

A Study on Designing Novel Solutions of Paperless Office - Focus on Tunisian e-Customs Systems

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Abstract

This research aims to study how we can design and develop new solutions for the e-customs system. This study suggests solutions that help to improve paperless office adoption to Tunisian Customs such as the data entry onboard vessels and the exit authorization for customs officers. The first solution will limit the human intervention in entering the data by reading a QR code made by the applicant, and the second software will abandon the use of paper for the exit authorization approval which represents the most complicated procedure in the customs administration due to the intervention of three departments in this process. The goal of this research is to reduce time and cost. This study shows the different steps of realization of the two solutions from designing to testing including developing. This study will help to improve the performance of the Tunisian customs administration and will be the first step for a 100% paperless office.

Keywords: *Paperless, Tunisian, E-Customs, Office, E-Government*

1. Introduction

Paper-based processes involve the handling of the physical document(s), photocopying, archiving, and retrieving physical document(s) from a file cabinet. Paper based processes are inefficient, cost valuable office space, and pose security risks [1][2] Notes that filing systems require a large amount of physical space and rent for physical filing space is about “6 percent of revenue for small and medium firms, and 5 percent at large firms” [3][4] finds that more and more companies and organizations are making the shift toward electronic filing, saving space and increasing security. Digital documents stored on these servers can be easily retrieved within minutes, which increases employee productivity due to the elimination of the chore of searching for misfiled physical documents [5]. However, the Tunisian customs suffer from the paper-based office. In the framework of this study, I will focus on two cases which are Data entry on board of a vessel and Exit authorization for Customs officers.

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In the next chapter, we present the problem statement of the paperless office in Tunisia and we will introduce the solution to resolve it. In the following chapter, we present the conceptual aspect of the application which is the first step before the implementation. We introduce the Class Diagram, Use Cases and the different sequences diagram of the solutions. After having detailed the design of the application, we arrive through the chapter to the stage of realization which describes the hardware and software development environment of the application. In the last chapter, we illustrate the expected goals of those solutions and my future work to improve those applications.

2. Problem Statement

2.1. Problem

The Tunisian government estimate more than one million Tunisians are residing abroad. Most of them live in western European countries and during summer vacation they prefer to go back to their hometown using board vessels. This is because of the cheapest transportation and provided car shipping service.

It is estimated that the number of arrivals through the seaport of “Goulette” in Tunisia is approximately 2000 passengers per day. However, this causes a big issue, where the Tunisian Customs need time and big effort to register all the shipped cars in the customs database.

Several solutions have been considered to solve this issue. One of these solutions is to hire Customs officers on ships that come from the European seaports. The Customs officer enters the information about the incoming vehicles manually on a computer located on the ship and checks their documents. Once the ship arrives, the officer copy all the data on a storage device (flash memory, cd, etc.) and give it to IT service office at the seaport to save it in the main Custom database.

The current solution faces several problems:

- Time-consuming.
- Resources consuming: Customs Officers (4 to 6 in each vessel), Computers.
- Lack of security: data can be modified by anyone.
- Data loss: Storage devices, such as flash memory and CD, have a high chance to be damaged.
- Due to the long time working hours, the officer can enter a lot of wrongs and miss typed information which will affect the customs control job later.

2.2. Exit authorization for customs officers

About 6000 employees are working in Tunisian Customs distributed throughout the country, this makes the task of the human resources department difficult and complex. One of the most critical issues the human resources department facing is the “exit authorization approval”. The Tunisian Customs is considered as a part of the security system in the country where Tunisian Custom agents are subjected to special laws, one of these laws is Departure authorization. The Customs employee cannot leave the country without obtaining exit authorization.

However, the current exit authorization process is complicated and depends on primitive means of data transfer (Fax).

3. Use case Design

A use case diagram is a graphic presentation of the intercommunications among the components of a system. A use case is a methodology utilized in system analysis to recognize, define, and organize system specifications. In the framework of this study, I will try to find solutions to those cases that we mentioned in the previous part. In this study I will design and develop two applications, first one is to facilitate the data entry onboard vessels using QR code technology [6][7][8][9][10], and the other one is Automation of Exit authorization procedure.

3.1. Use cases of facilitation of data entry onboard vessels solution



Figure 1. Use case of a citizen role

[Figure 1] presents the two purposes of the application that the Tunisian citizen residing outside the country is allowed to use, he can insert the information about him and his vehicle, and he can print or download a document including a QR code.

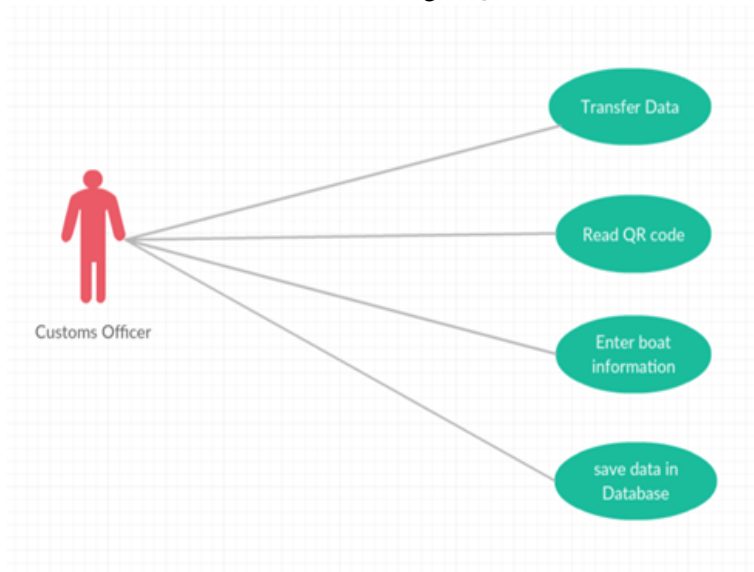


Figure 2. Use case of a citizen role

[Figure 2] clarifies the duty of the user. The main role of the administrator is to manage the users of the application which is divided into three parts: add, edit and delete.

3.2. Use cases of Automation of Exit authorization procedure

The Automation of exit authorization application has seven users; each one possesses a particular duty.



Figure 3. Use case of Customs officer task

This application provides two essential services to the customs officer as presented in [Figure 3]. The first service is to insert the approval data. The second service is pursuing the progress of the approval.

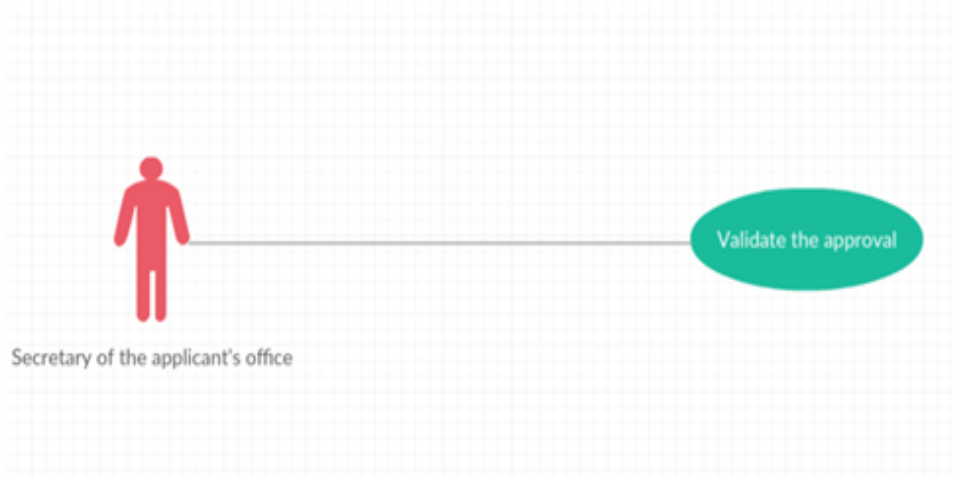


Figure 4. Use case of office secretary task

[Figure 4] illustrates the second main user in this application which is the secretary of the office. Its mission is to study the requirement and validate the information. If the information is correct, the request can be submitted.

4. Conclusions

We designed the Use cases for a paperless office. The current solution of data entry onboard is based on paper. In every travel, more than 500 printed paper and one black toner are used, which cost 55 dollars without counting the price of the printer. In 180 days, the data entry process costs 9900 us dollars. By adopting the new data entry onboard solution, the Tunisia customs administration will save more than 10000 us dollars in three months. In the current solution of data entry onboard, the customs officer enters the data manually.

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