RESEARCH ARTICLE   OPEN ACCESS

A Proposed Conceptual Framework of an NFC-Enabled Smartphone Application for Airport Play Areas Safety and Control

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ABSTRACT

This paper presents a new proposed mobile application that helps to enhance safety of children in play areas at airports as well as helping supervisors and workers there. The proposed application aims to improve the whole experience for travelers and their children in airports' play areas. Moreover, the proposed application presented in this paper helps the employees there in registering the required information of passengers who enter the play area which saves times and efforts. It also reduces the errors that usually occurs in the traditional human based way of writing information. Furthermore, for safety purposes, both children and their parents are provided with NFC_based wristbands with the same ID for matching when they check out of the play area as airports are usually crowd and kids can easily get lost. Finally, the proposed application sends alerts when departure time is close and a passenger did not check out of the play area.

Keywords: - **NFC**, Smart Phones, Mobiles, Applications, children, Airports.

I. INTRODUCTION

There are more than three billion travelers that transported yearly on airline flights , the majority of them are children [1]. In fact, traveling with children can be stressful, especially if it was for long distances. Children get bored easily and quickly ,they need to be busy. In fact, the situation becomes harder in case of long layover hours in airports. However, many airports allocate play areas for children to keep them busy which help their parents. These areas could be open or closed. Open play areas usually do not have workers or supervisors. On the other hand, closed play areas require supervisors who write information of visitors such as their names, flight numbers and departure times. In fact, the traditional human based way of writing information may cause many mistakes. One of the main goals of the proposed application is to decrease errors in such registering forms. Furthermore, travelers with kids are usually more exhausted than others without kids, and are at the risk of missing the flight if they fall asleep while waiting for their children playing. Therefore, this proposed application aims to raise safety inside play areas at airports by allocating an NFC bracelet for each child and his/her parent containing their names and same generated ID numbers while check into the play area, and when checking out , supervisor will scan both parent and kid NFC bracelets for ensuring that they are matching (having same ID) which raises safety procedures. In fact, registering passengers information are done by the application with no need for paper work which saves time and efforts, as well as reduces mistakes. Additionally , the proposed application provides statistical information such as the current number of play area visitors, passengers are able to know the number of visitors of kids area by the application earlier before

walking long distances in airport to reach the place so they can choose to come or not. Furthermore, thisproposed application sends alerts when departure time is close and passenger did not check out of the play area.

NFC Technology

Near Field Communication (NFC) is one of the relatively new released technologies in term of wireless communication and it is improving rapidly [2]. Moreover, NFC technology provides fast way to share data between smart phones and devices, this communication and data sharing can be done in seconds [2]. In fact, NFC-enabled smart phones can work as contactless smart cards, and are able to exchange data from and to those cards [3]. NFC has many applications in the area of communications in Smart phones [2]. Many objects around us are capable to include an NFC tag and present valuable services and information to mobile users [4].

II. PROPOSED FRAMEORK

The proposed Smartphone application is planned to offer services for both visitors and supervisors of airports' kids play areas. In fact, It provides the current number of visitors which allows crowd managing and control in such places. First of all, the application interface allows entering as a supervisor or a visitor, supervisors need to enter their IDs in order to validate it. However, the play area supervisor can use the application by choosing one of its interface two buttons: adding new visitor or main door checking. In case of ***Adding a new visitor task,*** the play area supervisor can add and register a new play area visitor. The

visitors ,parents and their kids , are required to provide their names, email address (for the parent only), flight number , and flight departure time. After the visitor's registration form is done, an automatically generated unique number (ID) will be provided by the NFC-application, and the supervisor will write the same ID for both parent and kid NFC-bracelets. On the other hand, *Main door checking task* which is also provided by the proposed application , it helps for crowd managing by showing the number of current visitors of kids area. Travelers are able to know the number of visitors of kids area by the application before they come by entering the application as a visitor and inquiring about the current visitors number. This allows people to make their decision of   visiting the area or not , before walking all the long distances in airport to reach the area which saves their time and effort.
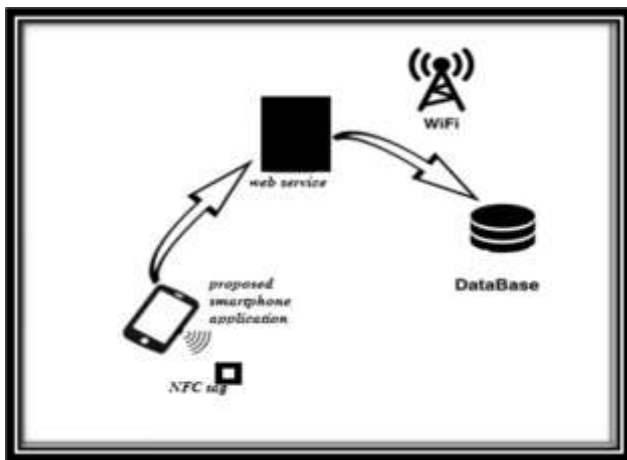

Fig 1. The proposed framework of the NFC-based application.

The proposed application allows area gate check in and out services. Travelers who come to the kids area are checked in, and the ones who leave are checked out through scanning the NFC bracelets they wear with the kids area supervisor's application mobile device. Supervisors scan both parent's and kid's NFC bracelets for ensuring that they are matching (having same ID). After that, the number is saved by the application directly and updated so visitors can check the application through the web server ,and then they know how much visitors are in the kids area before they come which enable them to avoid crowds, if they want.

III.   ALERT EMAIL SERVICE OF DEPARTURE   TIME

Through this service, a reminder email is sent to the traveler by the play area's administrator if the travelers do not check out before their flight departure time by 40 minutes ,as an alert , taking to consideration that travels could fall asleep while waiting for their child playing or relaxing. However, retrieving the stored email is done by a connection by a web service to the data base that contain passengers information such as his/her email.
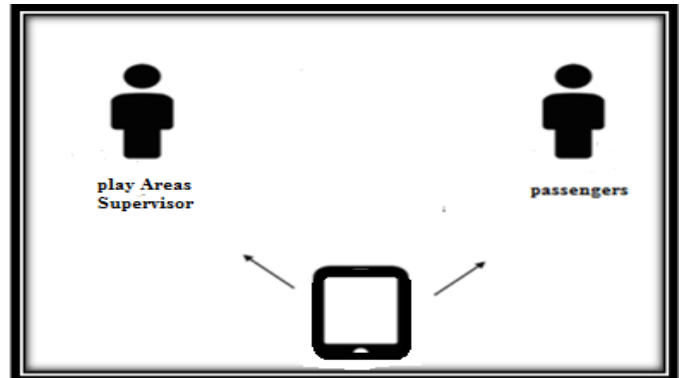

Fig 2. Audience of the NFC-based proposed application.

IV.   CONCLUSIONS

Our NFC-enabled mobile proposed application designed for play areas at airports aims to support safety inside play areas at air ports, as it should provide safe places for passengers of all ages. Our NFC-based smartphone application provides different services to enhance the experience at kids play areas by providing services for play area supervisors and visitors. Firstly, services that are used by play area supervisors are: travelers information registering. Moreover, reminder emails service that enables play area supervisors to send warnings to a certain passengers when their flight departure time is close. Additionally, matching parents' and kids' IDs service by scanning their NFC bracelets with a reader (NFC enabled smartphone) for safety purposes. Next , the NFC application provides services that aim to control the play area such as crowd-checking , which support controlling crowds. In fact, crowd problems could happen in various public places which makes crowd management solutions very important. However, using crowd checks service provided by the proposed application, travelers can inquire about the number of passengers inside the play area before they decide to come.

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