. It provides information at any time and at any place. This tool makes the government more transparent and one can easily take advantage of the services provided by different departments.

There are many challenges and opportunities as discussed in [a]. Basic problems and acceptability are discussed in[b]. The use of facilities which are a part of e-governance benefitted not only urban but rural part of the country too. It strongly reflects the country's development[c].

There are number of operating system and programming languages used for developing mobile apps like Android(Java), iOS(Objective-C, Delphi), Windows Phone(Visual C#/C++), Blackberry 10(Java ME (Micro Edition)), Firefox OS(JavaScript, CSS), Ubuntu Touch OS(Web-based: HTML5, CSS, JavaScript Native: QML, C, C++). This mobile application named m_businfoapp is developed in MIT App Inventor 2(a Web-based visual development environment for novice programmers, based on MIT's Open Blocks Java library and providing access to Android devices' GPS, accelerometer and orientation data, phone functions, text messaging, speech-to-text conversion and lot more) and tested on both emulator (by installing aiStarter) and android mobile set. Since this application is using GPS so we need to test on hand held android based device to get the location specifications.

II. MOBILE-APPS DEVELOPMENT TOOLS: BRIEF OVERVIEW

1. **MIT App Inventor / MIT App Inventor 2**
   App Inventor for Android is an open-source provided by Google and maintained by MIT(Massachusetts Institute of Technology). It has a graphical interface which assist beginner to create applications.

Characteristics of in MIT App Inventor 2:
   a) Visual blocks-based programming language, with Interface designer.
   b) .apk installer packaging option is available to install on the android enabled device directly. Emulator is also available.
   c) Limited debugging tools built into IDE but easy to learn for beginners
   d) Integrated Development Environment: Web-based interface designer, with connection to Java web-start program for blocks programming.
   e) Android devices are used Cross-platform deployment.
   f) No deployment tool costs.

2. **Eclipse**
   Eclipse is an integrated development environment (IDE) which uses custom plug-ins offered by Android called ADT(Android Development Tools) and Android SDK. It can be used because Eclipse is an open source IDE and is easy to use and configure.

3. **Android Studio BETA version**
   Android Studio Beta along with the Android SDK comprises of all the Android SDK Tools to design, test, and debug your mobile application running on Android. It requires a version of the Android platform to compile your application and a version of the Android system image to run your app in the

emulator. Android Studio is a new Android development environment based on IntelliJ IDEA.

Different options with operating system, programming language, IDE are available for developing mobile apps. Some of them are given in fig [1].

S.No.	Operating System	From	Programming Language	Development platforms,IDE
1	Android	Google Inc.	Java	Linux, Mac OS X Windows XP or later. Eclipse, NetBeans IDE also supports Android development via a plugin.
2	iOS	Apple Inc.	Objective-C, Delphi	Xcode
3	Windows Phone	Microsoft	Visual C#/C++	Visual Studio IDE
4	Blackberry 10	Blackberry	Java ME (Micro Edition)	HTML 5 webwork,Theme studio
5	Firefox OS	Mozilla	JavaScript, JavaScript,CSS	Firefox browser, Firebug
6	2.8 Ubuntu Touch OS	Canonical Ltd	**Web-based**: HTML5, CSS, JavaScript **Native**: QML, C, C++	Ubuntu SDK, Development requires Ubuntu Desktop 12.04 or higher, Free

Fig[1]: Examples of some operating system, programming language, IDE mobile apps development.

III. LITERATURE REVIEW

The motivation behind the proposed solution is the existing e-governance service offered by different departments which are citizen centric as discussed in[d][e]. Android provides free and open source , providing an easy-to-use development kit containing flexible map display and control functions is discussed in[f]. Location based services offered by Google API can be used to find the current physical location. GPS software service provides mapping compatibility with Google maps. Network based provider or GPS can be used in location provider so that either of the services can contribute to detect the exact location.

Mobile Seva, innovative initiative launched by Department of Electronics & IT (DeitY), Govt of India under mobile governance to provide public services to the citizen over mobile phones and tablets. Mobile Seva aims to provide a one-stop solution to all Government Departments across the Nation for all their mobile-enablement needs. The National e-Governance Plan (NeGP)**,** takes a holistic view of e-Governance initiatives across the country, integrating them into a collective vision, a shared cause. Around this idea, a massive countrywide infrastructure reaching down to the remotest of villages is evolving, and large-scale digitization of records is taking place to enable easy, reliable access over the internet. The ultimate objective is to bring public services closer home to citizens, as articulated in the Vision Statement of NeGP. The mobile verification system, the system of providing PDS benefits by using Aadhaar based online authentication is an app. e-governance scheme is the unique identity project Aadhaar.[g].

MEA(Ministry of External Affairs) with a view to provide mobile enablement of public services, has launched a Mobile Application mPassPort Seva to offer a wide variety of services to smartphone users such as Passport application status tracking, locating the Passport Seva Kendra (PSK) and general information on various steps involved in obtaining a Passport. This app is available on 3 platforms Android, IOS and Windows. Smartphone application warns people with vision disabilities of obstacles in their way to help them better navigate their environments.
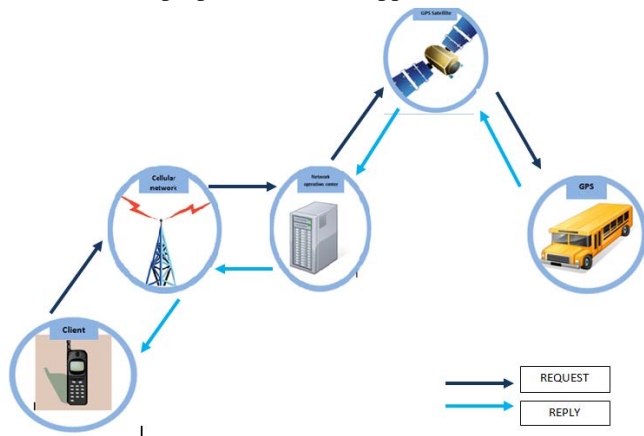
IV. EXISTING SYSTEM CHALLENGES

The existing system of offline GPS installed in CTU is used to keep track on the movement of the bus and make the drivers more accountable. GPS unit with electronic mapping of the bus route and customized software is installed on one-fourth of CTU buses to keep check on whether the bus has follow its designated route, did it stop at all its scheduled bus stops, the timing at which it stopped and left the bus stop, etc., is stored in it through radio frequency as soon as the bus enters a depot. The reading of average and maximum speed at which the bus has been driven help curtails rash driving. It is also used on buses belonging to the Bangalore Metropolitan Transport Corporation (BMTC), Delhi Transport Corporation and some private operators. Since the timings at various stops will also be monitored the commuters will be greatly benefited not having to wait indefinitely for the buses. But there is a possibility that bus does not reach its defined stoppage due to some other reason like traffic chaos, etc. Our proposed mobile app will give exact location of the bus at any instant and thus help the commuters to

get ready with the information related to the bus on the mobile device which is a handy tool and available all time and at all places.

V. PROPOSED SYSTEM

Fig[2] and Fig[3]shows the basic working model and workflow of the propsed m_businfoapp.

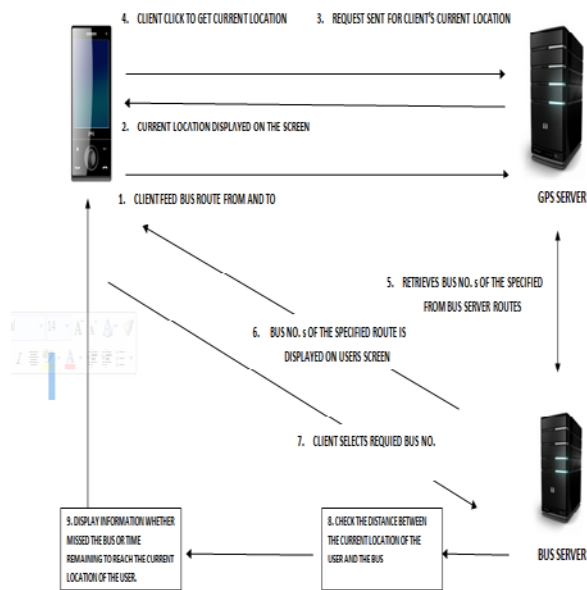**Fig[2] Model of m_businfoapp**

Fig.[3] Workflow of the proposed system

The various steps for the workflow of the proposed m_businfoapp is given below:

Step 1: Clients click the button to retrieve the current location(clients location)

Step 2: Clients current location information is retrieved from GPS server.

Step 3: Current location retrieved from the server & displayed on the users screen.

Step 4: Client feed the start and end terminal of the bus.

Step 5: GPS server retrieves the bus numbers of the required route from the bus server database.

Step 6: List of buses of the specified route will be displayed on the users screen from the bus server.

Step 7: Required bus will be selected.

Step 8. Current location of the selected bus will be display on Google map and distance is calculated to give estimated arrival time of the bus.

VI. IMPLEMENTATION

6.1 Tools used

The open source tool with graphical interface provided by Google MIT App Inventor for Android is used to develop this app. Tinydb is used as a database. LocationSensor is used to find the location with ActivityStarter. Android Emulator and Aqua Flash(Intex) mobile device is used to test the app.

6.2 Components

The proposed system consists of three components:
1. The mobile phone application (m_businfoapp).
2. Bus Server
3. GPS Server

6.3 Algorithm

Algorithm:
Current_Location [stores the current location of the user]
Time_to_reach [Estimate time to reach the stoppage]
Time_to_reach = Bus_current_location - Current_Location
If Time_to_reach > 0
Display   "Estimated time to reach your current location is:" + Time_to_reach
Else
Display   "Missed the bus"

VII. CONCLUSION

The proposed solution is the existing e-governance service offered by different departments which are citizen centric. Android provides free and open source, providing an easy-to-use development kit. There are number of operating system and programming languages used for developing mobile apps like Android(Java), iOS(Objective-C, Delphi), Windows Phone(Visual C#/C++), Blackberry 10(Java ME (Micro Edition)), Firefox OS(JavaScript, JavaScript, CSS), Ubuntu Touch OS(Web-based: HTML5, CSS, JavaScript Native: QML, C, C++). Android mobile device application, m_businfoapp GPS mobile app discuss in this paper allow the commuter to know the exact location of the bus by feeding the required information like selecting a particular bus no. from the provided list of buses of that route. By estimating the arrival time of the bus, reduce the waiting time of the commuter at the bus stop.

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AUTHORS

First Author – Monika Kohli, Assistant Professor, GCG Ludhiana, monikakrajotia@gmail.com

Second Author – Harmeet Kaur , Assistant Professor, GCG Ludhiana,k.harmeet@yahoo.com