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RESEARCH ARTICLE

SMART SERVICES FOR AIRPORT FLIGHT TRANSIT

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ABSTRACT

Traveling is very interesting and concerned huge field of business; millions invested for enhancing the traveling and make it easy and enjoyment by managing airports.[1] Also many researchers studied airport services.[2,3,4,5,] Millions of people travel using airplane and airports, some uses direct flight while others used transit, in both cases many passengers spends a lot of time in airport due the traveling process plane scheduling, many others miss there flight during there waiting inside the airport, some researches tried to manage departing traveler at airport and their time.[6,7] also not all passengers are familiar with airports gates and facilities such as restaurants, waiting halls, free duty, bathrooms, checking out counters, clinic. Although controlling, directing, monitoring, and secure passengers is difficult for airport security.[8] This project paper propose developing system that use smart ticket instate of paper ticket which passenger can take or down load it from reservation desk, this smart ticket includes all important information, and it will provide all facilities, services in the airport with 2D and 3D map to all gates with alarm starts before flight time (boarding), also provide offers for free duty and GPS location detecting for all passengers in airport for security issues with social media and full internet connection in addition it provides family group track.

INTRODUCTION

In the past years there were a lot of researches evaluates airport services (Erdil and Yildiz. 2011; Donelda S. McKechnie, 2011). Many researches worked on improving airport services (Liou, 2011 and Wen-Hsien, 2011), by developing systems to support and help both passengers and employee. Other researchers used varies airports models (Lubbe, 2011; Perelman and Serebrisky, 2010; Mukesh Mohan Pandey, 2016; Mohammed Arif, 2013 and Ahmad Azmi, 2013). However the proposed system suggests controlling and serving passengers through device similar ID card. The proposed system could be android, windows mobile smart devices, and special devices, those special devices available with basic languages (Arabic, English, franc, spaniel, Dutch, Italian, Hebrew, Russian…). The device has touch screen, hot key, and sound controlling. Passenger expected to get from airport (Fodness and Murray, 2007; Juan Gabriel Brida, 2016; Angelos Pantouvakis, 2016; George, 2015). The proposed system provide many available services, such as restaurants, bathes, and stores lunch and other facilities as 2D map depending on passenger current location. Also provide navigation system 2D map to gates boarding counters, and all information desk which help passengers.

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The System

Smart service airport flight transit (SSAFT) contains many parts and has the ability to add or remove parts according to the need of the airport, those parts are presented and discussed in the following section:

- Boarding card
- Services map
- Appointment alarm
- Gps services
- Stores and duty free commercial and promotions
- Setting languages
- Personal and passengers information
- Group connections
- Navigator
- Entertainment
- Internet connection
- Special needs people services

Each part of the system has its own functions stored in the device which also will be discussed and described later in the following sections.

Boarding cards: This part is automatically downloaded from the boarding system in reservation computer. The connection between device and computer is either by wireless Bluetooth,

or by wire line USB connection or network. The boarding system contains all the information about the passenger or the flight. New information can be added and existing information could be deleted or modify as the system needed, information such as (Passenger name, Passenger number, Flight number, Seat number, Gate number, Age, Date of birth, place of birth, Gender, Nationality, Picture, Destination, Coming from, Transit and direct flight, airlines, flight time, family, number of family, passport number, reservation number, ticket number, as shown in Figure1.

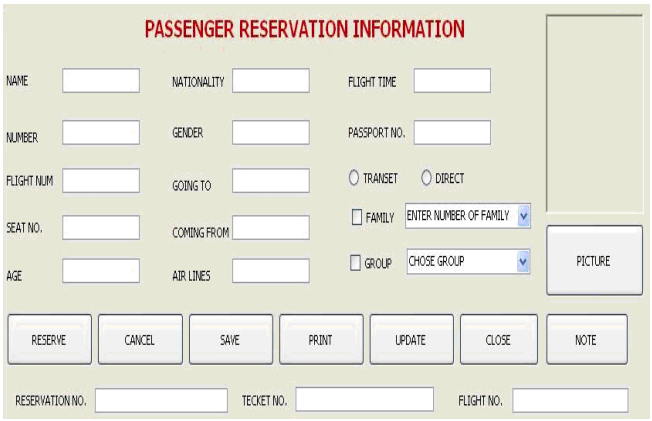

Figure 1. Passenger information form

Services map: this part of the system contains all maps and list of all services in airport and the way to reach them as shown in Figure 2.

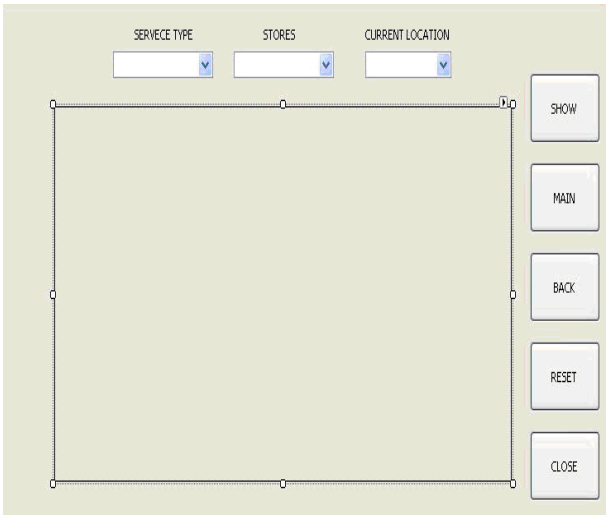

Figure 2. Services map form

In this form the passenger will chose from list of all available services and depending on selected service list of all related stores will be shown, then the passenger will chose one of the stores and the passenger will determine his current location from list that contains all basic locations in the airport which are stored before. Show button will display map pointing to passenger location and all paths to his chosen store destination. Another inception to the path is also available which is step by step instruction, which will show direction as instruction similar to GPS navigator.

Flight alarm system: This part of system consider the alarm for flight time, automatic alarm will be activate before flight time (standard is 30 minutes) or when last call for the flight the device will vibrates and stop all programs and display alert massage for the flight remaining time and the path for the gate with the gate number, all with red color screen and blinking light , a sound message is optional. The alert message contains show the map, show the path, and ok buttons as shown in Figure 4.

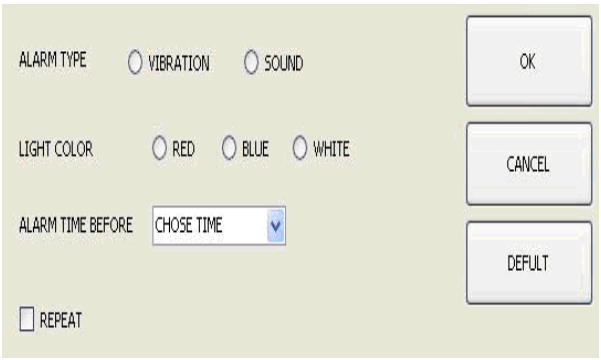

Figure 3. Flight alarm settings

Also extra setting may be done to alarm setting such as sound, vibration, light color, alarm time before flight, repeat, as shown in Figure 3.

Figure 4. Flight boarding path and alarm

GPS services: This part is useful for the security of the airport, each device (passenger) will have unique identification and will be monitor (locate his position) all the time. Detecting sensors distributed in specific positions area in the airport is used to detect and locate passenger, the sensors covers all area. In addition to the location detecting the status of the passenger will be determined. Status of passenger may be waking stopping climbing stairs; also waiting time and duration, path, speed direction of movement can be stored as information for the security of the airport as shown in Figure 5.

Duty free commercial promotions: in this part all commercial for duty free and promotions, offers, and important news will be shown and displayed as video while screen sever of the ID and name of passenger will be displayed every 5 minute or between commercials. Passenger can chose from a list of commercials or stores to play the video of the commercial. As shown in Figure 6.

Device setting: Language setting, this part will provide the passenger of major setting languages, volume, color , sound,…

etc, the passenger can chose among the languages to display and control device setting and facilities. As shown in Figure 7a.

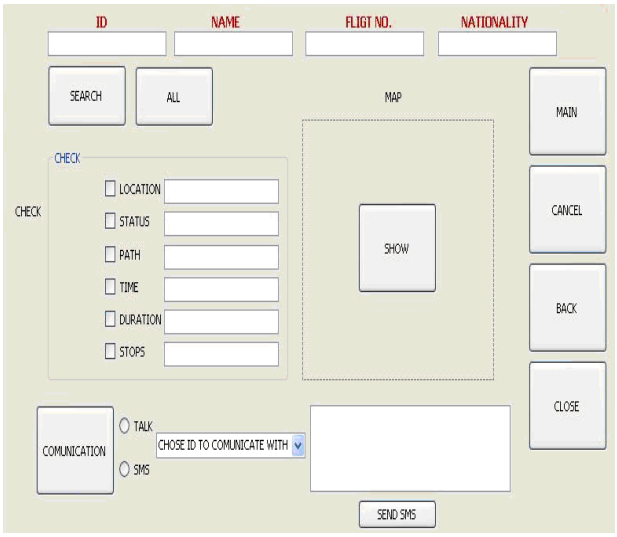

Figure 5. GPS services

Figure 6. Duty free and stores commercials

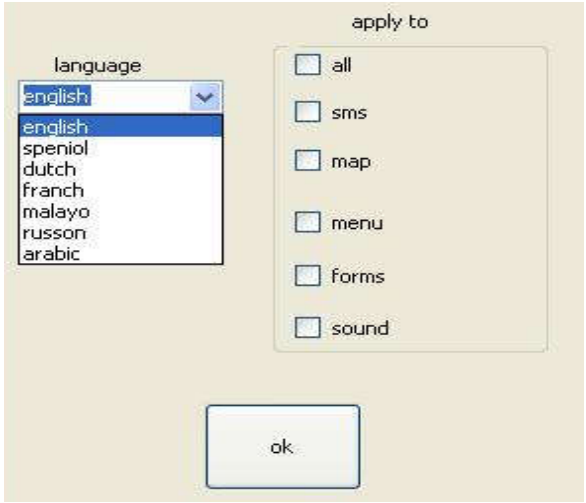

Figure 7a. Device language setting

Passenger Personal Information: This part shows all important information of passenger such as name, number, nationality, flight number, and picture. The information will be shown as screen saver which never shutdown unlike commercial screen saver which could be suspend or shutdown. See Shown in Figure 8.

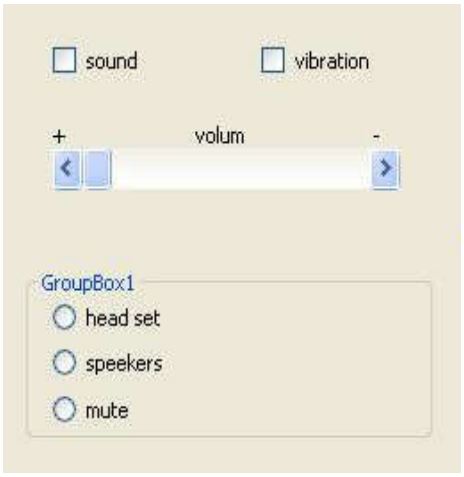

Figure 7b. Device sound setting

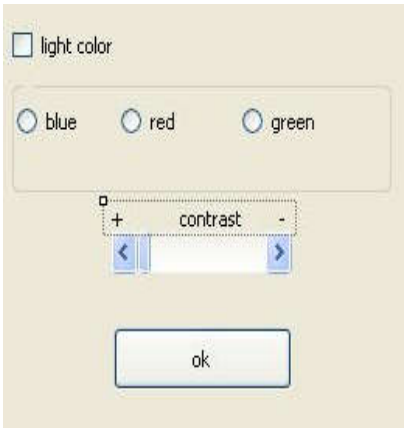

Figure 7c. Device color setting

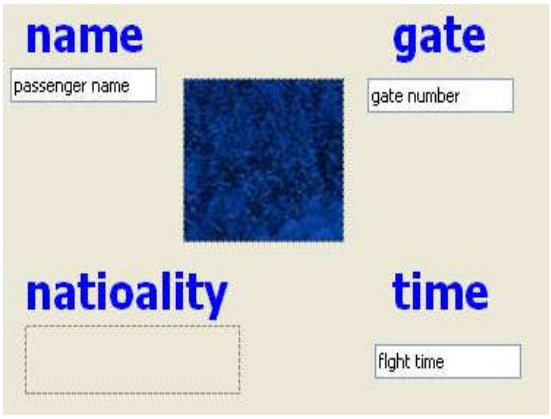

Figure 8. Shows Passenger personal information card

Group Contact and communicate

In this form all passenger which have family or form group will be connected with each other by textures and by map that locate other members through GPS or wireless network or blue tooth, Figure 5 shows the communication family form.

Airport navigator

This form – section – provide the passenger with 3d guide tour (virtual tour) for the air port using either video or by self

navigate using arrows as directions on the device. The tour includes information of locations in airport which are shown as text massage beside the video screen. Navigation screen and information about locations are shown in Figure 9.

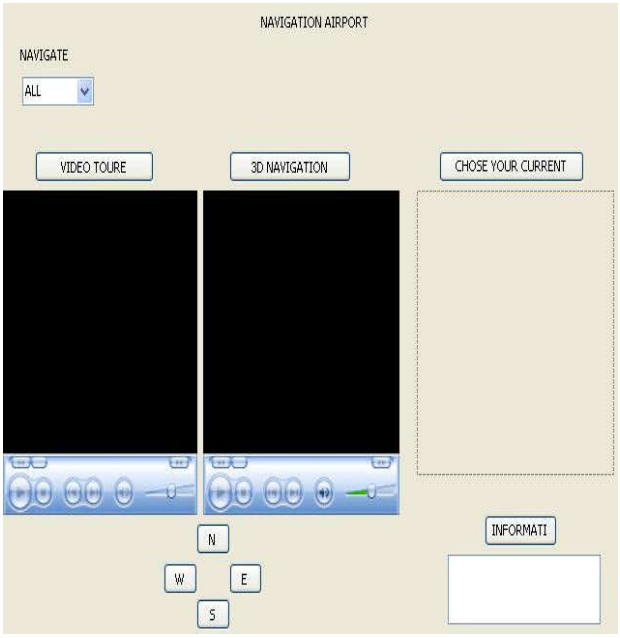

Figure 9. Air Port Navigator

Entertainment: This section stores songs, films, and individual and network games to entertainments passengers while waiting in airport for there flight. All Films will be categorized according to their types to romantic, comedy, adventure…etc. also all new films will be downloaded in the device by the airport controller which will be up to date. Extra films could be down loaded by the passenger using USB connection entertainment form is shown in form 10.

Figure 10. Shows Entertainment Form

Internet: This section passengers will have the ability to connect the internet using wireless connection with many different browsers such as chrome, explorer, and Firefox. This form contains many popular websites and utilities which the passenger could chose such as email, Google, YouTube, Facebook, Tweeter, shown in Figure 11.

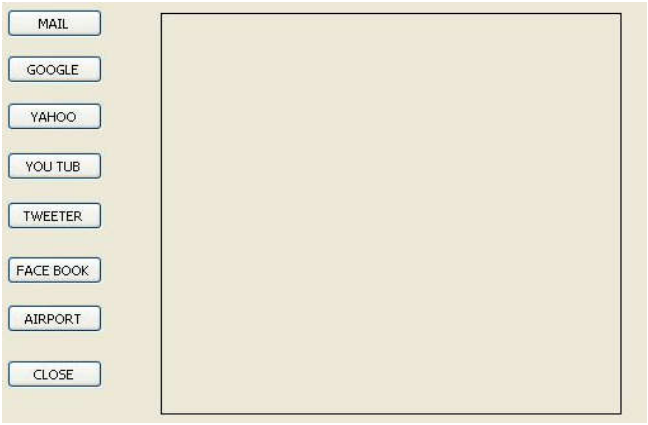

Figure 11. Shows internet form

METHODOLOGY

SSAFT is system that control airport services provided to passengers during there waiting in airport for their flight. The system is flexible where many services could be added, removed, or modified. The system contain many parts such as services map, alarm, GPS services, commercial duty free, language settings, passenger information, group connection, 3d navigation, entertainment and internet. As shown in Figure12

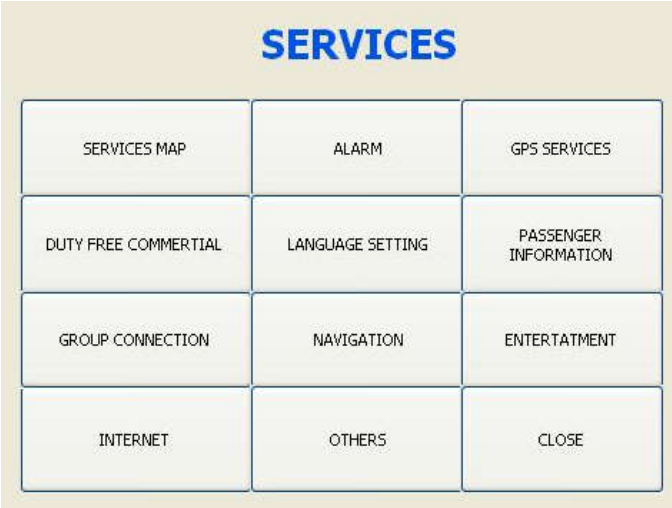

Figure 12. All SSAFT services

The first window will show welcome window in many languages according to the passenger language the second form will be language settings and volume to set the language and choose the volume level for the device after that a welcome massage will be displayed with the passenger name as shown in Figure 13.

After welcome massage an activity form will be displayed with animation buttons. When the passenger open this window all passenger information will be shown at the back side of the device in case of editing; otherwise if there is no modification on this then the screen server will be shown . The screen server will show passenger information and commercial advertising. All necessary information of booking will be entered to the

system and uploaded to the device, so that when the passenger turn on his device he will get the first window (welcome) and message in his language. Each device will show passenger id with picture, flag of the country, and nationality in case of the device not in use. When the device is used with any of the activities the backside of the device will show the id, picture, flight time, nationality or country flag.

Figure 13. Welcome form

Problems

There were many problems raise in this system some because of the device others because of wireless networks connections some because of security, low memory, operating system, virtual mapping, and multimedia. In this section such problems will be discussed in detail and propose solutions will be provided.

Device Problems: In this system the device which the system will be installed in must have specific requirements such as that the device weight must be light and small size similar to id card size, and must have touch screen with at least 5 control keys and volume scroll also must have building speakers with blue tooth port ad large building memory and USB ports in addition to microphone and microprocessor.

Wireless connection problems: All devices must have the ability to connect with other devices in same group, also must connect to the main server in controlling room. All connections will perform network of sensors covers the entire air port and all sections, each Hotpoint must be covered by at least 3 sensors and each point must have specific and unique ID connection.

Security problem: it is the most important issue when the system has network specially wireless network, such security must satisfy privacy of the passenger and data must be stored in database with the ability to access the data y the authorized person, addition to groups, internet, wireless connection must satisfy the passenger security by using user id, password, and network connection password.

Memory Problem: Memory is one of problems that faces this project the memory must be big enough to store all necessary data and programs, multimedia, and settings, in other hand memory must not be bigger than needed because this will make overload on system, memory is fixed can be upgraded t the size of the memory is 10 Giga byte building the device as chipset.

Operating System Problem: is the system that must operate the applications and devices ships RAM and ROM memory ,the System must abele to play multimedia and Store data basic with ports and Bluetooth and wireless Connection, the operating System used in this project is widows SE for mobile, while all application programmed using visual basic dot net 2008 or 2005 windows needs space and microprocessor while visual basic must be able to program mobile application, also VP.net is too heavy on device.

Maps Problem: Mapping the System contains many maps 3Dmaps, 2Dmaps , virtual maps and real time maps the Varity of maps needs different types of programs , some maps such as 2Dmap need just Drawing programs with VB.net, while 3Dmaps needs 3Dmaps auto codes with VB.net to be able to move in 3 dimension , virtual maps need special API and direct X with VB.net to navigate using the arrows to 4 direction and rotations with one speed other map is for commercial that shows specific using movies as 3Dmaps.

Multimedia problem: Multimedia is one of problem, such as problem raise of the different type of multimedia which is shown or used in the device , video for films and advertisement while sound for songs and images for pictures, each multimedia type need specific program to play.

Conclusion

Adopted system in most of airport still paper based till this moment, even the machine that poke ticket for passenger in same airports issues an airport (flight ticket) paper rather than going to the counter desk, then it is still second choice of paper ticket, this mean that special ticket papers are needed and it cost money. In addition paper ticket life cycle is within the waiting to the boarding to the flight and cannot be used outside the airport or reused again. Meanwhile the proposed device is recyclable, it could be used several times and still within airport buildings without extra cost. Guiding, information disk, security, signs are some ways for guiding passengers to the place or gate they want to go to. Employee's works around the clock is needed to cover all passengers all the time. Proposed system will replace them all and with lower price. One problem is that passenger may miss his flight even if there are a lot of people to show and guide him because he must ask for help, also guide couldn't know passenger flight unless the passenger asked for help. The proposed system solved this by using alarm and vibration and flash light to make the guide or the security notice the passenger and help him without in suitable time without waiting the passenger to ask. Also all facility will be shutdown and only the alarm will work so that passenger couldn’t work with anything and had to close alarm by boarding to his gate. Controlling and viewing passenger within the airport building without disturbing other passenger from control room that has the main system and server, the controlling and securing issues will be done minimum number of security guards. Some system may be use for different airports by changing some values such as number of rooms, distributing of departments with the some devices but modified system, so it is possible to use this system to more than one airport. The system is usable for different facilities other than

airport such as train station, bus station, bout station, so the system is re-usable and fixable.

Future works

- Develop System for employees of the airport.
- Develop system that covers train, bus, boat Station and pots.
- Develop OS enhance the system to be uploaded from internet.
- Develop the system to be uploaded to Mobile and Smart device.
- Develop the system to be able to fill the device with money to buy in the airport.
- Add scanner to scan passenger passport and program to pock rather than boarding desk.

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