

Design of Traffic Information System for a Typical Mobile Communication

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Abstract— This paper is about the design of a traffic information system for a typical mobile communication such as dropped calls. The database used for this project is Microsoft Access 2010 (Access). The database used to store the username and password for login. In this project, Microsoft Excel 2010 (Excel) used to insert a chart and can be displayed from Visual Basic 6.0 (VB) by clicking the command button exists. The chart was inserted for Max. Dropped Call vs Cell ID, Max. Dropped Call vs Cell ID for each hour in one day and Max. Dropped Call vs Time. Besides, pie chart also can be displayed to find which cell are most frequently occur a dropped call. VB used as a user interface in this project to allowed users to view the chart. Other than that, from the chart also can identify at which time dropped call are most often occurs. The interface that used are drawn in a form such as 'Label', 'Command Button', 'Text Box', and 'Picture Box'. VB used as the user interface because of its user-friendly interface and data access features.

Keywords— Traffic Information System, Dropped Call, Database, Access, Excel, VB, Interface

I. INTRODUCTION

In a cellular communication system, it is a big deal when there are drop calls to consumers and service providers. The propagation conditions required for a satisfactory communication cannot always be met due to irregularities in cell coverage or shadowing and rapid signal loss, i.e. due to the existence of areas which cannot be served by any of the Base Station(BS)s (holes)[1]. The definition of a dropped call is when the call disconnected unexpectedly before it is properly terminated[4]. The minimization of dropout needs an efficient plan for making reconnect requests at the right place and at the right time based on the propagation environment. But in now existing system, both Global System for Mobile Communications (GSM) and Code Division Multiple Access (CDMA), the recovery procedure is almost negligible because the procedure is too simple to be performed in the protocol.

In contrast to CDMA system, all users share the same frequency spectrum from time to time that they are active. In nearly all-existing multi-user circuit-switched systems, the frequency slots or time slots have been tasked to a voice conversation or message[5].

Cell phone signal or reception is the strength of the signal that measured in dBm that is received by mobile phone from the cellular network (on the downlink). The signal strength will be varied. Depending on several factors, such as close to the tower, there are obstacles such as buildings or trees. Most mobile devices use a set of bar height to display the strength of the estimated increase for the received signal to the mobile phone users[6].

Dropped calls can occur on several factors, which could be categorized by problems with the carrier, the surroundings, and also a problem with the phone itself.

A cellular network composed of many different cell towers that will communicate to make a phone call. The phone will connect to the nearest tower as long as there is no movement made during the call. in the event of movement, such as walking, driving, or other handoff will happen because there is a change to a nearby tower. However, this handoff occurs often without problems, but sometimes happens that causes complications Call dropped. Among the root causes of this complication, is due to the extreme cell traffic in one of the towers, power outages, and more. Mostly is a problem with the carrier, and usually calls can be made again without problems.

Among other factors, is when they are in an area without reception, which is known as the "dead zone". Dead zone exists due to several different factors. There is a wide swath dead zone in remote areas where no coverage is available from the cell tower some inhabitants or tourists. Example environment where there is a dead zone of the desert. However, in areas with high inhabitants as well, there is still a dead zone due to construction of the tower is not aligned, which may cause the area does not receive proper coverage. As well as locations blocked by obstacles such as hills, mountains, trees, large buildings and others. The dead zone is also most often on underground as underground parking.

Besides the dead zone, environmental factors also have an effect on the call dropped. The main cause of the local area did not get a good reception due to the type of construction materials used in the home or office. Materials such as wire, sheet metal, insulation type, reinforced concrete, and much more are contribute to signal degradation and loss. If the signal is digital phone becomes too degraded and sufficient data is lost in transit, then there is a high probability that the connection will be terminated and the call was dropped, even though the phone shows it still has the signal bars.

Finally, the phone itself is the cause of call drops. A phone with a damaged antenna will experience poor reception, data loss, and dropped calls often occur. In addition, the software isn't updated phone roaming is also a contributor to the call dropped. Cell phone requires a quality power supply to maintain a stable connection during calls[8].

Cell phone signal booster is a system that takes a good cell phone signal; it is usually found outside the building, where to amplify and then sent back to the areas that receive some or no signal. The system will bypass causes poor reception, and provides the strongest signal to the area required. Constraints to using a mobile phone signal booster is the antenna cannot be placed in areas where there is a good signal. Living or working area with spotty or non-existent signal, cell phone signal booster will not help consumers.

The possible solution to this problem is to move to a location with good reception. The mobile phone has the strongest signal in the area outside the house. In addition, make a call away from electronic devices, such as a computer is a way to limit the call dropped[9].

Handoff is an indispensable operation of wireless networks to guarantee continuous, effective, and resilient services during Mobile Station (MS) mobility[2].

When a cell phone moves into a different cell while conversation is in progress, the MSC automatically transfers the call to a new channel to the new base station. This handoff operation not only involves identifying a new base station, but also requires that the voice and control signals be allocated to channels associated with the new base station[10].

A. Database Window(Microsoft Access 2010)

Microsoft Access is a Relational Database Management System (RDBMS), which designed primarily for home or small business usage.

Access is known as a desktop database system because its functions are proposed to be run from a single computer. This is in contrast to a server database application (such as SQL Server), where it is intended to be installed on a server, then accessed remotely from multiple client machines.

Access is a software package that installs just like any other software package, and is bundled as part of the Microsoft Office suite[7].

From database window, database object can be created and used. The object is an item such as table, form, query and report. For this software the project tab selected is 'table'.

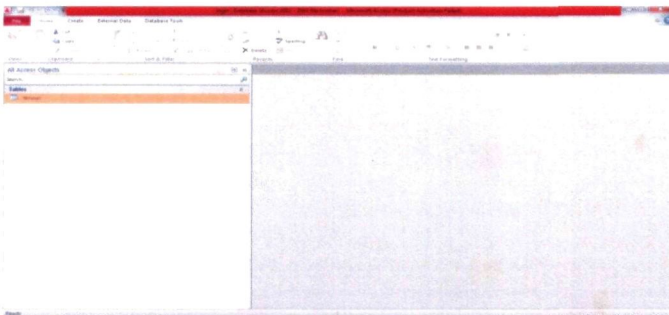


Fig. 1 Table in a database

B. Insert a chart (Microsoft Excel 2010)

Microsoft Excel is a member of the spreadsheet family of software. Spreadsheets allow users to keep track of data, insert charts based from data, and also perform complex calculations. In this project, Excel is used to insert a chart.

Cell ID	Max. Dropped Call
1	18
2	18
3	17
4	18
5	18
6	18
7	14
8	25
9	18
10	17
11	18
12	17
13	17
14	18
15	19
16	17
17	17
18	27
19	17
20	18
21	17
22	18

Fig. 2 Worksheet in a Microsoft Excel

C. Microsoft Visual Basic 6.0

Visual Basic is a high level programming language which evolved from the earlier DOS version called BASIC. BASIC means 'Beginners All-purpose Symbolic Instruction Code'. It is a very easy programming language to learn. VB is a popular programming package because of its user-friendly interface and data access features. The code looks a lot like English Language. Different software companies produced different versions of BASIC, such as Microsoft QBASIC, QUICKBASIC, GWBASIC, IBM BASICA and so on. Now, people prefer to use VB today, as it is a well-developed programming language and supporting resources are available everywhere. However, there are many versions of VB exist in the market, one of the most popular and is still used more widely by VB programmers is none other than VB 6.0.

Most of the programming done today requires data access. With large amounts of data being maintained in databases, access mechanisms that allow manipulation of this data are very important. VB is a tool that allows programmer to create software applications for the windows operating system. VB incorporates a set of software technologies called ActiveX. ActiveX technology allows the creation, integration, and reuse of software components that can be integrated into a large number of different software products. The way that a program accepts instruction from the user and presents result is called the user interface. Nowadays, the most application have a Graphical User Interface (GUI). A GUI provides visual clues such as small pictures, or icons, to help the end user give instruction to the computer. Microsoft Windows is the most widely used GUI for personal computers. In this project, GUI is also referred to form. VB was released with new data control or ActiveX that is an ActiveX Data Object (ADO). Six windows will appear when a VB starts:

The Main Window consists of the title bar, menu bar, and toolbar.

- i. The form window is central to developing VB applications. It is where the interfaces of application are draw. For this project it's have two form with their own interfaces.
- ii. The Toolbox is the selection menu for controls used in the application.
- iii. The Properties Window is used to establish initial property values for objects.
- iv. The Form Layout Window shows where (upon program execution) form will be displayed relative to laptop's screen.
- v. The Project Window displays a list of all forms and modules making up the application. To obtain a view of the Form or Code windows (window containing the actual basic coding) from the Project window.

II. OBJECTIVE

The main objective of this project is to display the traffic information system for a typical mobile communication such as a dropped call and also to identify which cell are most frequently occurs dropped call.

III. METHODOLOGY

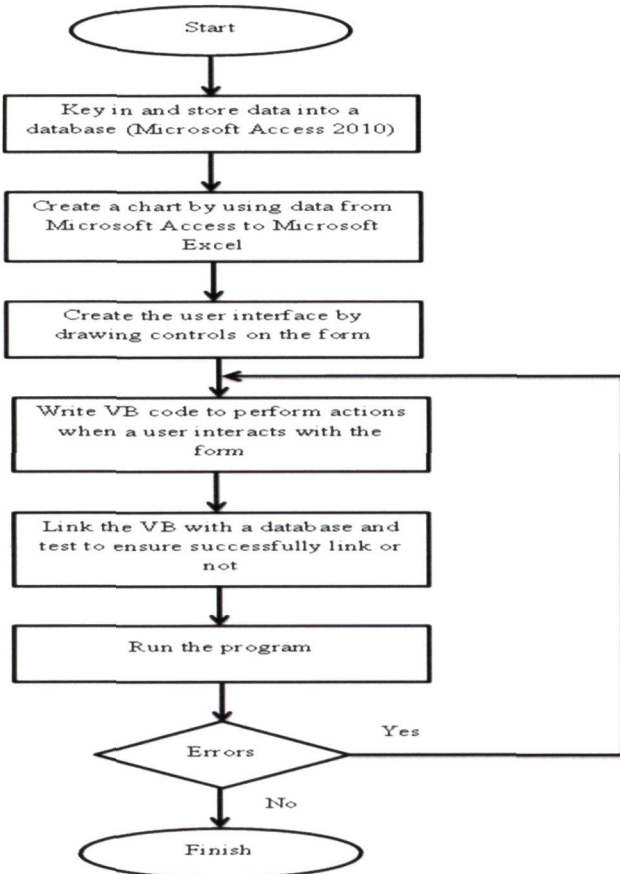


Fig. 3 Flow Chart of the project

The project is starting to insert the data of dropped call with its own cell in Access. From the data in an Access than copy to Excel to insert a chart to identify or analyse chart.

In VB, the interface will create based on the required data that have been inserted in Access. Then, in field source code the coding is perform to interact with the form. After all the interface done, some test is made to ensure that they have connected each other. The program is run to see the result and if there is an error, it will return to process number five.

IV. RESULTS AND DISCUSSION

This software application starts with login form as shown in Fig. 4[3]. This login form requires users to enter their username and password. Only valid users can pass through this form before they can proceed to other forms. If the username and password are not valid, an error message will be displayed and users can re-enter it again. The username and password have been stored in a database.

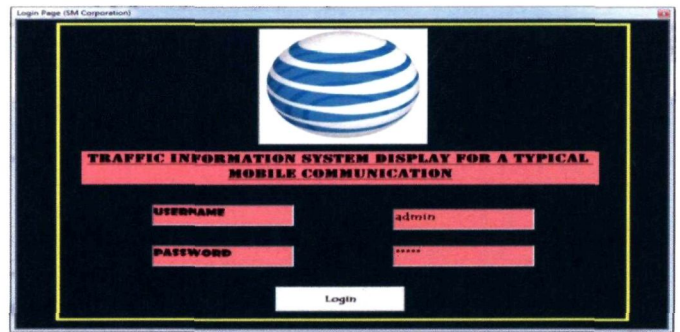


Fig. 4 Login form

When the users pass the login form, the Calendar form will be displayed. Fig. 5 shows the Calendar form with existing labels and users can select any day to view a chart which consists of a week. From the Calendar form also, users can view a pie chart for No. of dropped calls of each cell and each time.

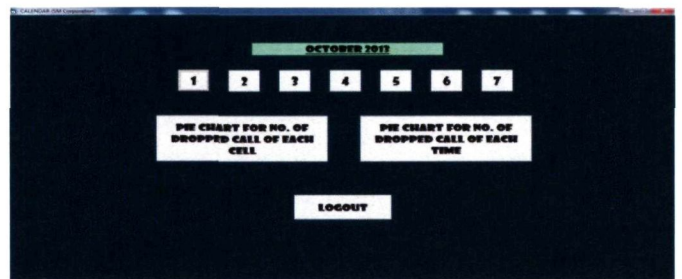


Fig. 5 Calendar form

Once users click the day, the form as shown in Fig. 6 is displayed. When the user clicks on the icon in the 'label' time, the chart will be displayed according to the selected time. For example as shown in Fig. 7 which is a user has selected for time 0:00. From this page, users can see the different number of dropped calls between cells for each hour. From the overall chart it's shown that at 4:00, the number of dropped calls is lower than other times.

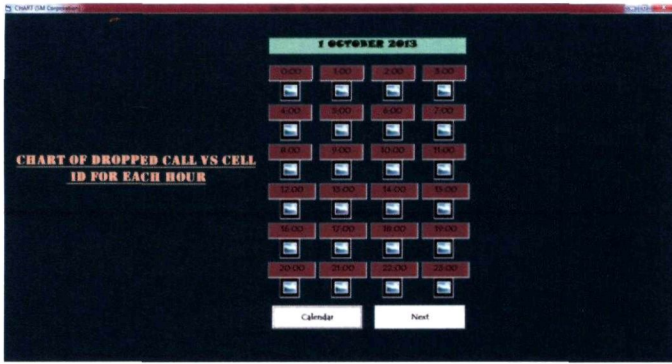


Fig. 6 Form for Max. Dropped Call vs Cell ID for each hour

Users also can go back to the previous page by click the 'Back' command button and to view chart for one day of Max. Dropped Call by clicking the 'Next' command button.

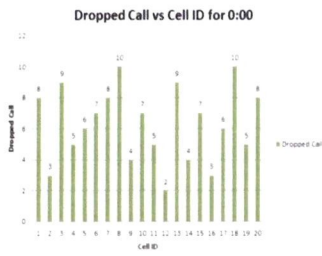


Fig. 7 Chart for Max. Dropped Call vs Cell ID at 0:00

Fig. 8 shows the chart for one day of Max. Dropped Call for each cell. It's shown that Cell 18 has the highest number of dropped calls which is 27 followed by Cell 8 with 25 numbers of dropped calls.

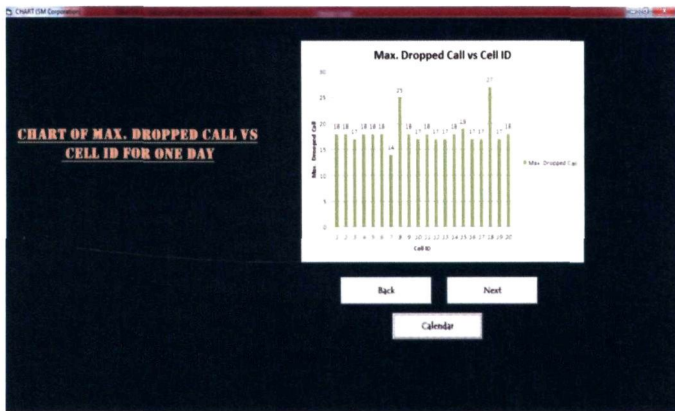


Fig. 8 Chart for Max. Dropped Call vs Cell ID for one day

Fig. 9 shows that at 13:00 were the most frequently occur a dropped call compare to other times. This is due to the lunch hour, and most people will made the call at that time. Then followed by 14:00 also have number of dropped calls. This process also can be done for another six days.

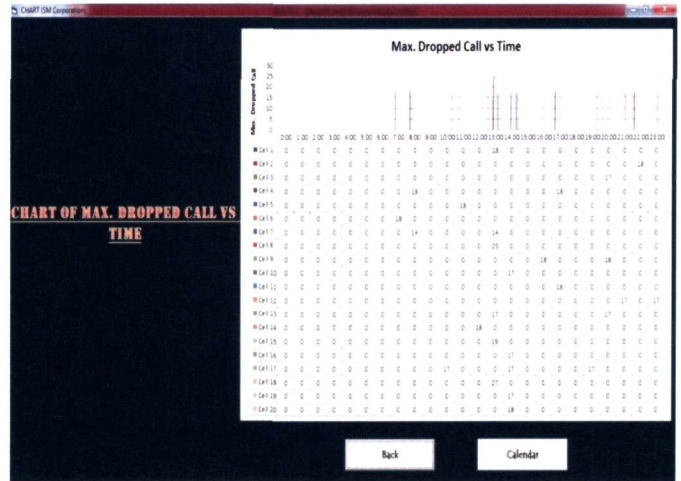


Fig. 9 Chart for Max. Dropped Call vs Time

For a pie chart, users can click the command button in Calendar form to analyse which cell is the highest dropped calls for a week and also in what time a dropped call frequently occurs. Users can click the command button 'Logout' to exit from the page or form.

V. CONCLUSIONS

The objective is successfully achieved. The main objective of this project is to display the traffic information system for a typical mobile communication such as a dropped call and also to identify which cell are most frequently occurs dropped call.

From the analysis, it can be concluded that cell 9 has the highest number of dropped calls among the cells about 7%. The lowest of dropped call is cell 1,3,5,6,7,13 and 20 with 4%.

Besides, the numbers of dropped call at 13:00 are the most frequently occurring about 25% and its remaining until 14:00 with 18%. From the chart, it can be seen the difference between the number of dropped calls day and night, where on the night only a few cells will have a dropped calls compare during the day. As a conclusion, period from 13:00 to 14:00 can be said as a busy hour for almost every day.

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