THE UNIVERSITY OF DODOMA



COLLEGE OF INFORMATICS AND VIRTUAL EDUCATION DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING BACHELOR OF SCIENCE IN COMPUTER SCIENCE PROJECT FINAL REPORT

TITLE: Tanzania Local Government Resident Identification System

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CERTIFICATION

This is to certify that "Tanzania Local Government Resident Identification System" project and report have been submitted to the Department of Computer Science and Engineering which is under the College of Informatics and Virtual Education of the University of Dodoma as partial fulfillment of the requirements for award of the Degree for Bachelor of Science in Computer Science in July 2021 by five (5) finalist students of the academic year 2020/2021 named below;

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DECLARATION

We solemnly declare that this project and its report are our works and they have not been presented and will not be presented to any other institute of higher learning in Tanzania and outside of Tanzania for a similar or any other degree award. We will take full responsibility if any plagiarism is found on our work(s).

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Special thanks to our parents, friends, relatives and all strangers who in one way or another provide us with support, suggestion, encouragement and contribution towards the accomplishment of this project.

Thank you.

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LIST OF ABBREVIATIONS

NIDA - National Identification Authority

NBS - National Bureau Statistics

SMS - Short Message Service

RITA - Registration, Insolvency and Trusteeship Agency

TAMISEMI - Tawala za Mikoa na Serikali za Mitaa

LG - Local Government

PC - Personal Computer

JS - JavaScript

PHP - Hypertext Pre-processor

HTML - Hypertext Markup Language

CSS - Cascading Stylesheet

UML - Unified Modelling Language

ERD - Entity Relationship Diagram

DFD - Data Flow Diagram

FAQ - Frequently Asked Questions

HTTP - HyperText Transfer Protocol

CHAPTER ONE

INTRODUCTION

Local Government is a generic term for the lowest tiers of public administration within a particular sovereign state, refers specifically to a level of administration that is both geographically localized and has limited powers. Local Government has the authority to make decision and pass laws to a small geographical areas. It is the first stop for any citizen who is in need of any service from a government.

After decentralization some of the tasks or services have been discharged to these Local Governments offices so as they can directly reach citizens and simplify the task for Central Government in serving its people. Local Government generally act only within powers specifically delegated to them by law and/or directives of a higher level of Government.

The Tanzania Local Government is divided into two authorities which are urban authority and rural authority. In Urban authority the level of powers is from municipal or city or town council to ward then to street. Also under Rural council the level of powers is from district or township council to ward then to village and sub village. Below is a structure of Tanzania Local Government.

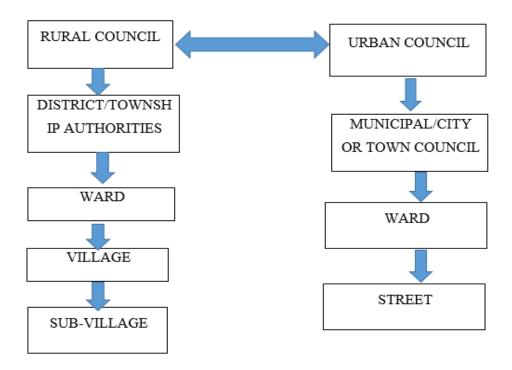


Figure 1: Structure of Local Government in Tanzania

BACKGROUND

Local Governments offers a wide range of service to its resident, one of them being a letter of identification which is mostly used to introduce a person to other organizations (prove that a certain person lives within a certain area). Most Local Governments recognize their residents by asking them some basic questions such as which house do they live and the ten cell leader of the area, a resident may not be able to answer all these questions especially the question like the house number of the house he or she stay.

Since Local Government have no actual information of all the residents living within their area, then there is a high chance of these offices to guess the detail of a resident so as to give him the service he or she wants. People who are not living within the area sometimes may obtain an identification letter from a certain Local Government and use it for a bad intention.

When employing a person in a certain task by certain organizations they sometime requires a letter of identification so as they can know where does a person they are employing is currently living. If there is any case to occur between these two parts then, they can use provided identification letter to know where does a person lives.

Local Governments also serve those residents who wants to shift from one area or street to another with a certain letter which an individual is required to go with it into his or her new area, but most of residents do not know or follow this process, they mostly shift to their new area and rarely report to a ten cell leader of the area, they only report to a Local Government when they are in need of a service from them only.

PROJECT OVERVIEW

This project aims at developing an information system which shall manage and simplify the above addressed activities by ensuring that only registered or known citizens within the area gets the service within a Local Government office. This will help to make sure that a person gets recognized in an identification letter of a Local Government as per area he or she belongs to.

Also with this system, if a person wants to shift to another place firstly he or she has to report to previously residing Local Government office so that they can know that their resident is shifting from their area, then he or she has to report to a newly shifted area Local Government office so

that they can register him or her within their place. A person will be required to report to newly shifted area within a specific period of time (E.g.; a maximum of one month).

To ensure that a person gives accurate details about him or her the system will have to be linked with NIDA database for more information on a person, such that when a person number of identification is entered in the system, other details will be retrieved from NIDA database to the system. This will ensure accurate details of a person are given and no forgery is being done upon registering to the system.

PROBLEM STATEMENT

Local governments can be defined as a sub-national, semi-autonomous level government discharging its functions in a specified area within a nation. It is responsible for delivering a broad range of services to the community. In Tanzania if a citizen is in need of a service in a government office like RITA or NIDA then he or she has to acquire a letter of identification from its resident local government first. These letters aims at reintroducing a citizen from a place where he or she stays.

Most of local governments does not know all details of where there people lives, instead they use ten cell leader letter as identification of an actual place where a person resides within a street. If a person shifts from one place to another then he or she has to report to ten cell leader only (but most of the time people do not report to these leader when they shift to a new place unless they face with some challenge which require their assistance).

Also when a resident is stack when obtaining a certain service from a certain organization which require him or her to have an identification letter so as to make sure a person reside in a certain area, then he or she should have to cancel the his or her plans and make the efforts of obtaining the letter from a Local Government which tends to cost an amount of time. This situation leads to delay of a service to a person which can be solved by ensuring that there is a way for them to obtain this letter from any place without physically going to a Local Government office.

OBJECTIVES

GENERAL OBJECTIVE

The general objective of this project is to develop a web based resident's identification system for local governments in Tanzania. This system will ensure that only authorized or registered residents within an area are getting served by the local government office.

SPECIFIC OBJECTIVES

Specific objectives for our project is as follows:-

- i. To gather requirements from stakeholders (such as TAMISEMI and Local Governments) so as to identify actual requirements for the system to assist during development.
- ii. To design the system according to gathered stakeholder requirements.
- iii. To develop a web based resident identification system.
- iv. To evaluate the developed web based system to check if it meets user expectations.

JUSTIFICATION OF THE SOLUTION

With no doubts we believe that this idea is worth in the society as it will strengthen security within a society. This information system will simplify the access of citizens' information within a Local Government for different activities. With existence of this system we believe that a person who is not a residence of a certain area will not be served by forgery means by that area Local Government office so as he can acquire some service in different institutions.

Also on security concerns, this system will helps to simplify the task of knowing where a particular person who is in conflict with a certain organization lives if he or she is registered within the system. This will save a lot of efforts and costs which that organizations will have to undergo just to locate their person of interest. The system will also enforce people who tends to shift from one place to another to report on their newly residing area within a specific period of time just like other developed countries operate.

SCOPE OF THE PROJECT

This project aims at developing a web based system for Tanzania Local Governments mainly for storing residents' information so as to easily identify them when they are in need of any service within a Local Government office. Also for the case of obtaining a letter of identification, the project will save residents time as there is an online service portal for them to obtain an identification letter directly without going physically to Local Government office.

The project is limited to certain features such as a feature which enable residents to get an identification letter based on his or her details within the system, also a feature which enable Local Government to record residents details within its area (both residents who wants to register for the first time and those who moved to their area while they were registered in other place). On the future the project may be extended to simplify all the activities performed by a Local Governments in Tanzania within the system.

CHAPTER TWO

LITERATURE REVIEW

Information system can be defined as an integrated set of components for collecting storing, and processing data and for providing information, knowledge, and digital products, Business firms and other organizations rely on information systems to carry out and manage their operations, interact with their customers and suppliers, and compete in the marketplace (Zwass, 2020). Also information system may be defined as software and hardware systems that support data-intensive applications (Shasha, Vossen, & Weidlich, n.d.).

Local government has had a mercurial role in recent African history, strong local government is widely regarded as critical to administrative efficiency, citizen participation and regime legitimacy (Samoff, 1989). With the help of information system technology, a company or organization can become competitive in all phases of its customer relationships (Ives & Learmonth, 1984). NIDA is an agency introduced for issuing identification to all residents in Tanzania, these includes migrants with permanent residency in Tanzania, all this was done to strengthen security relations focused on the Rule of Law in the country (NIDA, n.d.).

NIDA records all information of a citizen of Tanzania including where he or she stays at a national level. But when it happens this person shift from one area to another, this updated data is not recorded by NIDA but these newly data would only be recorded by NBS who collects data through census and household surveys every after ten years. This issue may weakens security relations within a country as bad or wanted criminals may live among the society and not be recognized.

Our local governments which operates under TAMISEMI, one of the aims is to ensure law enforcements and protection of citizens but this cannot be achieved if these local governments fails to identify their citizens within the area. (Ilunde, Magoho, Lekule, & Ruchyahinduru, 2012). When employing a person many organizations requires a letter of identification as a document which shows where a particular person lives, but there is this culture of Tanzanians being shifted from one place to another, and this important information is not being recorded in any database of a government thus failing to know where does a certain person lives at the moment.

Ilunde and his colleagues have expressed on how these local governments can succeed in protecting its citizens and ensure law enforcements in the area, which are, despite being

independent in performing their duty also there should exist a way for the local governments to identify their people at a particular period of time. With existing of information system, this task is likely to be succeeded as these offices may know their citizens both who stays and recently shifted within the area as they are required to report to the office as per the rules of the country which nowadays is not being followed at all.

CHAPTER THREE

METHODOLOGY

This chapter will discuss the method used to achieve the goal. Software development methodologies plays a vital role in developing a software the basic purpose of these methodologies is to provide smooth software development according to the project requirements.

Based on this project, the best methodology to use is waterfall model software development methodology. This model is a sequential model that divides software development into a predefined phases. Each phase must be completed before moving to the next phase.

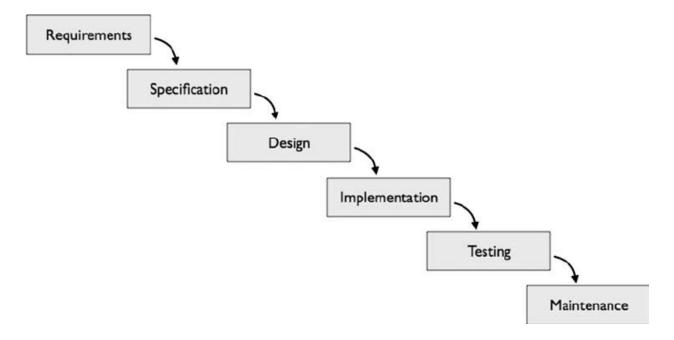


Figure 2: Waterfall Model Diagram

The first two phases (Requirements and specification) of above waterfall model diagram will help in achieving the first objective of obtaining user requirements which will guides in the whole process of development of the system that is acceptable. In order to achieve this interviews and techniques will be used. The advantage of using interview is that it helps to build a deeper understanding about a topic to respondents as a result it becomes easy to learn information that may have missed. Also interviews ensure correct interpretation of the questions.

The second and third objectives will be achieved through design and implementation phases. After acquiring requirements, the interface will first be designed and after that we will implement the back end of the system to accomplish the objective.

On design phase we expect to define elements of a system such as interfaces and data for a system based on requirements, in here we will specify the means by which stakeholders interact with the system. In this phase we will come up with several designs which will help to achieve project result. The output on this phase will be UML schemas, HTML screen designs, flow charts and site trees. The output in this phase will be used as input in implementation phase which will complete second and third objectives.

On implementation phase is where the codes are written by a development team to produce the functionality of a system. The system will be implemented using a Laravel PHP Framework with the help of Bootstrap, HTML, CSS and JavaScript. We will use a Visual Studio Code as a text editor to accomplish this task. On server side we will use Xampp to build a database which will be connected with our system.

On last objective, we will compile our system to a fully working system and perform an integration testing so as to check if the system meets stakeholder demands. When there is any malfunction then the maintenance phase will come into play to fix the defects or bugs so as to have fully working system that satisfy user demands.

The main reason for using this model is that, this model is suited for smaller projects with requirements which are well defined, also waterfall model helps in performing quality assurance test before completing each step so it becomes successfully at the end and lastly is that this model suits a project team that is less experienced

ARCHITECTURAL/CONCEPTUAL DESIGN

In this part we will discuss on how a local government residents identification system will help local government offices serve only registered residents.

When a resident arrives at local government office so as to acquire a certain service, then he should first provide his details so as the office verifies if he is a resident of the area or not, the local government office will verify this details through a local government residents identification web based system and the system will give a result or feedback to local government showing them if a resident lives in an area with all of his or her registered details or he or she is not living in an area and rejecting the service to that person.

Below diagram shows how the local government offices will interact with the system to serve their residents.

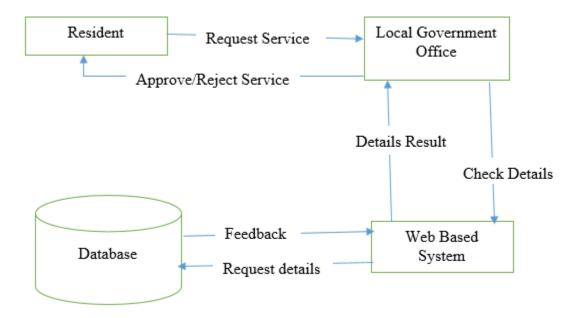


Figure 3: Architectural/Conceptual Diagram of LG Resident Identification system

System Development Environment

- Development for front-end we will use Bootstrap as a front-end library and for backend we will use Laravel framework
- Diagrams Microsoft Visio
- Database management MySQL

HARDWARE REQUIREMENTS

Hardware requirements for developing this information system are as follows:-

- i. Laptop PC
- ii. Modem for internet connection

SOFTWARE REQUIREMENTS

Software requirements for developing this information system are as follows:-

- i. Microsoft Windows 10
- ii. Text editor Visual studio code
- iii. Xampp server
- iv. Composer for managing dependencies in Laravel
- v. Node.js

CHAPTER FOUR

REQUIREMENT GATHERING AND ANALYSIS

As local government resident identification system development team, we preferred to use interview as a tool to collect correct requirements of a system from user. Using series of interview questions we managed to obtain the requirements as detailed below.

The interview was conducted on two local government office since the system is directly affecting their day to day activities more. Special thanks to Mr Bakari Chelangwa (Ilazo Bwawani Local Government office) and Mr Mathias Mkoma (Makulu Local Government office). Both face to face and phone interview was used to help with the task of requirement collection.

The interview questions focused mostly on issues like resident identification and how movement of resident from one place to another is managed. Some of the responses were;

- On issue of identifying a resident, these local government use the method of asking some questions about where does a person live and who is the area leader of the place (sometimes when a person fails to answer some of these questions they just guess the details)
- On issue of resident movements, there is specific letter used to introduce a resident
 migrating from one area to another, when a person migrate he or she first report to a local
 government office to obtain a letter which he or she will deliver to a newly shifting area.
 But in most cases both residents and local government does not follow this process at all.

Based on answer given by respondents we were able to come up with requirements as follows.

FUNCTIONAL REQUIREMENTS

The functional requirements for the local government resident identification system are as follows:

- The system authenticate user (super-administrator, administrator, Local Government) when accessing the system.
- The system super-administrator (operating at national level) will create accounts for administrator (operating at district level) which will be used by district admins to manage their areas.
- The system allows administrator to create Local Government account for Local Government office.

• The system enable Local Government to register or update Local Government details

(residents, houses and ten cell leaders' details) of their area only.

• The system notifies residents about their registration or update status on the system.

• The system allows Local Government to see Local Government details of their area only

• The system provide residents with an online service portal which they will use to generate

or retrieve an identification letter with their correct details as they exist within the system.

EXTERNAL INTERFACE REQUIREMENTS

User Interfaces

The user interface for the system is compatible to any browser such as google chrome, Mozilla,

Netscape, internet explorer etc. the system also provide a user friendly look for good interaction

between user and the system.

Hardware Interfaces

Since the system must be run over the internet from user, all hardware devices shall require internet

connection. Device accessing the system shall be able to connect to internet for it to be able to

access the system. Device which supports:

• Mac or windows operating system.

• IOS (iPhone Devices)

• Android operating system (Android devices)

Software Interfaces

Software interfaces consists of the platform used to develop the system, front-end and back-end

framework, operating systems and libraries.

Platform - PHP

Front-end - HTML5 and CSS3

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Back-end framework – Laravel PHP framework

Library – Bootstrap (Library for HTML, CSS and JavaScript)

Packages – Twilio (Package for SMS notification), SweetAlert (Package for alert upon correct and incorrect events within the system), Laratrust (Package for authenticating and redirecting user to their respective panel upon login).

Communication Interfaces

The system use the HTTP protocol for communication over the internet.

NON-FUNCTIONAL REQUIREMENTS

Performance Requirements

Local Government Resident Identification system is based on web and has to be run from a web server. The system shall take initial load time depending on internet connection strength which also depends on the media from which the product is run. The product depends upon hardware components of users' device. The database for the system is also normalized to prevent redundant data and improve performance.

Safety Requirements

Some of safety requirements for the local government resident identification system are as follows:

- User of the system shall be authenticated when accessing the system.
- Residents' details shall be accessible by respective local government office only.
- Password of user in the database shall be stored in an encrypted format.
- Only registered residents should be able to retrieve a letter of identification from the system.

Security Requirements

Some of security requirements for the local government resident identification system are as follows:

- The system use secure sockets in all transactions that include any confidential user information.
- The system automatically log out a user after a period of inactivity.
- The system never display user's password. It shall be echoed with special characters representing typed characters.
- The system back-end server does not display user's password. The password can be reset but never shown.

CHAPTER FIVE

SYSTEM DESIGN AND IMPLEMENTATION SYSTEM DESIGN

USE CASE DIAGRAM

Use case diagram consists of actors, use cases and their relationships. The purpose of use case diagram is to represent interaction with the system by showing relationship between users and different use cases in which user is involved (Smoliar, Cotterman, Couger, Engel, & Harold, 1983). The system supports three kinds of user privileges which are Super-administrator, Administrator and Local Government staff. Below are some of user class (actors) and their characteristics.

Super administrator is able to do the following functions

- Add and modify administrator details to the system.
- View all Local Government details.
- View all house details for a certain Local Government.
- View all residents registered in the system.

The Administrator should be able to do the following functions

- Create a Local Government account for a Local Government office.
- View all Local Government details of its respective area.
- View residents and house details of each Local Government of his area.

The Local Government should be able to do the following functions:

- Add or update resident details.
- Add or update ten cell leader details.
- Add or update house details in the area.
- View resident details of the area when needed as well as details of residents who retrieved an identification letter or residents who moves from their area to another area.
- Update some of Local Government details (such as Phone number, chairman name and executive officer name).

Also NIDA and SMS gateway will interact with the system as when inputting resident details within a system they must be verified to ensure the details provided by a resident are real details and SMS gateway interact with the system through notifying a resident about registration or update status within a system. So they will appear as actor into a system boundary of Local Government Resident Identification System.

Key:

LG stands for Local Government.

ID stands for identification.

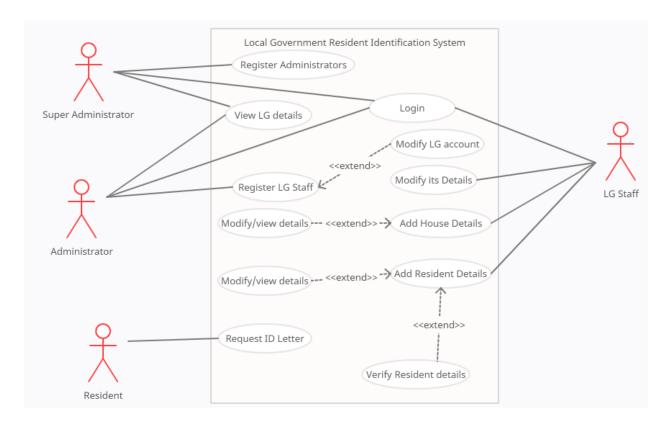


Figure 4: Use Case Diagram for Local Government Resident Identification System

DATA FLOW DIAGRAM (DFD)

This is a visual representation of information flows within a local government resident identification system. DFD is used to show how data enter and leaves the system, what changes the information and where a certain data is stored. The main objective of DFD is to show the scope

and boundaries of a system as a whole (Smoliar, Cotterman, Couger, Engel, & Harold, 1983). Consider the following DFD diagrams (figure 5 and 6);

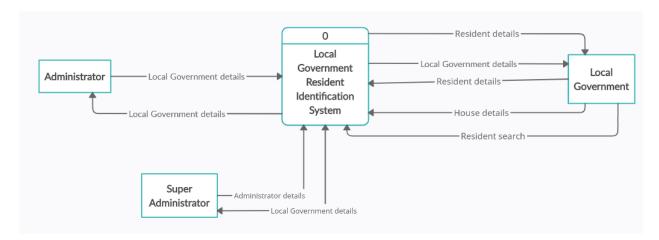


Figure 5: Local Government Resident Identification System Context Level Diagram

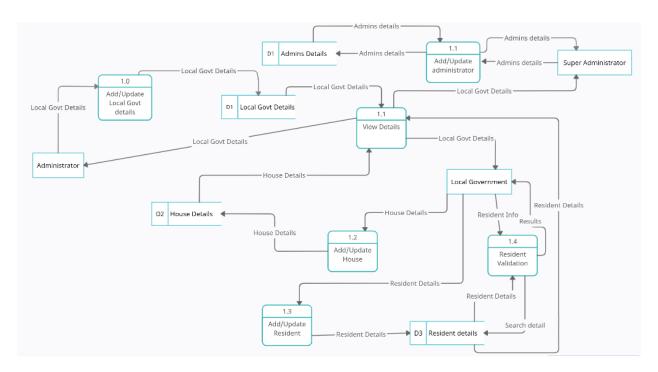


Figure 6: DFD Level 1 of Local Government Resident Identification System

ENTITY-RELATIONSHIP DIAGRAM (ERD)

This diagram is commonly used in database design. It consists of entity types and specifies the relationships that can exist between entities (Smoliar, Cotterman, Couger, Engel, & Harold, 1983). Below is ERD for local government resident identification system.

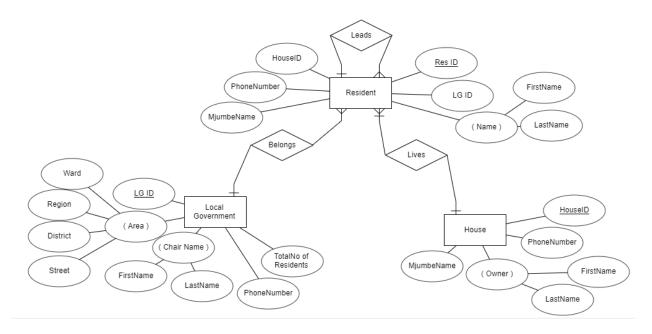


Figure 7: Entity Relationship Diagram of Local Government Resident Identification System

The above ERD stores several kinds of details, some of the information stored within the system are as follows

House details

It includes house number (HouseID), the name of house owner, ten cell leader name (Mjumbe Name) and phone number of house owner and status to indicate whether the house is private house or renting house. This will be retrieved from the database when registering a resident. This details may further be used in new features (such as revenue collection etc.)

Residents details

It includes resident ID, resident name, phone number, ten cell leader name (MjumbeName), house number he or she lives. A resident may also be a ten cell leader

Local government details
 It includes Local Government ID, Local Government area, Local Government chairman name, Local Government total number of residents and Local Government phone number.

From the ER diagram above, the relationships details are:

- Many residents belongs to one local government Belongs relationship
- A resident (ten cell leader) may leads many other residents Leads relationship
- Many or One resident lives in one house Lives Relationship

SYSTEM IMPLEMENTATION

Upon successfully system implementation, below are some of the screenshot of the system

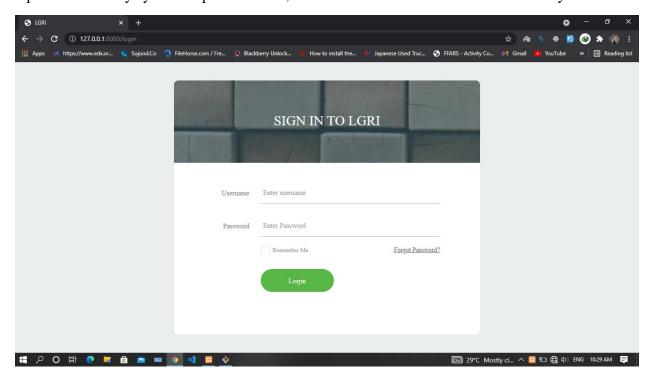


Figure 8: Login Page of the system.

Above is the first page once a user access the system, he or she will first be authenticated and redirected to his or her respective panel as per user role.

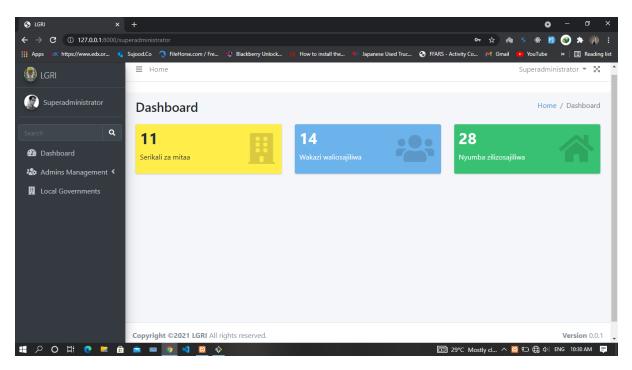


Figure 9: super-administrator dashboard

Upon successfully authentication of super administrator, above is the dashboard which shows him all registered details nationwide.

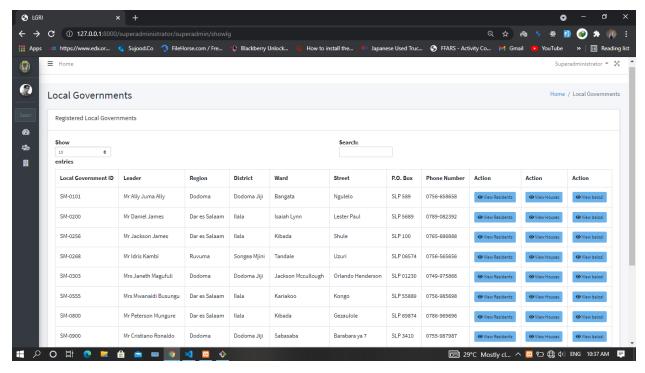


Figure 10:super-administrator page to show all Local Governments and their details Above page allows super administrators to access all details of each Local Government.

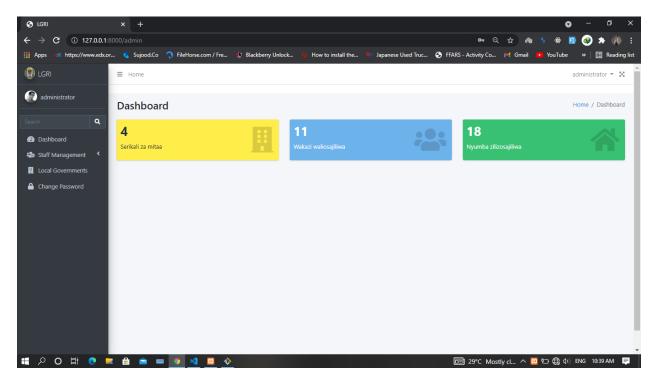


Figure 11: District Admin dashboard page

Above is dashboard page of district administrator once successfully authenticated, as shown he or she can only see the details of Local governments in his area only (District Level). And on Local Governments menu in sidebar, he can see the details of each Local Government (details such as Residents, houses and ten cell leaders detail).

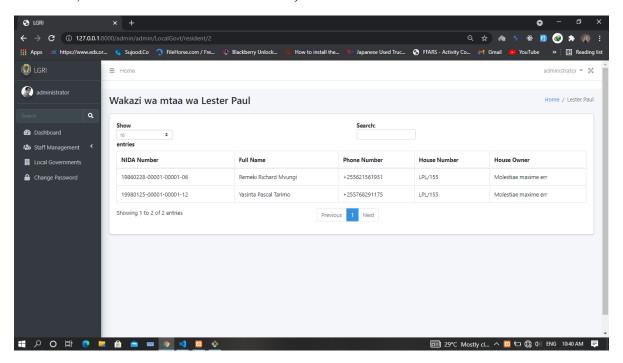


Figure 12:Residents details in Lester Paul street accessed by a district administrator

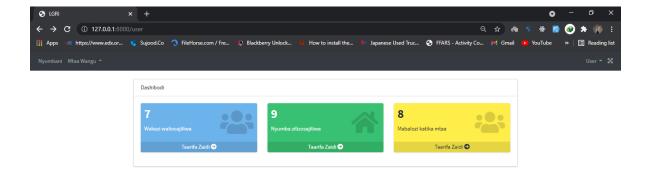




Figure 13: Dashboard for a Local Government account after successfully Login

After a Local Government is successfully authenticated he or she can access the system, above is the first page to be accessed. Within the system he can ten cell leader details, house details and lastly after houses and ten cell leaders is a resident details.

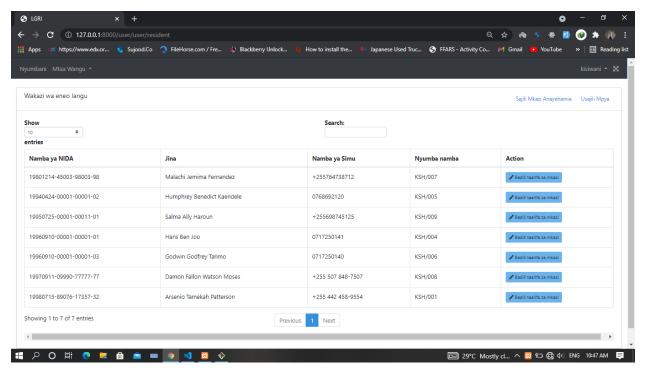


Figure 14: Residents page

Above page is where a Local Government is allowed to add resident details of their area (on Usajili mpya button), or change details of residents when they shift (on Badili taarifa za mkazi button) and also (on Sajili mkazi anayehamia) is where a Local Government can register a resident who is moving to their place and previously was registered from another area.

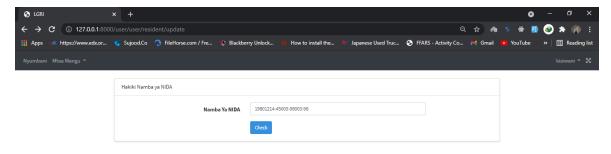




Figure 15: Verifying Resident detail page

Above page is used to verify resident details by using a NIDA number provided by a resident, once the number is checked then it will return all the details about the resident as shown below.

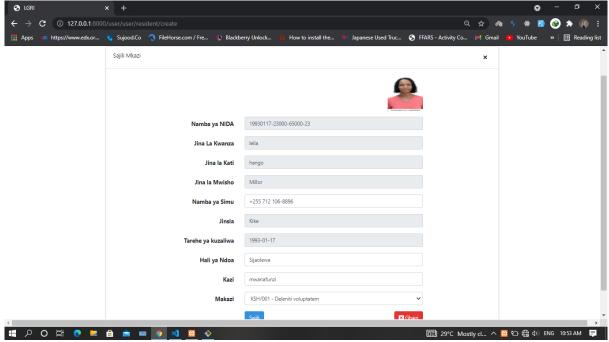


Figure 16: Resident details retrieved from NIDA

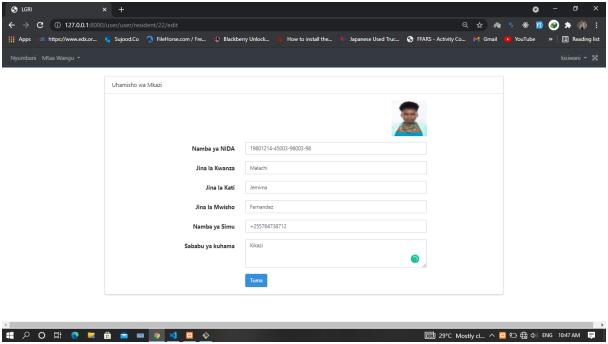


Figure 17: Resident details filling when shifting

Above page is where a Local Government will fill the details of a resident who is moving from their area, once the detail are filled the resident will be informed through SMS notification about the status and he won't be able to obtain a letter of identification unless registered in her new area.

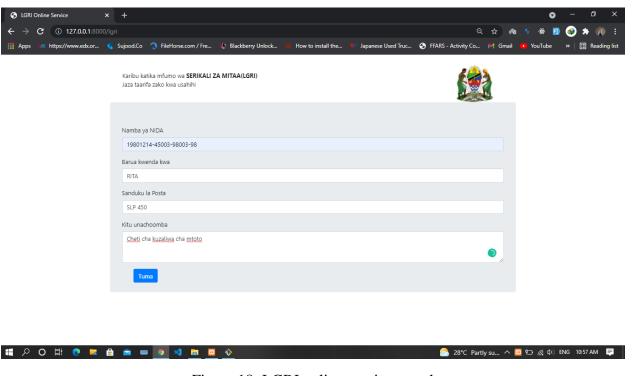


Figure 18: LGRI online service portal

Above is the portal where a resident will access to obtain a letter of identification, by just filling some details as shown above. Once submitted the letter will be generated as shown below.

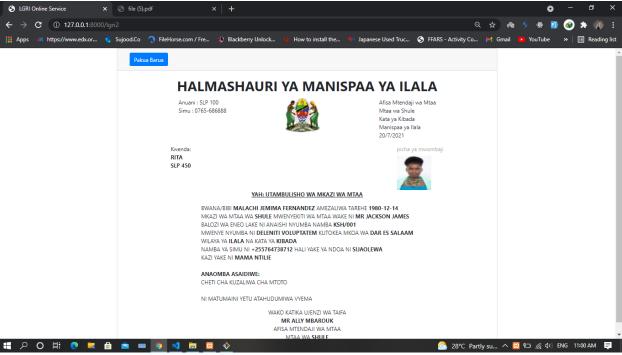


Figure 19: Generated letter of identification

The letter may be downloaded once a user is satisfied and the Local Government will get the notification that certain resident in their area have obtained a letter of identification from the system and all details. Below are sample of SMS notification sent to resident.

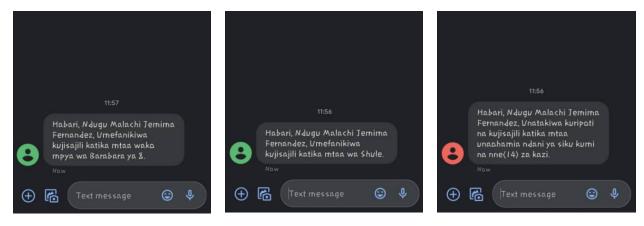


Figure 20: Sample SMS Notification sent to residents

CHAPTER SIX

CONCLUSION

The aim of this project is to help Local Governments in serving their customers without asking them some questions to prove that they belong to the area, also to ensure that no more forgery of information by individuals when requesting a certain service that require them to have an identification letter. The project also aims to save the time a person takes to obtain an identification letter from a Local Government of his or her area.

On the future the system may be extended to satisfy or simplify all the activities of Local Governments such as revenue collection as well as may be used during census activities which is conducted every after 10 years in Tanzania, since the system will seems to have all the details about people within a country and which place has how many people during a certain time.

RECOMMENDATION

The developed system will allow all Local Governments in Tanzania to have a proper handle of correct information about their residents. We recommend Local Governments to adapt into this new technology as the world is now in advance and the paper era is not environmental friendly.

In addition, we recommend that for anyone who will be interested in making improvements and further development of this project he/she is welcome to do so since the field of engineering is all about effective and efficient problem solving which can help most of us develop our ideas and help hundreds of thousands of Tanzanians using science and technology.

Due to our strong personal opinion, we wish to stress that whoever want to perfect this project let it not be a copy paste work but instead let new ideas flow into the system for more improvements to the system.

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APPENDICES

APPENDIX 01 – Interview Questions Used

- 1. Je ofisi yako inatunza taarifa zozote juu ya wakazi wake? (Taarifa ambazo zinaweza mtambulisha mkazi wa eneo kama mkazi halali)
- 2. Vitu gani vinahitajika kwenye usajili wa mkazi katika eneo lako?
- 3. Vigezo vipi vinatumika ili kumuhakiki mkazi kama mkazi wa eneo lako na kuweza kumpatia huduma anayohitaji kutoka katika ofisi yako?
- 4. Je kama mkazi si mkazi wa eneo lako na anahitaji huduma (kama barua ya utambulisho wa mkazi) kutoka kwako, ni huduma au ushauri gani mnampatia mkazi wa aina hii ili aweze kupata huduma atakayo?
- 5. Kama mkazi amehama makazi yake, je kuna taarifa yoyote inayoletwa kwa ofisi za serikali za mtaa?
- 6. Kama mkazi amehamia mtaani kwako, je kuna utaratibu wowote wa kutoa taarifa za ujio wake kwenye ofisi za serikali ya mtaa?

APPENDIX 02 – Current form used as an identification letter



Figure 21: The current form used as a letter of identification