ANDROID APPLICATION DEVELOPMENT FOR AIRCRAFT MAINTENANCE ENGINEERS

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ABSTRACT

Most of the aircraft maintenance industries are following the conventional paper-based system, which requires a lot of shelf space, consumes more time and is not eco-friendly. E-maintenance is a new concept being used by very few operators like Virgin Atlantic, Boeing, Airbus and Honeywell. It has proved to be comparatively more efficient. A survey has been conducted from the senior management of the flying clubs at the Walton Airport and their opinion have been noted. The application has been developed on the Android Studio, which is an open source platform for developing Android applications. For making the graphical user interface, a prototype has been created in Adobe Photoshop CC showing how the application looks like and how it works including all the features. The target of the application is to include e-manuals, e-logbooks and ATA chapters, which are all important part of the aircraft maintenance industry.

INTRODUCTION

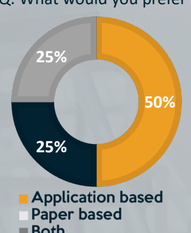
Growth in the demand for air travel is expanding the fleet gradually. Correspondingly, increasing the pressure of work load over the maintenance engineers to provide well-timed and correct maintenance. The root problem is the current practices of these conventional systems followed by both small and big scale maintenance organizations. Such practices may lead to major human error, difficulty in data handling, management and record-keeping. As documentation requires ample time, it can increase turnaround time resulting in flight delays costing millions of dollars to the airline annually. Maintenance industry is a hub of multicultural people, probability of misunderstandings regarding paper-based work highly increases. The solitary solution to overcome delays and safety hazards is to shift towards e-maintenance. Digitalizing maintenance practices will integrate the tasks, checks, maintenance procedures on an Android support platform. Making it all on one touch. Resulting, in saving time due to its efficient and smart search button. Performed tasks can be recorded that can later be viewed. It will cut down the huge bulk of manuals unlike in paper-based systems. Application (e-maintenance) not only provides ease in handling data, record-keeping but also improvises efficiency, safety. Above all, it is a cost-effective solution. According to Virgin Atlantic a profound Airline shifting to e-maintenance will result in 20% reduction in flight delays, 15% reduction in deferred defects, 24% man-hour saved, 2 hours per day saved, turn around 20 to 30 minutes saved per dayshift, turn around 20 to 30 minutes saved per day (Connect, 2016).

OBJECTIVES

- To increase overall safety and to reduce time while doing maintenance. mitigating the need to search from papers
- E-maintenance would reduce shelf space. because the volume occupied by manuals are more than smart phone/tablets
- Switching to e-maintenance would be cost effective
- It is environment friendly

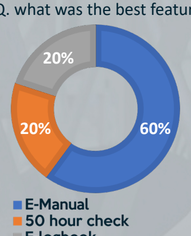
METHODOLOGY

Q. What would you prefer for Aircraft Maintenance?



A survey was conducted at the Walton Airport Lahore, majority (50%) preferred the application based system keeping in view its advantages while a few preferred both because of the conventional procedures and CAA regulations.

Q. what was the best feature provided in the application?



After application development, a trial version was given out to all the flying clubs at the Walton Airport, all of the clubs opted for the E-manual feature and only one opted for E logbook and one opted for the 50 Hours Check.

TOOLS USED

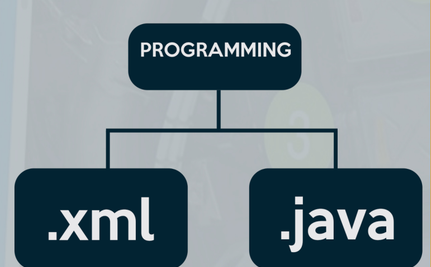
PHOTOSHOP

A prototype layout of the actual android application for the aircraft maintenance engineer was designed using Photoshop. It contains some of the key layouts of the application for example the login layer and the aircraft selection layer.

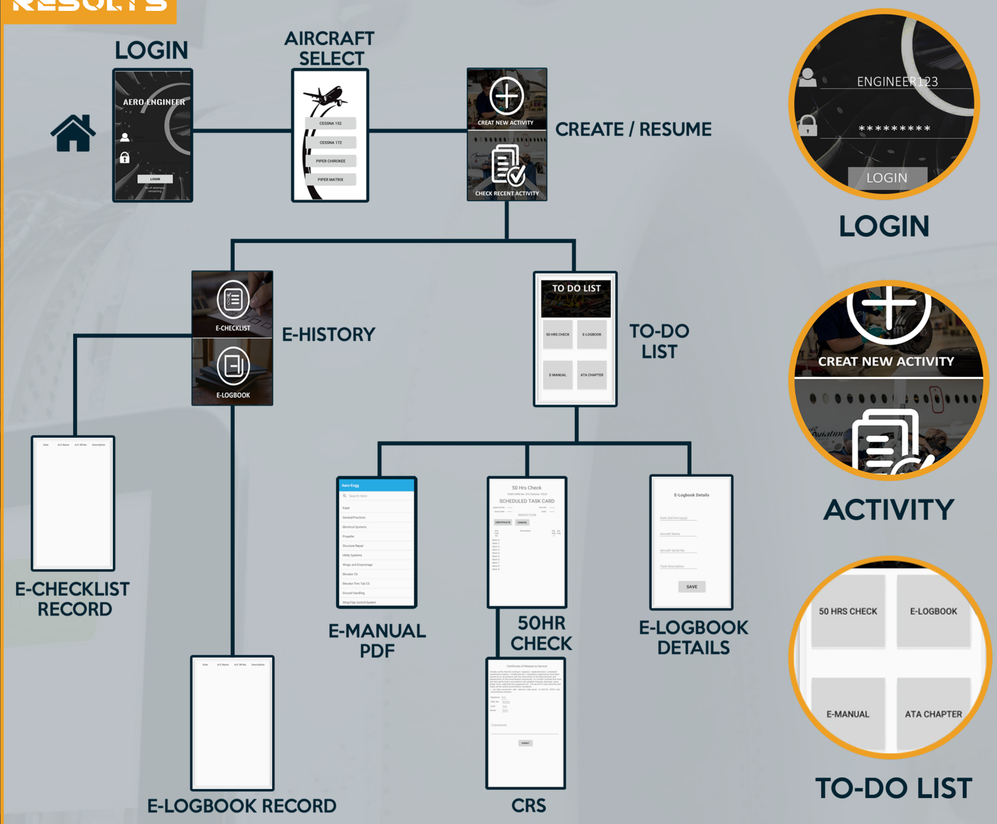
ANDROID STUDIO

The .xml layout in Android Studio is a GUI that allows the user to design how the layer in an application would look like. It has features like attributes, palette.

.java is the file in Android Studio where the programming part takes place. In this file, all the actions which were created in .xml are going to be programed.



RESULTS



All the working layers of the application are displayed above and some close-ups of important layers as well. The progression of the layers starts from the login layer and ending at multiple layers depending on what course or path the user takes and what type of user is accessing the application i.e. the engineer or the technician.

Login screen is where the user will enter their username and password. This will lead to aircraft selection screen where user must select the type of aircraft to work on. After selection of the aircraft two options will be given either to create a new task of resume a previous one. Create new activity leads to a To-Do tab screen where four different paths are available which are “50 HRS CHECK”, ”E-LOGBOOK” ,“E-MANUAL” and “ATA CHAPTERS”.

All of these four options have their own paths, layers and different functions. For example a 50 HRS CHECK has a layer named CRS as can be seen in the figure above.

DISCUSSION

The survey was conducted from Aircraft maintenance personnel in various flying clubs at Walton, Lahore after the development of the application. From which we concluded that we were able to succeed in achieving the method of developing a paperless, fast, cost-efficient method for maintenance work. That was by developing an e-platform for Aircraft Maintenance Engineer in the shape of android application. This practice allowed us to enhance the safety of this industry.

Secondly, we were suggested to expand our application to Quality Assurance domain by permitting access to Quality Assurance Manager. Addition of Maintenance Safety Management features i.e. showing the service, shelf life of the equipment, and next due maintenance were also recommended.

Lastly, we suggest making this application server-based. It will make the application lighter as all data will be stored in a cloud and the people granted with the access can obtain the data too. Moreover, in case of any incident data recovery can be done through a server.

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