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Deviation Analysis in Safety using iPhone Application

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ABSTRACT

Background: This paper presents deviation analysis in safety by using iPhone application for Alstom Company. The present application to do analysis of deviation is by using Microsoft Excel but it is difficult using this method for the safety officer to do the analysis because all data must be recorded on pieces of paper before transfer the information to the computer. Besides that, the present method use a lot of time and paper hence it is not environmentally friendly. The software used to develop the mobile application is by using Xcode 5.1 that is only available on OS X and not compatible with Windows operating system. The programming language used in the project is Objective-C. **Objective:** To reduce the deviation in safety at the workplace. **Results:** The results for this project are the mobile application is able to plot the bar chart from the iPhone based on 14 categories of deviation. Besides that, the user is able to send the recorded bar chart into the email of the Alstom Company. **Conclusion:** This application was successfully developed in order to generate the bar chart from the input data by using iOS platform instead of using Microsoft Excel. User can do the analysis of deviation using iOS device by entering the number of deviation at the workplace based on respective categories and send the information via the email. Therefore, it is efficient and save time by using the mobile application in industry.

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INTRODUCTION

The Safety and Health Officer (SHO) is the field that concerned with protecting the safety, health and welfare of the people engaged in work or employment. The purpose of SHO is to provide a safe and healthy work environment. By follow the rules set by SHO the risk of accident at the workplace can be reduced or prevented (National Safety Council, 2013).

All organizations practicing the SHO to ensure the employees at the organizations are remain safe. Basically there are 5 types of hazards at the workplace. The hazards are physical, mechanical, biological, chemical and psychosocial. All the hazards potential risks must be obey in order to ensure safety working environment. Besides the hazard rules, there are others protocol in SHO that must be followed by the organization. The deviation in SHO is defined as noncompliance to specific requirement in health and safety protocol and it can cause an accident at the workplace.

The deviations is referred as errors, failures, problems that does not obey the good practices at the workplace based on the Regulations, standard and procedures and by disobey the deviation can cause accident at the workplace.

The deviation analysis is important in order to reduce or prevent an accident from occurred at the workplace. Some of the workplace might have unsafe working arrangement. Deviation record analysis is important to be updated daily in order to ensure a safe working environment. Deviation analysis basically covers the type of deviation and how much the situation occurred at the workplace.

The deviation analysis at the workplace consists of 14 categories which are housekeeping , machinery & tools, working at height , lifting / crane operation, confined space , chemical management, fire safety , personal protective equipment , electrical safety , vehicle movement , Isolation , ergonomic / manual handling, other findings and customer scope (EHS Alstom, 2013).

The system used in certain company such as Alstom Company to do the deviation analysis usually

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by using Microsoft Excel. However, this kind of method have limitation as it is not portable, hence the people responsibility to record the deviation have to record it manually in the form of paper and transfer it back to the computer.

Therefore, this mobile application is developed in order to overcome such problems. The software used to build this mobile application is by using Xcode 5.1. Xcode is a powerful tool to develop an application for used in iPhone, iPad, iMac or MacBook. The programming language to program within the Xcode is by using Objective-C. Objective-C is almost similar with Java and C# language. User that does have experienced using C++ or C can learn Objective-C more easily as some of the syntax in both programming language are presented in Objective-C (Joe Conway and Aaron Hillegass, 2012).

For this application, the user can see all 14 categories of deviation checklist. Then, the user have to input the number of how many deviation that are occurred depending on the categories and the graph will be plotted automatically at the screen of the iPhone. Then, the user can send the data to associated email to be analyzed or reset back the data in order to perform the new analysis (Apple Developer, 2013).

Methodology:

The first step before develop this application, the developer must understand the current concept of existing application being used. The application used now for generate the bar chart is by using Microsoft Excel. Hence, the mobile application should have the ability to generate the bar chart and additional features that cannot be implemented in the Microsoft Excel.

For designing a mobile application, it required high skill of programming language in order to relate each class of subclass to the user interface. For the first step before develop an application, the developer must identify the platform of the application can be used. As an example, there are several of platforms for smartphone such as Android and iOS. For this project, the chosen platform is iOS.

The next step is the developer has to choose the software suitable for develops the application. For this project, Xcode is being chosen because it using Objective-C as programing language which is easier for developer because it can interact with the storyboard and main class of the system. All interfaces in storyboard will be linked to the right coding in each implementation and header file.

The developer has to understand and able to develop a simple mobile application by using Xcode. Then, the developer can design the storyboard of the project. The storyboard is the graphical user interface. All storyboards have interfaces for the user to input the data. Design storyboard is part of programming procedure as the developer has to assign all buttons to appropriate coding.

After storyboard had been created, then all storyboard have to be added to specific subclass and class. These classes are belongs to each of the storyboard. The developer then must write the suitable coding to each of the label, text field, view controller and buttons to allow all the storyboard to integrate each other. This is the hardest part in the project as the Objective-C is a case sensitive. All the property in each classes and subclasses must be written in default coding that has been setup by Apple Inc. All these type classes also known as implementation and header file.

The coding written for the project took the longest time to be completed. A simple sign or capital/small letter cause error to the project. A warning symbol in the coding should be prevented as it can create error in the coding. After rewrite all the coding, then building phase took process. If there is no error in the coding, the build process will write 'build successful' while 'build failed' is for wrong coding has been implemented. The coding of Objective-C is written in header and implement file which also noted as .h and .m file respectively.

In Xcode, it is user friendly to build the mobile application because it has simulator in it. The simulator can change to iPhone with variable resolution and processor speed and iPad. Therefore, the mobile application developer does not have to install the mobile application into the device for each time to troubleshoot the coding. Therefore, time can be saved when developing a mobile application. The functions of vary the processor speed of simulator is because to use for gaming development. In this project, it is only used simple interface and image. Therefore, iPhone 3.5 inch is selected to be the simulator (Hans-Eric Groundlund, 2012).

RESULTS AND DISCUSSION

Figure 1 shows the page of deviation analysis. There are 14 lists that show the deviation process. The user has to input the number for each categories based on the workplace. This part shows how easy the mobile application has more advantage than Microsoft Excel software to easily plot the bar chart.

Fig. 1: Deviation Categories

Based on Figure 1, the plot graph button will display the bar chart shows in Figure 2 below. All bar chart can display the value as the user touch each of bar chart. The bar chart looks almost similar with bar chart that has been plotted using Microsoft Excel. Below the bar chart, there are listed *a* until *n* which represent categories of deviation. The *a* is belong to housekeeping and the rest, from *b* until *n* is

corresponding to machinery & tools, working at height , lifting / crane operation, confined space , chemical management, fire safety , personal protective equipment , electrical safety , vehicle movement , Isolation , ergonomic / manual handling, other findings and customer scope. Therefore, this mobile application is more efficient because it is portable.

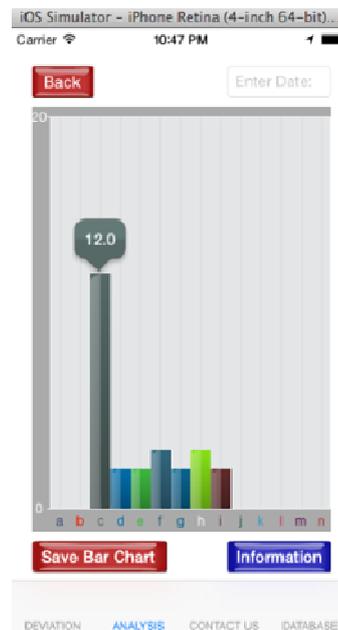


Fig. 2: Bar Chart of the Deviation Analysis

After bar chart has been plotted, the user can snapshot the bar chart and send it to corresponding email. The email will content the respective data and the bar chart itself. Figure 3 shows how the email interface looks like. To create the bar chart in Xcode

is the most challenging part. The developer has to build the bar chart library first according to the colour of background, the shape of the bar chart and the number of data in each bar chart. All bar chart is written in array coding (Neil Smyth, 2013).

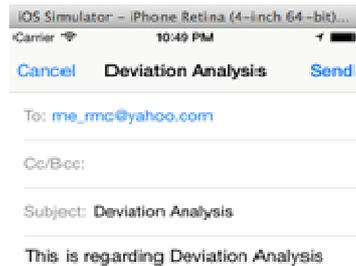


Fig. 3: Email Interface

The user can add additional info, recipient or other information like other email. To build the interface, the developer has to add Framework which represents the function block to send an email use in mobile application. In Xcode, the Framework functions as a library which specified to each of mobile application that often are being used.

Conclusion:

This project is covering the initial stage on developing the mobile application of iPhone. This application was successfully developed in order to generate the bar chart from the input data by using iOS platform instead of using Microsoft Excel. Therefore, it is efficient and saving time to use the mobile application of deviation analysis in industry. Besides that, the input data can be varied not only for analysis of deviation but all other applications that required a bar chart. Develop a mobile application also improved a lot of programming skills and to master a certain programming language usually took about 2 years. Besides that, knowledge of develop a mobile application give an advantage to telecommunication engineer to develop a mobile application related to telecommunication engineering sector as he or she have a deep understanding in telecommunication sector.

RECOMMENDATION

For future recommendation, the application is not only limited to iOS platform, it also can be used in the Android platform. Due to the short period, the application can only be develop in iOS platform.

Besides that, in the future, this application also can saved all the data in the form of plist file so it can be retrieved and loaded back into bar chart more easily. The data of plist file also can be deleted or saved in the memory of the device. Lastly, the application has its own server for transferring information can be more efficient instead of saving the data in the email.

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REFERENCES

- Apple Developer, 2013. Xcode. [Online]. Available: <https://developer.apple.com/xcode/>
- EHS Alstom, 2013. Policy and Commitment. [Online]. Available: <http://www.alstom.com/microsites/group/sustainability/our-policy-and-commitment/>
- Hans-Eric Groundlund, 2012. iOS 6 Recipes, iOS Development, Chapter 13 - Basic Data Persistence, pp: 445-449.
- Joe Conway and Aaron Hillegass, 2012. iOS Programming: The Big Nerd Ranch.
- National Safety Council, 2013. Safety Policy. [Online]. Available: <http://www.safetyandhealthmagazine.com/articles/9287-practice-good-housekeeping-in-the-workplace>
- Neil Smyth, 2013. iOS 7 App Development Essentials, iOS Development, Chapter 1 - Starting Xcode, 5: 15-50.