Mobile Based Web Application for Real Time Field Data Collection

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ABSTRACT: We have developed a dynamic android application which can be used to take real time data as well as location and transfer it to dynamic web application integrated with Google Map API. So we are reducing the manual work and errors in the system. We are writing a dynamic code which can change the XML at runtime using the metadata entries. This application can serve many domains as it is a dynamic application. We are including IMEI number verification in this. The surveyor will be created from the web application and user name and password will be assigned to his IMEI number. We are also transferring the images from android to web application. The objective of the project is to develop a dynamic mobile and web based application which can be used in any industry for the survey. This application will also plot the network on Google Maps using the data sent from android. We will generate the graph by obtaining the data from the surveyor and make the analysis form that graph. We will provide the user recommendation. The main objective of this work is to demonstrate a real-time field data collection method to surveyor using their mobile phones to collect field data in a timely and handy manner.

KEYWORDS: Real-time field survey, Android-based interface, Mobile GIS

I.INTRODUCTION

A smartphone running with the Android operating system was chosen to be a field device with which the survey is to be done. It has built in GPS chip, camera and capable of transferring data over network and also can send collected data in real time. There are three major modules that are the location module, the input module, and the transmission module. The location module isused for finding or getting back the location with the help of the GPS. The location will be sent along with other types of data to the server, and it can be used to detect the place. The second module is the input module. This module is responsible for getting the data from the field data collector including type of the field data records fill in the report, location that capture by the camera and images taken with camera during the survey. After the data reaches the server it will be processed by the data processor and will be stored in the database. The data in the database that is collected can be accessed and displayed through Web applications on the clients such as a PC, laptop for the further process such as making analysis and getting the result. The user first logging in to the app, then identify the current location. The GPS chip in the phone is able of finding out the current location automatically. Implementation of the data retrieving and data displaying part of the system consists of the data processor, the database, and the Web applications. Full capacities of the Smartphone already manipulated in the mobile side to encapsulate the field survey and data were send via cellular, 3G or Wi-Fi network with the office where the office researchers awaited to process the neatly tabulated data, store it in the database, and display image locations using Google Maps API. [1]

II. **LITERATURE SURVEY**

1. Real Time Field Survey Using Android-Based Interface of Mobile GIS

Author Name: PhaisarnJeefoo
Functions:
The application has three major modules that are as follow:
• The location module
• The input module
• The transmission module.
The location module is used for retrieving the location data from the GPS. This locationwill be sent along with other types of data to the server, and it can be used to pinpoint thecurrent location of the device when displaying a map. [1]

Advantages:
i. Implementation of real time field survey using android phone.
ii. Transferring data capability.
iii. Send collected data.
iv. Real time field data availability provides many advantages.

Disadvantages:
i. It is static survey.
ii. If there is no internet connection location is choose manually.

2. Web Based GIS System for Real-time Field Data Collection Using a Personal Mobile Phone

Author Name: KoKoLwin, Yuji Murayama

Functions:
A personal field data collection soft-ware called UM-Field GIS(Ultra Mobile Field GIS)for the UMPC or Netbook computer, to collect field data using either Google Maps or apre-installed map (PIM). UM-Field GIS allows users to create, edit and modify thesurvey items and attach multimedia information.[2] However, UMPC or Netbookcomputers and Wi-Fi Internet access services are expensive and not suitable for students.We need to find an alternate way to collect field data in a handy and timely manner atlow cost, such as using a personal mobile phone. [2]

Advantages:
i. It is used for implement real time field survey using android phone.
ii. Transferring data capability.
iii. Send collected data.
iv. Real time field data availability provides many advantages.

Disadvantages:
i. It is static survey.
ii. There is no proof of survey is done by student or not
iii. There is no verification and authentication.

2.3 Geospatial IT for Mobile Field Data Collection

Author name: Sarah Nusser, Leslie Miller, Keith Clarke, Michael Goodchild

Functions:
Project Battuta seeks to unable access to and use of digital Geospatial information forfiled data gatherers who do not have any expensive training for analysis or informationsystem. Assume users need seamless access not only to Geospatial information resourcesprepared for the field campaign but also data is available online.[4]

Advantages:
Large and critical data collection can be done.

2.4 Mobile Phone as a Tool for Data Collection in Field Research

Author Name: Sandromourao and Karla okada

Functions:
Discuss the main feature of mobile phone based solution for field data collection.
Basically there are three modules- a survey editor, a survey web application and clientmobile application.[3]

Advantages:
i. Collect interviews responses.
ii. Mobile phone based solution for field data collection.
iii. Sends response back to server for instant analysis again via a network.
iv. Pen and Paper based problem are solved.
v. Handwriting issues over comes.

Disadvantages:
Locations are not traced.

2.5 Future views of field data collection in statistical surveys

Author Name: Sarah Nusser, Leslie Miller, Keith Clarke, Michael Goodchild

Functions:
An alternative model is to augment the client-server setting with an infrastructure thatenables more flexible access to a greater extent of information resources. Under thisparadigm, a field user can take advantage of repositories in which there is informationstored about the digital images and prepared for data collection, as well as informationresources more generally available via the Web. Geospatial data represent an especiallyrich no of resources of interest in field data collection, and are a special focus of thispaper. This model raises issues with respect to three areas of field data collection forstatistical surveys: the user, the field computing environment, and the survey process.[5]

Advantages:
i.   Collection of maps and user position.

Disadvantages:
i. Statistical.
ii. Issues related to field data collection and geospatial data.

III. **GOAL**

   I.   To collect the real time field data.
   II.   To reduce the manual work of surveyor and increase the time efficiency.
   III.   To produce the graphical results from the data submitted to the server by surveyor.
   IV.   To change the fields dynamically whenever necessary.

IV. MOTIVATION

From many years research methods are gaining popularity in many sectors with its application such as Public Health, Education, Agriculture, various National and International researches etc. Field Data Collection with a Mobile Phone has the ability to improve the service to a greater extent. So that the accurate and up-to-date data can be collected. There are many issues and problems related to the methods of survey that are required to be solved so some of the solutions for the issues are given in this system such as a new team is required to develop another app for new purpose. The fields in the form are static.

V. IMPLEMENTATION

Android Application: We have developed an android app where there is login for the surveyor and will collect the fields and send it to the server. The security will also be provided. The verification of the surveyor will be done with the IMEI number. The location of the surveyor will also be traced with the GPS and LBS services. The image will also be captured.
Web Application: Web application is where admin will login using username and password and will be able to see results submitted by the surveyor. The admin can see the results in form of graphical representation. He can also add and remove the surveyor.
Master Form: As the goal is to make survey dynamic the master form comes in picture where the admin has rights to change the form as per requirements where he can delete, update, add the fields for survey. The changes done by the admin will be directly updated in the surveyors app.
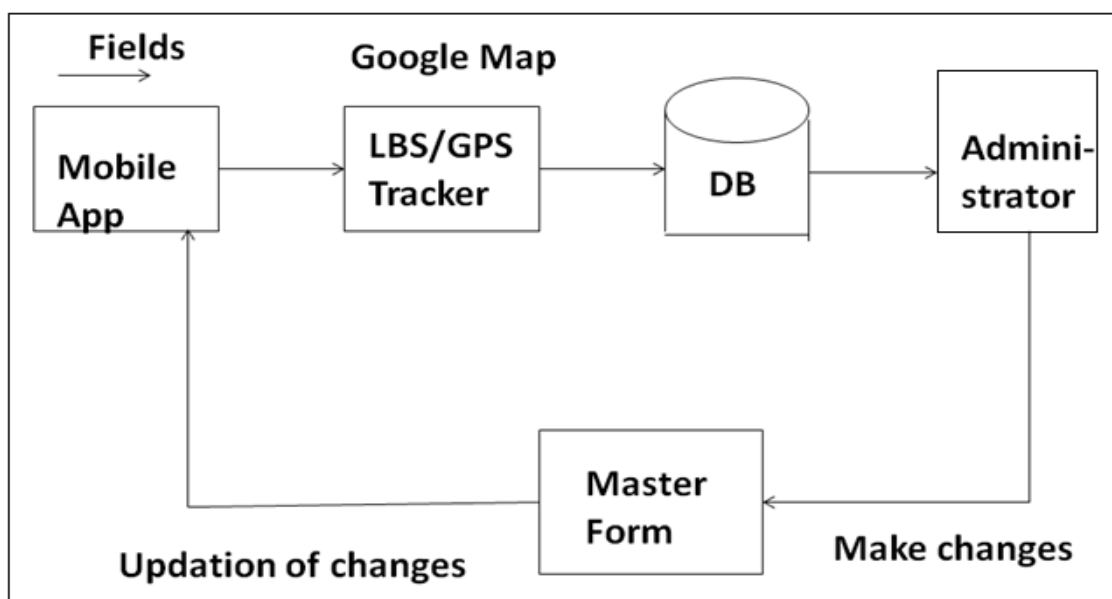
VI. SYSTEM ARCHITECHTURE

Fig1. System Architectures

System Architecture:
The architecture consists of the following:
1. An Android Mobile Phone.
2. LBS and GPS Tracking services.
3. Database.
4. Administrator.
5. Master Form.

1.**An Android Mobile Phone:**
An Android Mobile Phone is a mobile where an Android Operating System isinstalled. It has an Application installed that will be used doing the Survey. It willcollect the data fields and images related to survey and end it to the server over theinternet.

2.**LBS and GPS Tracking services:**
LBS and GPS trackers are the services that are used to find the locations with thehelp of internet and the mobile networks. It will be used to track the surveyor for theverification of whether the survey has been done by the surveyor or not.

3.**Database:**
Database is where all the information and data that is collected by the surveyor willbe stored after the surveyor submits it. The data that is collected will be used for theanalysis purpose from where the administrator will be able to make the result forfurther business.

4**Administrator:**
Administrator will be the authority who will get the collected data and it will be usedfor the further analysis process in order to make the business profitable.

5**Master Form:**
Master form is where the Administrator will be able to make the changes in theapplication related to the fields that will be needed for survey as it will be dynamic itwill be changed whenever it will be required. The administrator can delete, update, and add the fields as per the requirements for survey to be done.

VII. EXISTING SYSTEM

1. The existing system is static and cannot be used for multiple applications.
2. The data is not stored dynamically and also the surveyor's positioncannot be traced.
3. There is no comparison between two products.
4. No graphical representation for calculating performance.

VIII. PROPOSED SYSTEM

1. In proposed system, we will develop a dynamic android application.
2. It can be used to take real time data as well as location and transfer it to dynamic web application integrated with Google Map API.
3. So we are reducing the manual work and errors in the system.
4. Graphical representation for performance calculation will be done.

IX. EXPERIMENTAL RESULT
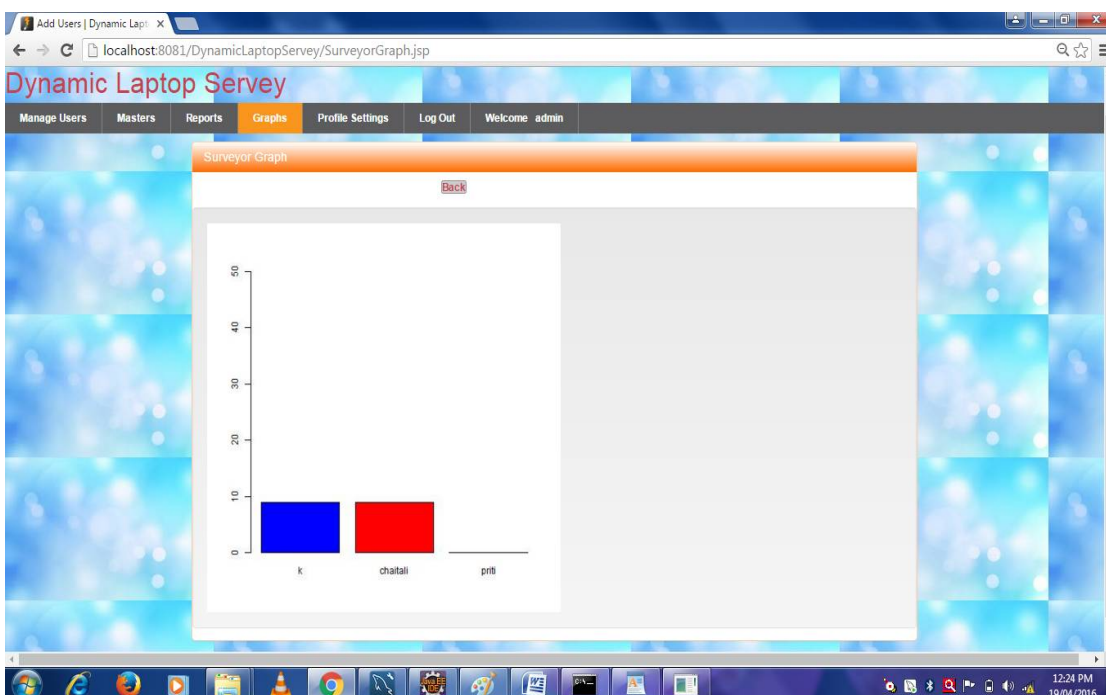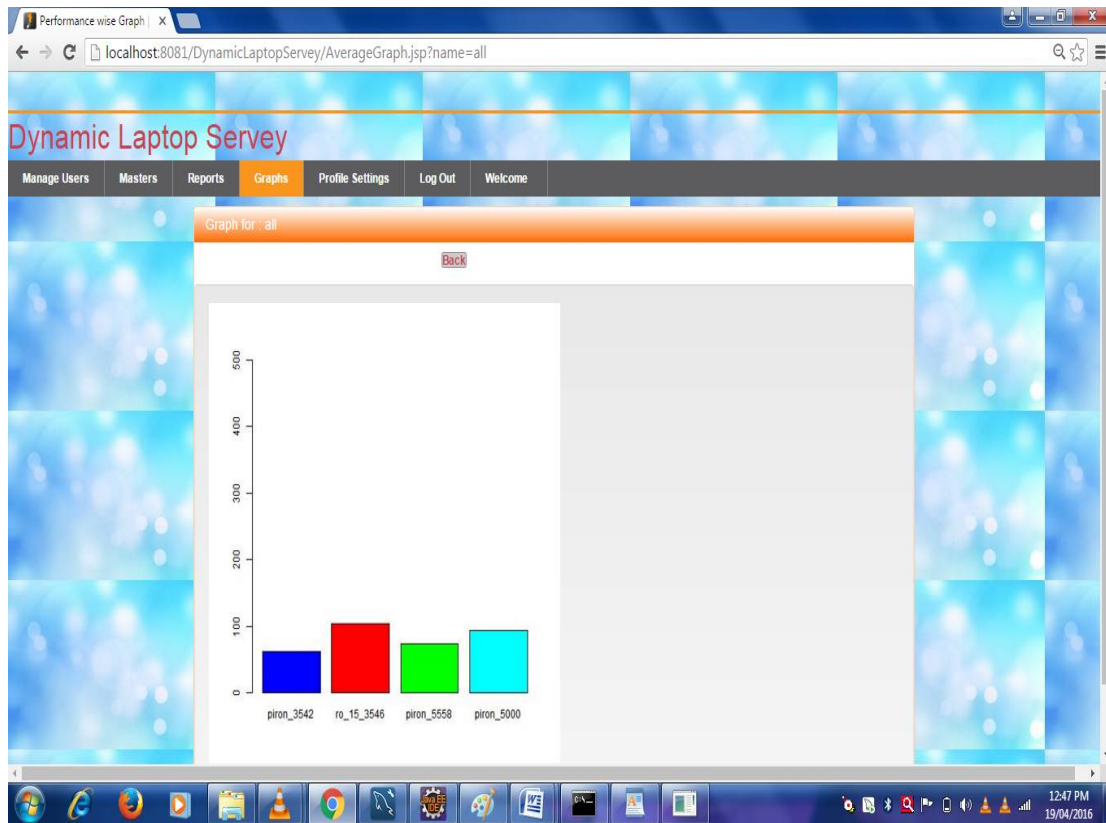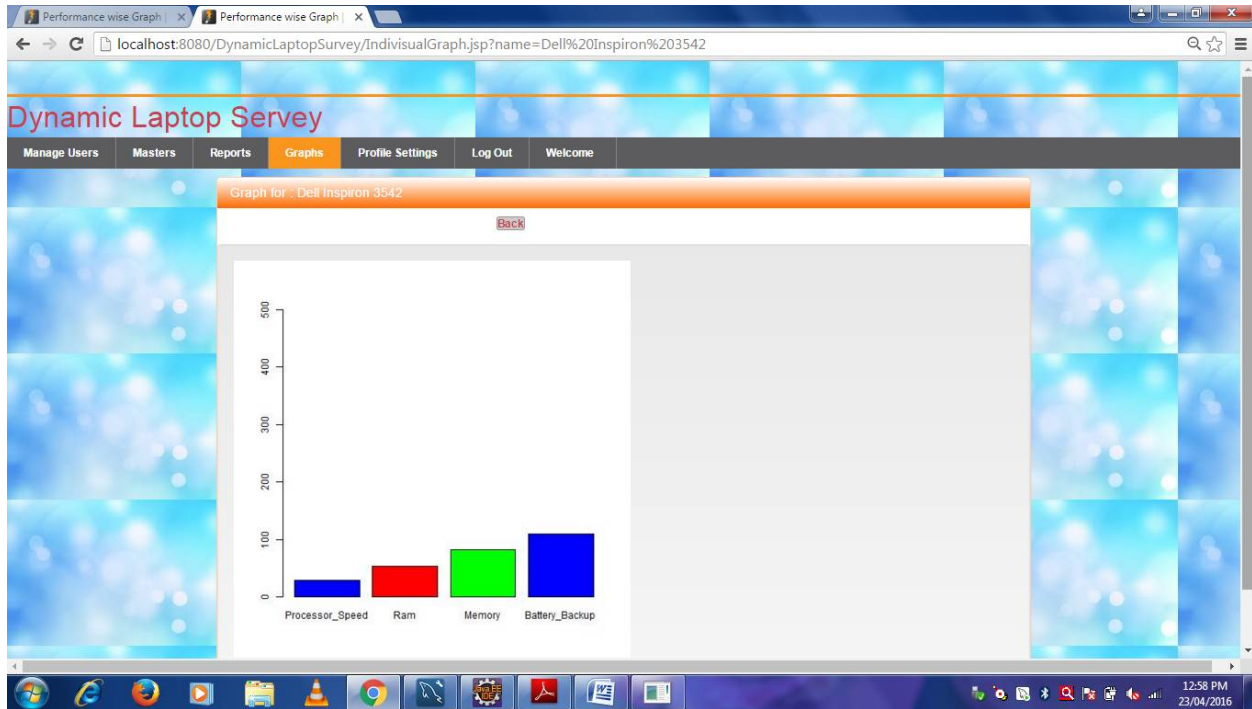
X. CONCLUSION

We have developed an android app for the real time field data collection. Surveyor will collect the information and send it to the server. The admin has rights to make changes for fields related to survey. Using master form changes can be done and updated in the app of particular surveyor. Thus paper and pen manual work is reduced and cost effectiveness is achieved.

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