

A Proposed Android Based Mobile Application to Monitor Works at Remote Sites

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Abstract: *In recent years the Android Technology with web services has brought many drastic changes in the mobile application development field. Keeping this in mind, an Android based mobile application to access the remote database has been developed. This application provides a generalized solution to monitor the various works that are carried out by a construction company at different geological points. By using a Web Service the data are stored in the remote database. This mobile application requires General Packet Radio Service (GPRS) or Wi-Fi technology to reach the remote database. Using data in the remote database various reports are generated and projected as a MIS [Management Information System] web application. Thus the construction company can use the MIS to monitor the works carried out at various sites.*

Keywords: Android, GPRS, MIS, Web Service, Wi-Fi

1. Introduction

The process of works monitoring in any Construction Company is a tedious job. The construction company performs various works at various geological points. Currently, for these works the construction company will be having the site supervisors, who will be taking care of the various sites. The site supervisors currently furnishes only their weekly or monthly expenditure details and progress of works, because of this the Construction company has to wait, to know the expenditures and the progress of work made by the various construction site.

This process is very much time consuming and it involves a lot of manual work to be carried out. To update the day to day activities, every site supervisor requires a computer with internet connection at their sites. They also require a camera to capture the construction status. To provide all these facilities at the remote site the construction company has to spend huge sum of money, time, and space. So to surmount this problem a new framework was proposed.

Thus, the project entitled “A Proposed Android Based Mobile Application to Monitor Works at Remote Sites” has been developed for the betterment of the construction company. By developing this application the Construction Company can easily record their progress of various works and their day-to-day expenditures that are made at various sites.

2. Technology Overview

This section elaborates how the Web Service is accessed by the android application to reach the remote database server. Web Services are platform independent and language independent since they use standard XML languages.

Moreover, majority of the web services use Hypertext Transport Protocol (HTTP) for transmitting the messages [1].

The most interesting features of a web service is that they are self describing. This means that once a web service is located we can ask it to describe itself and tell what operations it supports and how to invoke it. This is handled by the Web Service Description Language (WSDL). A web service invocation involves sending of messages between a client and a server [2]. For example, SOAP (Simple Object Access Protocol) specifies the format in which the requests are sent to the server and how the server should format the responses. The data from the android application has been sent as HTTP request to the Web service. To perform this, the android mobile device needs the GPRS or Wi-Fi connectivity.

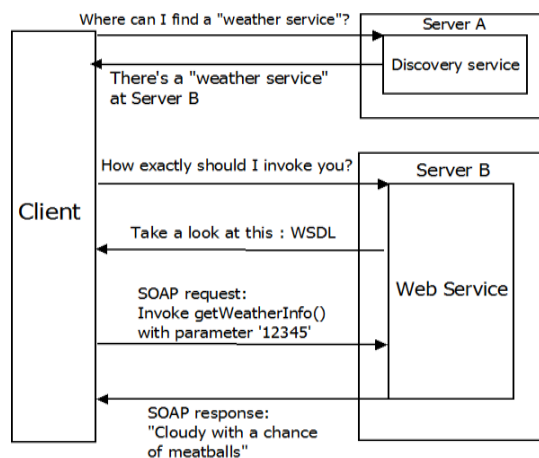


Figure 1: Web Service Discovery and Invocation

Thus using the Web service the data reaches the remote

database server.

3. Proposed System

Proposed system aims at developing an Android based mobile application that monitors the expenditures made and works performed by the various sites of the Construction Company. The expenditures and construction work made on various sites are recorded and it can be viewed at any point of time. Using the Android based mobile application the day to day activities of the remote construction site can easily be updated to the remote database server [3]. Initially the site supervisor using his login credentials, has to login in the mobile application loaded in his device? After which he has to upload the day to day activities along with the photographs of the works performed.

Using a Web Service the data in the mobile device can be updated in the remote database. Thus the data in the remote database can be projected as MIS [Management Information System] Web Application. Thus the works carried out at different geological points can easily be monitored using this system. The proposed system consists of the following advantages, Time Saving, Secured Environment, Will prevent any possible corruption, and Work efficiency.

4. System Architecture

System Architecture alludes to the “the overall structure of the software” and the ways in which that structure provides conceptual integrity for a system. In its simplest form, architecture is the hierarchical structure of program components, the manner in which these components interact and the structure of data that are used by the components. One of the goals of system design is to derive an architectural rendering of a system. This rendering serves as a framework from which more detailed design activities are conducted.

The Overall System Architecture defines, how the data from the Android mobile application reaches the remote database server, and how the data it is reflected in MIS (Management Information System) as a Web Application.

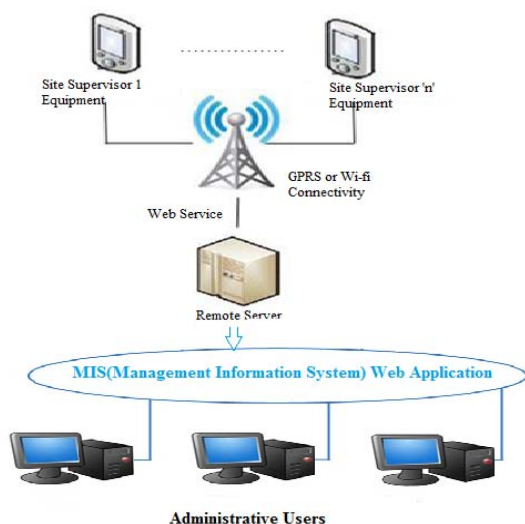


Figure 2: Overall system Architecture

5. Technical Requirements

Software requirements of our system are:

1. Windows XP/ Windows 7 Operating System
2. Android mobile Operating System
3. Eclipse IDE
4. SQL Server 2008 or later
5. Microsoft Visual Studio .NET 2008 or later
6. .NET Framework 2.0 later, with ASP.NET functionality tested.

As far as the hardware requirements are concerned, one needs to have a Pentium 4 processor or later with a minimum RAM of 1GB and a HDD of 80GB or more. It should also have a well equipped network adapter. The site supervisor would require an Android OS based smartphone.

6. Modular Design

The proposed system is divided into five distinct modules which are described as follows,

6.1 Authenticated User Login

The Site Supervisors located at different sites of the Construction Company, login with their unique user name and password. Every time when a user login through the mobile application the IMEI number, the latitude & longitude of the work site, and the mobile number are captured. The Authenticated User Login is implemented as follows,



Figure 3: Authenticated User Login

By capturing these details we provide an authenticated way through which the site supervisors alone can use this mobile application. Thus the expenditure details and progress of works details can be sent only from the site supervisor's mobile device.

6.2 Location Based Works Entry

The works performed in the various sites of the construction company are monitored using the corresponding site supervisor. The expenditure made on that day and the works performed are updated in this module. The site supervisor is allowed to enter the details in his android application. The various works at various works sites are selected using the spinner control,

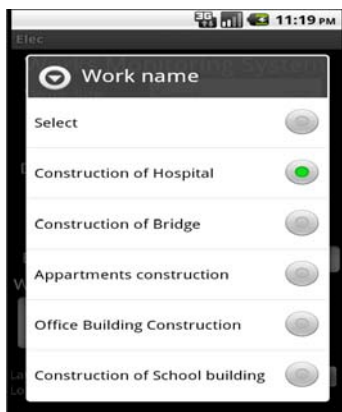


Figure 4: Selecting works using Spinner Control

Using this Spinner Control the various works and works sites are selected. The Location based works entry is implemented as follows,

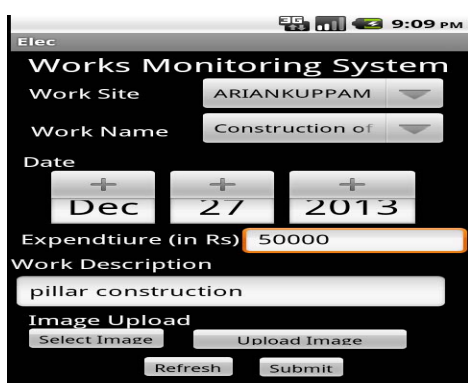


Figure 5: Location Based Works Entry

While updating the expenditure and work details the longitude and latitude of the device and the IMEI number of the mobile device is captured to verify that the data comes from the authorized users.

6.3 Calling of Web Service

After submitting the details from the mobile device the data are parameterized and passed to a Web service. To perform this mobile device needs the Wi-Fi or GPRS connectivity. Thus the data from the mobile device reaches the Web service. The Web Service receives the parameters that are sent from the mobile device and it moves the data to the remote server. Thus the data from the mobile device reaches the remote database.

6.4 Works Photo Upload

The Works Photo Upload module allows the site supervisor to upload the images of latest works carried out at the site. Thus the images of works carried out at the remote sites can easily be viewed by the administrative users. Thus the works carried out at various work sites can easily be monitored.

6.5 MIS Reports to Monitor the Work Status

The data regarding the works and its expenditure received from various work sites are reflected as date wise, and work wise reports in the MIS (Management Information System) Web Application. Thus using this MIS reports the

construction company can easily monitor the daily work status of their various work sites.

7.Future Scope

In future our system plans to include the GIS (Geographical Information System) which can be produced using the latitude and longitude details captured from the remote work sites. This GIS module displays the work sites on a map through which the construction company can easily monitor the works carried out at different geological points. In future this application can be extended to other Mobile operating systems.

8.Conclusion

This project titled A Proposed Android Based Mobile Application to Monitor Works at Remote Sites provides the construction company an easy and efficient way to monitor the works performed at various work sites. Thus using this application the Construction Company can easily record their progress of various works and their day-to-day expenditures that are made at their various construction sites.

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