EGERTON UNIVERSITY

NJORO MAIN CAMPUS

COMPUTER SCIENCE DEPARTMENT

SYSTEM REQUIREMENTS SPECIFICATION (SRS)

IMMUNOTRAK VACCINE STATISTICS TRACKING

PROGRAM: BACHELOR OF COMPUTER SCIENCE

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1. Introduction

This is the eye of the system designers where they will use this as the checklist of what the system is comprised of and all the functionality of the system together with how it integrates with other existing systems

1.1 Purpose

This document is a blueprint for the designers to get to know the requirements of this system. It helps them identify the particulars in regard to requirements of the system. Requirements are what the system will require for it to function or operate optimally.

1.2 Scope

ImmunoTrak is a vaccination statistics monitoring web application that helps in ensuring children receive their vaccinations and keep track of areas that need more focus in immunization campaigns.
This will made possible by sending reminders to mothers the immunization schedules for their children when they are near.
The reminders will made through a text message sent to parents or guardians to the child.
This system should achieve its goals of reminding and keep a record of medical history of children and parents.
This software will also be an informative tool for guardians on how important a particular vaccine to be administered is to the child.
Lastly, the ImmunoTrak system will also be a broadcaster tool of important information concerning children.

1.3 Definitions, Acronyms, and Abbreviations.

MHO – Medical Health Officer

Admin – Administrator

API – Application Programming Interface. This is a set of functions and procedures allowing the creation of applications that access the features or data of an operating system, application, or other service

CRUD Operations – Create, Read, Update and Delete operations per

1.4 Overview

This document is an executive in depth understanding of ImmunoTrak. Feature discussion and system interfaces will be discussed in order for the system's objectives and goals to be understood and the essence as to why the system in terms of how it will bring changes to the medical field and particularly to children's health and reduction in their mortality.
Users of the system will also be discussed and how they are interfacing with the system.

2. The Overall Description

This software will ensure that children receive their immunization vaccines when their time for administration reaches. A reminder will also be sent to the parent / guardian of the children stating the due date for the visit and the importance of that vaccine.

This system will also generate a report stating the children who have not gone for their scheduled immunizations. It will also ensure that a vaccine is administered once for every scheduled immunization exercise.

2.1 Product Perspective

This software is a standalone web application that is mandated to remind and send notifications, reminders and convey important messages relating to child immunization.
The medical facilities are also mandated to ensure that the patients (in this case the children scheduled for immunization) are reminded of the visit check-ups. This system will take care of that process.

2.2 External Interface Requirements

2.2.1 User Interfaces

The users of the system will be able to interact with the system through the web pages that will displayed on the web browser that are composed of Graphical User Interfaces that are known and universal to users.

This web pages will be composed of web components that are official and simple colours will be used.

We shall have forms that will be filled especially when inputting in data or registration of new staff, new children and new visits to the health facility.

2.2.2 Hardware Interfaces

Any device that connect to the internet and has a browser can have access to this software.

2.2.3 Software Interfaces

MySQL database version 5.5 will be used as the main database management system for this project. The database will connect to the software via the JDBC driver that makes it possible for the application to make seamless communications with the database.

The charts API used to display the graphical representation of the data from the Django web app is the Chart.js framework. Its integration within the project's web pages is essential to give a real time representation of the data mirrored by the application. This is essential since it will give the user a solid perspective and provide a dimensional prerogative that will help them easily analyze the data.

This software will be deployed on a server. The server can run on any Operating system as long as the dependencies of the software are installed on it. The server should have the MySQL database installed, the required version of Python and the Django framework. The server should also have python pip installed that will be essential in installing the required packages in the application.

2.2.4 Communications Interfaces

Being a web application, HTTP will be the main communication protocol to serve pages to users of the system.

REST will be the architecture used as web services which will make it possible to transfer data to and from the user's side on the browser i.e. charts and the data.

2.1.6 Memory Constraints

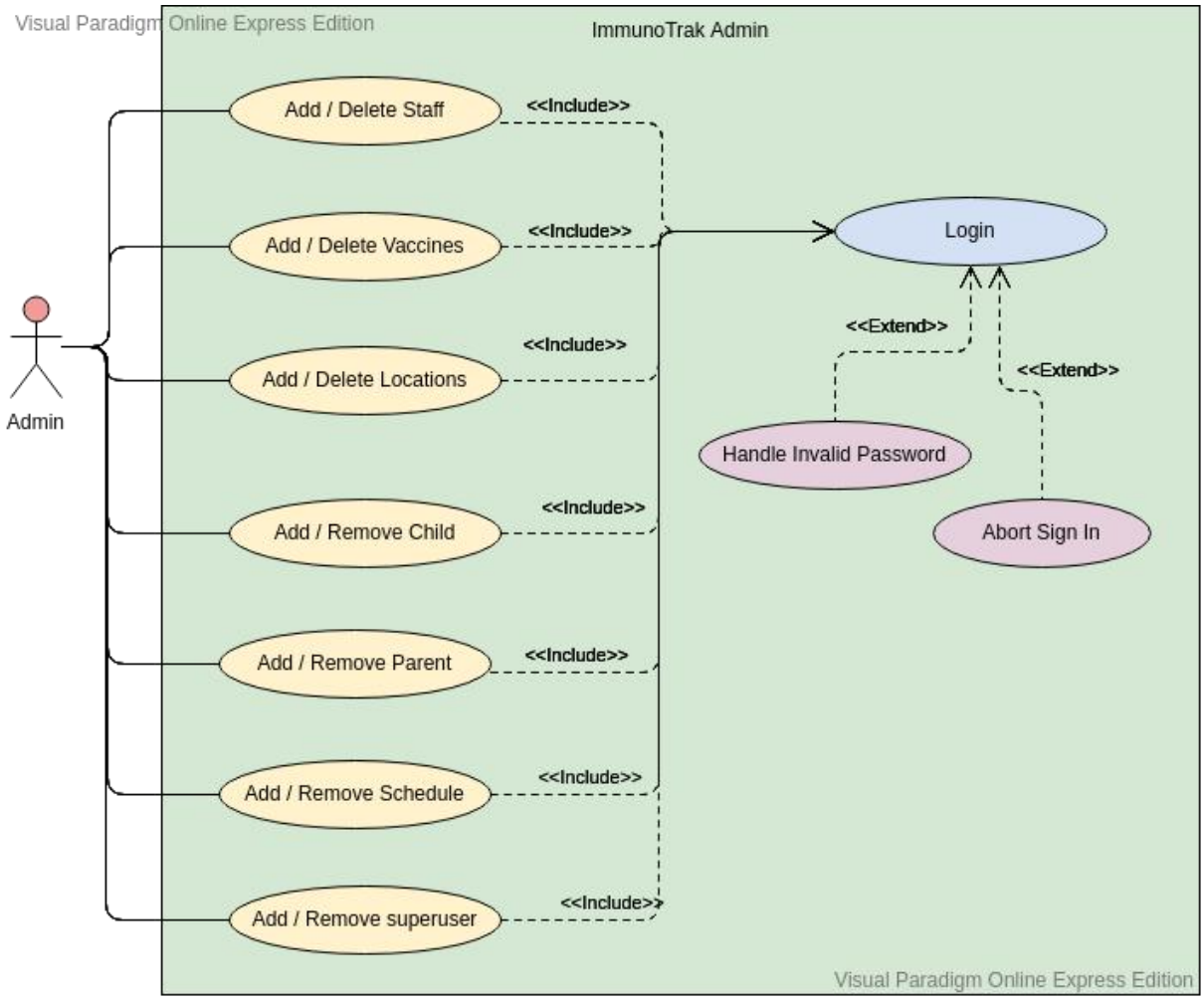
The system does not have any memory constraints since this is a web application that most of its code runs on the host's server.

2.1.7 Operations

The system has to check the current date and compare with that stored in the database which then triggers an automatic delivery service operation if the dates match. This has to be a process that is initiated when the system starts running. Being a web application, this will run when the system is deployed onto the server.

3. System Features

3.1 ImmunoTrak Admin use case



3.1.1 Description and Priority

This is the administrator of the system. Its functionality has the highest priority. He is the one who interacts with the system more than any user. The Admin has direct access to the models and the database.

3.1.2 Stimulus Sequences

This use case is tasked with a number of activities.

- Adding staff

A nurse and a physician are the roles to be added as the new staff for they are the users of the system. This user will also add new staff to the system. Their use cases for the staff added will be discussed below

- Removing a staff member

In case the staff is relinquished off her/his duties or change of role, her/his record is removed from the system since (s) he won't be a user of the system anymore.

- Adding new children and parents/guardians to the system

  New children's details have to be taken to make a new record. This will then be linked to their parent/guardian's if their records exist, or make a new record for them if it is their first visit to the facility.

- Adding new vaccine record and their schedules to the system

  New vaccines and their dosage timelines will have to be input into the system so as to notify guardians when their due administer period reaches.

- Removing a vaccine dosage from the system

  In case a vaccine is not needed either because of its ineffectiveness or side effects, it has to be removed from the system by this user.

- Sending broadcast message

  Apart from reminders sent i.e. immunization reminders, important information may be broadcast to parents. This may be for example a polio vaccine that is not in their schedule, health education message or in case of an outbreak.

3.1.3 Functional Requirements

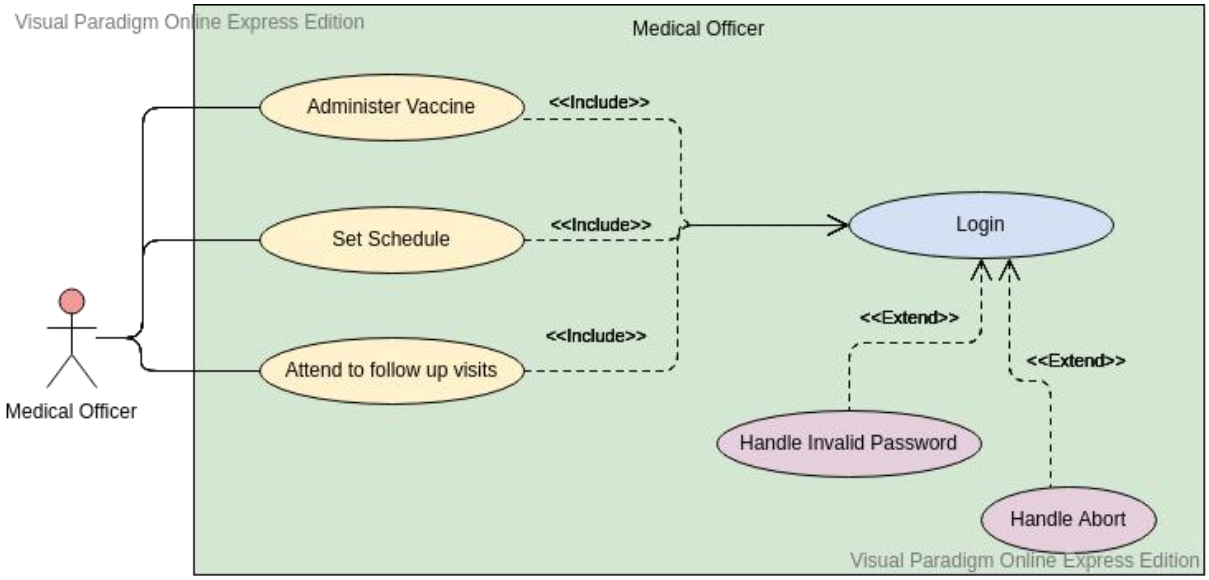
REQ-1: Authentication

The system has to authenticate this use case when the user needs to login to the system

REQ-2: Authorization

This user being an administrator, the system has to identify the role of the user and admin rights granted to the user after login.

3.2 Medical Health Officer use case



3.1.1 Description and Priority

Has a low priory. This use case is tasked with a few tasks that are not very critical in comparison to the objectives of the system.

3.1.2 Stimulus Sequences

This use case is tasked with a number of activities.

i. Administer vaccine

A record to show that a child has been immunized has to be taken

ii. Maintain the immunization checklist

Maintain a visit checklist for the children who are supposed to visit the facility for their immunization check ups. Also includes follow up vaccinations and visits.

iii. Setting schedules for the children

In the case of vaccinations that have to be administered over a certain period of time, follow up schedules can be to ensure the vaccines work as they should.

3.1.3 Functional Requirements

REQ-1: Authentication

The system has to authenticate this use case when the user needs to login to the system after entering the required credentials.

REQ-2: Authorization

This user being a Medical Health Officer, the system has to identify the role of the user and normal user rights granted to the user after login.

REQ-3: Reservation

The system should be able to make special reservations for special schedule visits created by this user.

3.1.2 Stimulus Sequences
This use case is tasked with a number of activities.

i. Sending messages

   Sends the reminders to parents or guardians for immunization of children.

ii. Return a delivery report

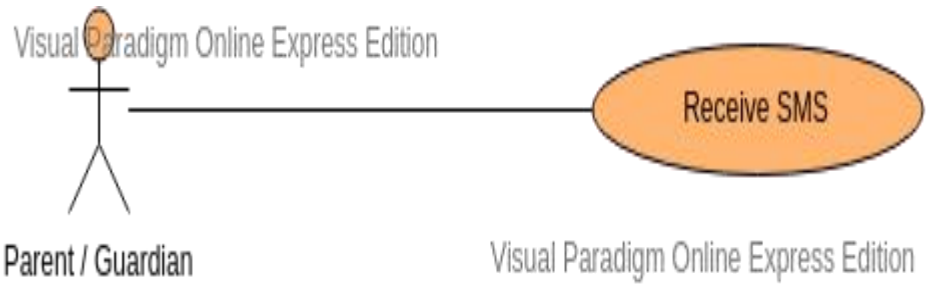
   Returns a list of those who have received the message

3.1.3 Functional Requirements

REQ-1: Delivery Report generation

The system has to authenticate this use case when the user needs to login to the system after entering the required credentials.

3.4 Guardian use case



3.1.1 Description and Priority

This is a recipient of reminders sent. This use case has a low priority since it does not interact with the system directly. It is on the receiving end of the system.

3.1.2 Stimulus Sequences

This use case is tasked with a number of activities.

i. Receives messages

   Will receive messages sent by the messaging API service.

3.1.3 Functional Requirements

REQ-1: Phone number validity

The system has to ensure that the recipient's phone numbers are in their correct format.

3.6 Software System Attributes

There are a number of attributes of software that can serve as requirements. It is important that required attributes by specified so that their achievement can be objectively verified. Below are a few of the non-functional requirements that will be portrayed by this system

3.6.1 Reliability

This system will have to meet the needs of the users and the health facility that is using this system. The health facilities will depend on this system to ensure that parents and guardians are notified to attend to their children's immunization schedules in time and as required. The system has to deliver without fail.

3.6.2 Availability

This software will run 24/7 because the system will depend heavily on the system date to know the expected date to send the messages to the parents / guardians. The system will be comparing the current date with the expected date for the guardian to visit the health facility for an immunization schedule with their child(ren).

3.6.3 Security

This system will be developed using Django framework whose security is handled by Django Web Security and authentication. This ensures that only authorized users of the system are able to access and alter the data. Users will be given granted authority to access different pages. The administrator will have the highest security privilege rank. Normal users will not be able to access the administrator's page.

Passwords are encrypted and hashed before being stored into the database. It uses the most secure encryption algorithms that is hard to crack.

Logs are also kept for future references so that the developers will be able to know where, what and when the system is crashing or misbehaving.

3.6.4 Maintainability

Detailed documentation of the system will be done to ensure that anyone with responsibility of maintaining the system in the future will be able to do so with little struggle.

The code will also be well organized and simple functions will be used without compromising the integrity of the code. This will increase the readability of the programming language used.

3.6.5 Portability

This being a web application, it is machine-independent. Users will be able to interact with the system on whatever underlying operating system their devices are running on.

The system will be deployed on any server running any operating system because this system will be programmed using Python. The python interpreter works the same way across all platforms hence the application can be considered machine-independent.

6. Model Template View (MTV) Analysis of the project

This section presents a list of the fundamental apps (loosely-coupled components) that will be modified and later combined to form a fully functioning application to satisfy the system's requirements. The purpose is to provide an alternative structural view on the requirements stated above and how they will be satisfied in the system.

6.1 App layout (modules)

These are the loosely coupled elements and components (apps) that will be later combined to work in conjunction with each other. Every app / module had a combination of its own components (models.py, urls.py, views.py, admin.py, apps.py and tests.py).

6.2 Project Apps

This are the apps found in the system.

i. trak

ii. schedules

iii. charts

iv. vaccines

v. children

vi. locations

6.2 Templates

These are the HTML pages that are rendered on the web browser based on the request and responses mirrored from the web application.

They include:

- home.html
- chart.html
- login.html
- log_out.html

- Parent_list.html
- Vaccine_list.html
- Locations_list.html
- tables.html

6.3 Views

Every app has its own definition on the models, urls and views. The views defined in that particular app determine what is rendered in the web browser.

6.4 Service classes

These are the classes that hold the business logic for the system. Currently the system has none, but they'll be added in the next release of the software.

References

1. World Health Organization (WHO - www.who.int)
2. UNICEF (https://data.unicef.org/topic/child-health/immunization/)
3. World Atlas Organization (https://www.worldatlas.com/articles/immunization-against-preventable-disease-the-highest-rates-of-youth-vaccination-worldwide.html)