Article

Online Criminal Record Monitoring System for Issuance Certificates of Good Conduct, Life, and Morals in Bukavu

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ABSTRACT

In the Democratic Republic of the Congo, the Ministry of Justice maintains criminal records for individuals with legal antecedents. However, certificates of good conduct, life, and morals are issued by local or district authorities without prior verification of the applicant's criminal record. This is due to the lack of a shared information system between the Ministry of Justice and these authorities. This paper describes the implementation of a platform that allows the Ministry of Justice to share criminal record information with local and district authorities. The system was modeled using the UP7 methodology and the Unified Modeling Language (UML). This platform ensures the reliability of the information provided on certificates of good conduct, life, and morals. Thanks to this new system, anyone with a criminal record is no longer able to hide their past by obtaining a certificate of good conduct, life, and morals that does not mention their criminal record. The results of the tests confirm that the system is user-friendly and meets the requirements of the users.

I. INTRODUCTION

Humans have always needed history to understand the past, compare it to the present, and prepare for the future. Historians rely on a variety of sources, including oral tradition, material sources, and written sources. Written sources are the most reliable and effective, and it is important to preserve them for future generations [1].

It is truly abnormal in a country like the Democratic Republic of the Congo, which is the epicenter of armed conflicts and where the laws of the country are not respected at all, to use the traditional method to preserve information about people's criminal records. This way of doing things does not allow public services that issue the certificate of good conduct, life, and morals to access data on the criminal records of anyone who orders the certificate of good conduct, life, and morals in order to complete reliable information and verify.

The issuance of certificates of good conduct, life, and morals should not be carried out without establishing the accuracy of the information in the criminal records. Therefore, the importance of having reliable information about an individual's legal past is paramount for all municipal offices and the judicial police in the city of Bukavu in order to avoid granting certificates of good conduct, life, and morals to anyone.

Investigations show that more than 5,000 people apply for certificates of good conduct, life, and morals in the city of Bukavu each month. These certificates are granted in most cases without prior review, which is why it is necessary to equip the city with an online criminal record tracking system. This is because, among the people who apply for these certificates, there are often those who have already tarnished their criminal records. In order to erase their misdeeds, they obtain these documents without their past being mentioned. This allows unpatriotic people to hide their true identities.

The lack of close cooperation between the Ministry of Justice, the Criminal Investigation Department, the communal services, and the Court of First Instance of Bukavu contributes to the ease of access to the certificate of good conduct, life, and morals. Therefore, we have implemented a platform capable of tracking the legal pasts of all individuals who want to obtain this certificate.

II. LITERATURES REVIEW

Based on previous research, we have observed that the issuance of documents from public services is done without prior verification. The most requested documents include birth certificates, death certificates, nationality certificates, physical fitness certificates, marriage certificates, celibacy certificates, and certificates of good conduct, life, and morals. Of all these documents, only the certificate of good conduct, life, and morals mentions a person's criminal record. None of these studies have examined the reliability of the information contained in these certificates [2].

In Bukavu, people with criminal records often seek to obtain a certificate of good conduct to conceal their guilt. The purpose of this study is to prevent this from being possible.

Criminal records

The criminal record is a file that records an individual's criminal convictions, and is made available to public authorities. The characteristics of the criminal record, both in terms of its administration and content, can vary significantly from one country to another [3]. Criminal records can have adverse effects whose reach goes well beyond the limits of the formal ramifications of the criminal legal system. These effects have been conceptualised as 'collateral consequences' (hereinafter CCs) [4].

Certificate of good control, life and manners

There is no legal definition of the certificate of good conduct, life, and morals. In this article, we have considered the criminal record to be an administrative document issued by local authorities (registrar or other designated officer), at the request of an individual, for the purpose of verifying their good character and moral conduct [5].

Information system

An information system (IS) is a collection of components that work together to collect, process, store, and distribute information. The components of an IS can include people, processes, data, and technologies [6]. The use of the information system itself is also designed to process various information managed by each company or organization so that the resources needed are not too large and the processing time can be shortened. In addition, managed data can be used anytime, anywhere, so as to reduce existing bureaucracy [7].

PHP5

According to [8], PHP is a scripting language that is executed on a web server and allows for the relatively simple mixing of the structural information of a web page (expressed in the HTML language) and the programming instructions that make the same page dynamic and interactive.

Bootstrap

According to [9], bootstrap is a front-end framework that makes it easy to create a responsive website (adapted to all screens: computers, mobile devices, and tablets) without having to code the entire CSS section. The Bootstrap framework provides a collection of ready-to-use tools and components, such as responsive design, a grid system, stylish UI components, and useful JavaScript functionality. By using Bootstrap, web developers can easily build responsive and attractive websites with a faster development time [10].
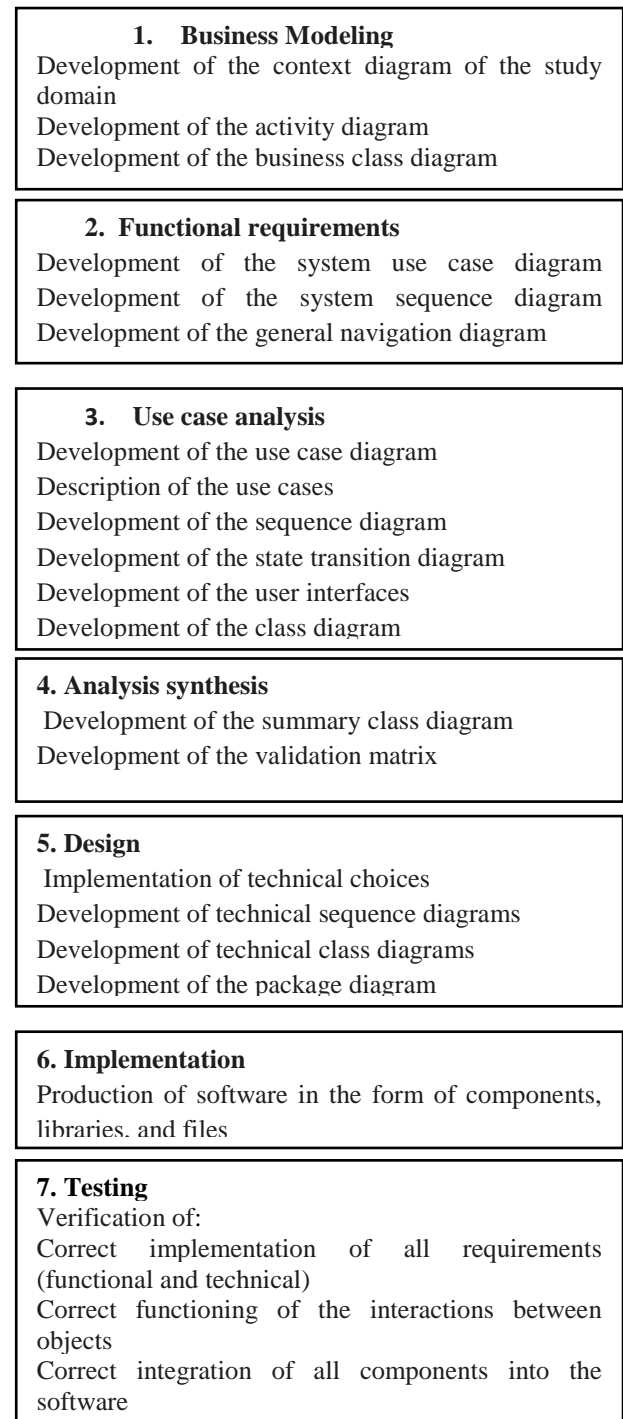
WampServer

WampServer is a web development platform for Windows that provides a ready-to-use environment for developing dynamic web applications using Apache2, PHP, and MySQL. It also includes PHPMyAdmin for managing databases [11]

III. METHODS

Based on the experience of [12] in the implementation of UML-based projects in the

enterprise, we chose to implement our system following the UP7[1] method plan below:

1. Business Modeling
Development of the context diagram of the study domain
Development of the activity diagram
Development of the business class diagram

2. Functional requirements
Development of the system use case diagram
Development of the system sequence diagram
Development of the general navigation diagram

3. Use case analysis
Development of the use case diagram
Description of the use cases
Development of the sequence diagram
Development of the state transition diagram
Development of the user interfaces
Development of the class diagram

4. Analysis synthesis
Development of the summary class diagram
Development of the validation matrix

5. Design
Implementation of technical choices
Development of technical sequence diagrams
Development of technical class diagrams
Development of the package diagram

6. Implementation
Production of software in the form of components, libraries. and files

7. Testing
Verification of:
Correct implementation of all requirements (functional and technical)
Correct functioning of the interactions between objects
Correct integration of all components into the software

Figure 1. The Overall Diagram of UP7 Approach

Due to the number of steps required by the UP7 method, we were unable to present all of the required steps in this article. We have limited ourselves to presenting a few elements, which

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we believe are sufficient to demonstrate the validity of our results.

IV.   RESULTS

Requirement Analysis
Development of the context diagram of the study domain
We present in this diagram how the services that are now involved in providing information on the withdrawal of driver's licenses and criminal records interact.
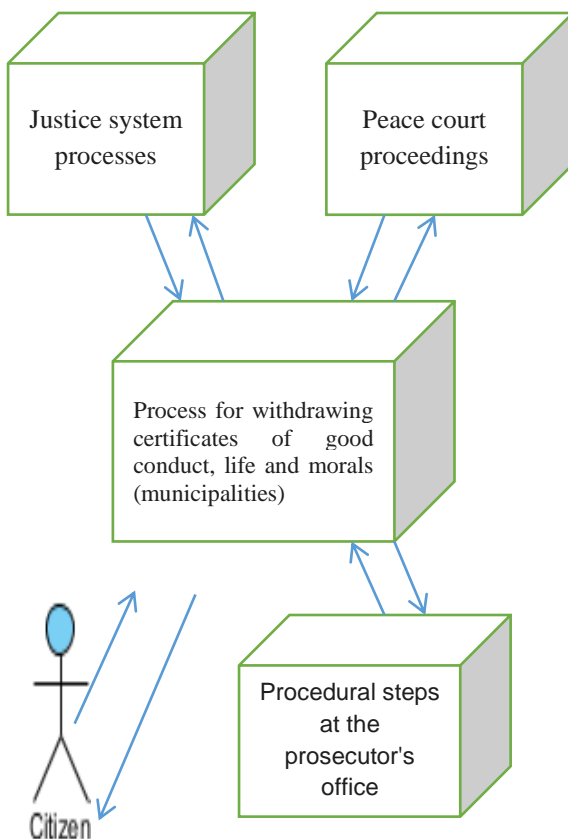

Figure 2. Context Diagram of Study Domain

Activity diagram
Four main actors are involved in the process of withdrawing certificates of good conduct, life and morals:

Communes: The city of Bukavu has 3 communes, Ibanda, Kadutu and Bagira. To obtain a certificate of good conduct, life and morals, you must go to one of these communes. The commune agents who deliver the certificates of good conduct, life and morals

must each log in to their workspace, identify the citizens who come to order the documents, and consult the information related to the criminal records of those who come for the certificate of good conduct, life and morals.

Peace Court: During the last conference of provincial governors held in Kinshasa at the end of August 2011, the governors recommended making the peace courts operational in all territories of the Democratic Republic of the Congo. These courts, considered as local jurisdictions, have a primary mission of bringing justice closer to the people. The peace courts can record information about a citizen, validate a conviction, and consult the information of the citizens' criminal records.

Prosecutor's Office: In the Democratic Republic of the Congo, the role of the prosecutor's office is to investigate offenses and, if necessary, prosecute their authors before the courts. During the investigation period, the prosecutor's office has the power to investigate and perform investigative duties [13]. On the developed system, the prosecutor's office records and validates a conviction, develops a restriction, consults information related to the judicial records, and identifies a citizen.
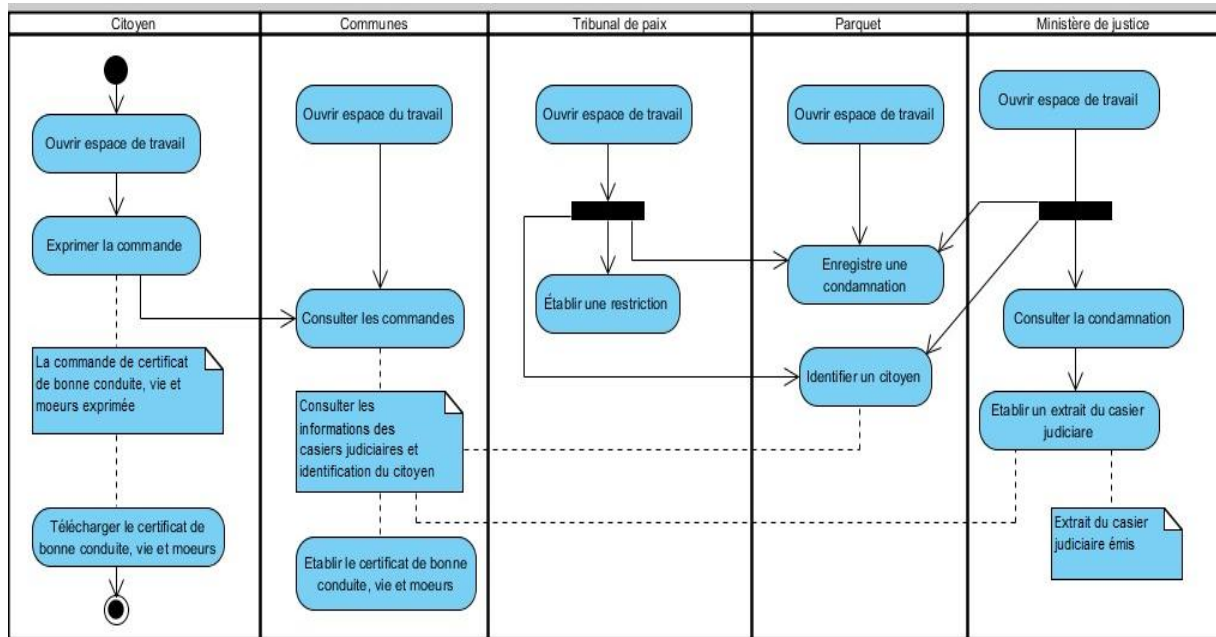
Figure 3. Activity Diagram

Ministry of Justice: The Ministry of Justice of the Democratic Republic of the Congo is the ministry responsible for the administration of justice. On the system, the Ministry of Justice,

is through its skilled services, manages users, establishes a criminal record extract, records a conviction, consults information on criminal records, and identifies a citizen.

Class diagram

A class diagram represents the classes that constitute a system and the associations between them. A class diagram generally expresses the static structure of a system, in terms of classes and relationships between those classes [14].
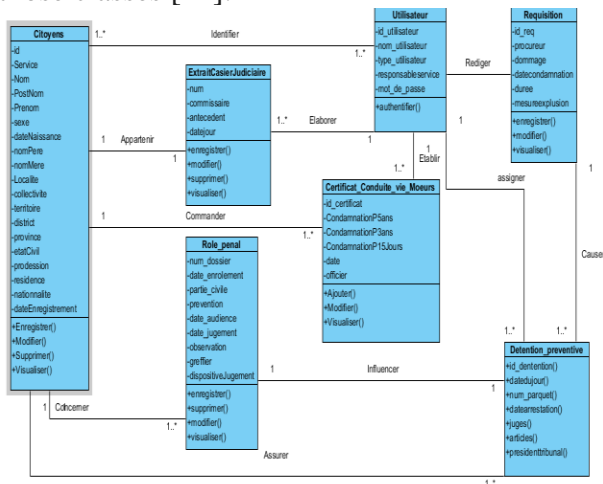
Figure 4. Class Diagram

Here we present the class diagram of our system:

Use case diagram of the online criminal record monitoring system.

A use case diagram a modeling tool used to describe the behavior of a system from the perspective of its users. It is composed of actors and use cases. Actors are external entities to the system that interact with it. Use cases are sequences of interactions between an actor and the system leading to an observable result [15]

For our case, we described the behavior of the proposed system using a use case diagram.

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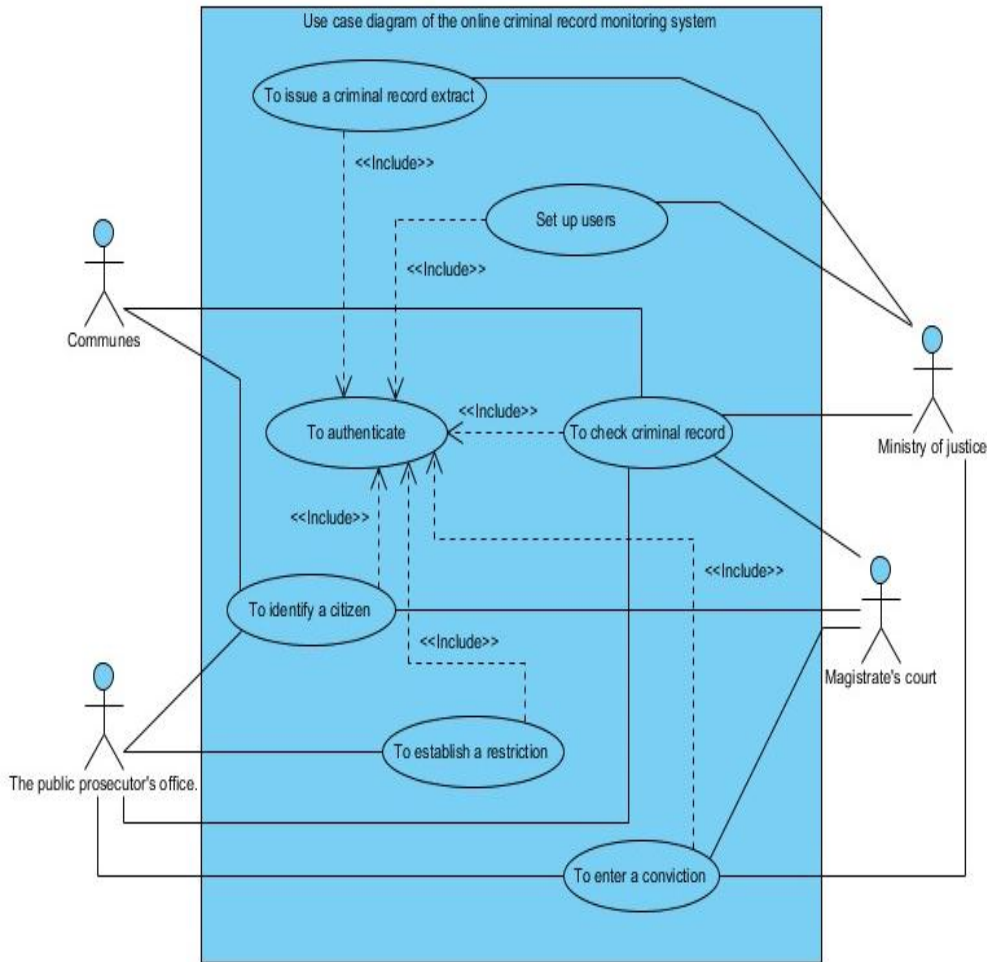
Figure 5. Use Case Diagram

Sequence diagram

A sequence diagram, also known as a system sequence diagram (SSD), is a visual representation of the interactions between objects in a system over time. It's like a detailed timeline of how different parts of a system work together to complete a specific task [16].
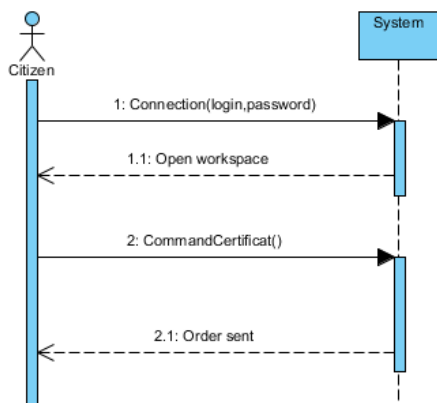

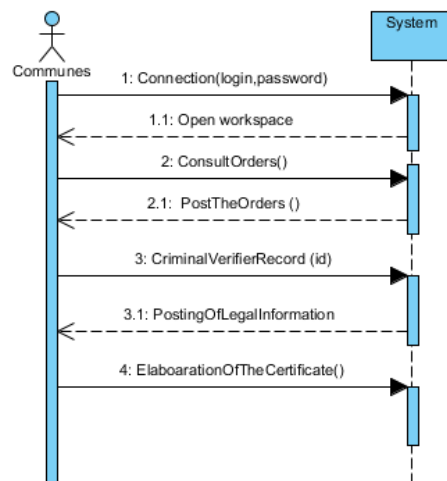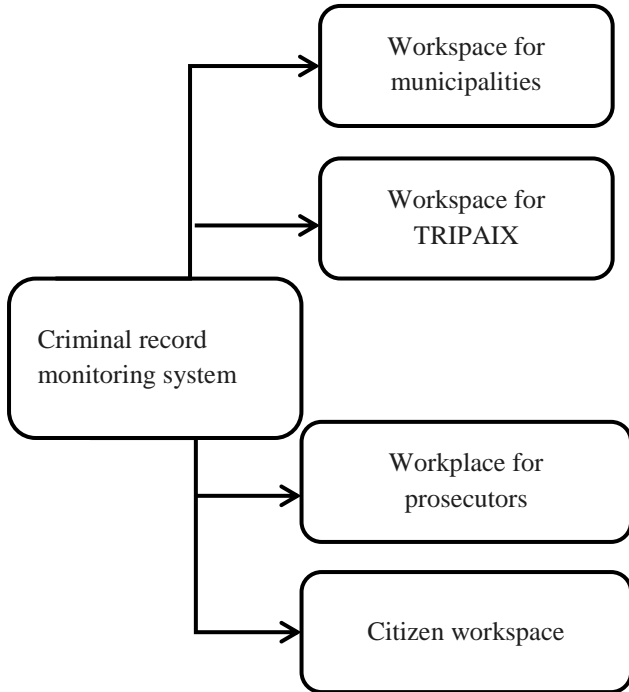**Figure7. Sequence Diagram for Use Case "Generate Certificate"**

Figure 6. Sequence Diagram for Use Case "Order a Certificate"

Design of a general navigation structure With through this diagram of general navigation, we presented the total sequence of the screens.

Figure 8. Design of General Navigation Structure

Design of a validation matrix

The validation matrix helped us to ensure that the use case analysis is comprehensive and that all business use cases are mapped to analysis use cases.

Table 1. Validation Matrix of Use Case Diagram

Business use cases	Analysis use cases
The user management system	Add a user
	Edit a user
Generate a criminal record extract	Delete a user
Register a conviction	Register a conviction
Identify a citizen	Validate a conviction
Authentication	Search for a conviction
Consult criminal record information	Register a citizen
	Edit a citizen
Establish a restriction	Delete a citizen
Issue a certificate of good conduct, life, and morals.	Search for a citizen
	Create an account
	Log in
	Generate a criminal record

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	Register a criminal record
	Update a criminal record
	View a criminal record
	Write a restriction
	Register a restriction
	Edit a restriction
	Complete a certificate of good conduct
	Send a certificate of good conduct
	Download a certificate of good conduct

V. DISCUSSION

System home page

Once the system is accessed, the next page opens and allows users to begin using the system.

Figure 9. System Home Page

Authentication page

Each user must authenticate to access their workspace.
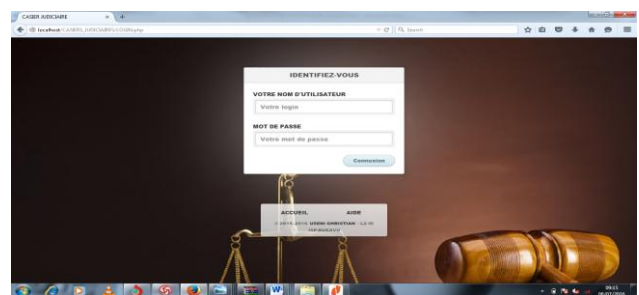
Figure 10. Authentication Page

Municipal work interface

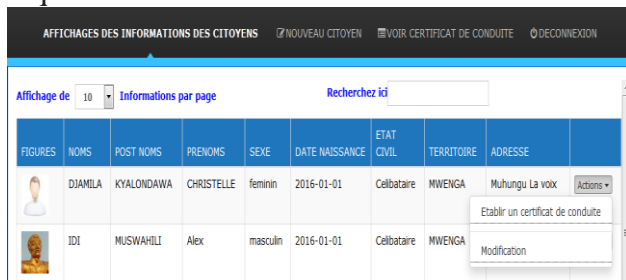Through this space, the civil registry service can produce certificates for those who have requested them.

Figure 11. Municipal Work Interface

A certificate of good conduct, life, and morals

Once the criminal record is consulted, the certificate of good conduct, life, and morals, which contains valid and verified information, is produced.

Figure 12. Certificate of Good Conduct, Life, and Morals

We performed a variety of tests to ensure that the system meets requirements, performs well, and is secure. The implementation tests verified that the system meets the requirements specified in the design documents. The performance tests verified that the system can handle the expected traffic volume. The security tests verified that the system is secure against attacks. After all of these tests, we concluded that the system is ready for use.

VI. CONCLUSION

In the context of globalization, the implementation of information systems is essential. In this paper, we present a system for tracking criminal records online in the city of Bukavu. This system allows communal service agents to access all the information they need to complete certificates of good conduct, life and morals with reliable and accurate data.

Our results show that the system is effective in combating fraud and ensuring transparency in the certification process. We recommend the implementation of an Android application to make the system more accessible to citizens.

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BIOGRAPHY

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