Middlesex University Mauritius

FACULTY OF SCIENCE & TECHNOLOGY

CST3990

Undergraduate Individual Project

SCHOOL OF DIGITAL TECHNOLOGIES

PROJECT PROPOSAL

PROJECT TITLE: Hospital Management System

Name: Pavan Hanjary

Student ID: M00912754

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3 Background of study

Healthcare is the most important aspect of our society without which the life expectancy of humans would drastically decrease. Health care providers face many challenges to offer their service to numerous patients on a daily basis. Handling the records of such a large number of patients can be tedious and difficult. This is where health management systems help accomplish this task effectively and efficiently (Mocdoc.com, 2024).

In Mauritius, public hospitals use paper-based methods to keep track of patient's medical histories and treatments. This involves doctor's notes, laboratory results, radiological investigation and medication history. Using the traditional paper-based method for record keeping gives rise to problems like misplacements, inaccuracies and difficulty accessing records when needed. In the healthcare system, these issues can be life threatening to patients due to delayed access to their medical history. Nowadays, technology is taking a leap in every sector, and it can be beneficial in the healthcare system of Mauritius to increase the efficiency and effectiveness of medical care by switching to digital record-keeping systems (Diaz et al., 2024).

4 Problem statement

As mentioned above, Mauritius uses a paper-based method to store patient records. The latter causes a plethora of challenges for the healthcare sector. The following list outlines the issues faced which leads to need for an improved hospital management system:

1. **The limitation of storage**
   Medical records use up a lot of space, specially in hospitals with high inflow of patients. With increased number of patients, it becomes costly to upscale storage space to accommodate the records of new patients (John, 2022).

2. **Limited backups**
   Physical files once lost is irreversible and may have life threatening consequences to some patients. With physical medical records, the risk of damaged files due to unforeseen circumstances like a fire is high. With no backup available of the records, it becomes impossible to recover lost information.

3. **Higher risk of errors**
   Paper records are time consuming and more prone to errors. Different handwriting of doctors can lead to others misreading crucial information such as giving the wrong medications to a patient (John, 2022).

4. **Difficult to share information**

With paper-based medical health records, it is difficult and time consuming to locate and share critical patient information across different healthcare providers and across different departments. This lack of accessibility can slow down decision making and affecting patient outcomes (Ehrinpractice.com, 2024).

5 Description of project

Our hospital management system, SmartCare is a web app which will be designed to improve the management of health records by storing medical records in a digital format. It will aim to reduce the issues faced by hospitals in Mauritius and provide more efficient healthcare services.

For doctors, the web app will allow them to log into the system and view patient records. They will be able to write surgical notes, emergency notes, write prescriptions, give appointment details, upload radiology reports and other tests for lab investigation.

The patient will be allocated appropriate appointment dates which will be assigned using an AI appointment scheduler and patients will be notified through email of their next appointment. This system will help decrease manual labour and automate the system for efficient healthcare services.

Additionally, health records will be stored in such a way to enable interoperability with other public hospitals. In the event where a patient is being treated in another hospital, their record will be available.

5.1 Aims and objectives

5.1.1 Aims

The aim of this application is to increase the effectiveness of the healthcare system in Mauritius as well as to automate tasks to reduce the manual workload.

5.1.2 Objectives

The main objectives of the application are outlined below:

- Requirement analysis and planning.
- Design a user-friendly frontend for users of every age and technological background.
- Using AI to create a model for automatic appointment scheduling.
- Use appropriate technologies to enable interoperability.
- Implement proper security to prevent loss of data or illegal access to patient's personal data.
- Testing and quality assurance of the application to ensure maximum user satisfaction.

- Proper evaluation of the system to suggest improvements for the future.
- Proper documentation of all the steps involved in the project.

6 Key activities of the project

6.1 Development methodology

For the development of this application the agile methodology will be used. The app will consist of short sprints and increments. The feedback from supervisors will then be used to make the necessary modifications to ensure better end product. The agile method is more suitable as changes can be easily made compared to the waterfall method where the development lifecycle must be restarted to implement new features to the application.

Figure 1 - Agile method

(Michaud, 2024)

6.2 Literature review

A literature review will be conducted before starting the design of the application. This will involve reading and summarising scholarly articles, journals and articles related to the topic so as to identify related projects. A critical analysis of the related projects will be conducted to find gaps and problems to help improve the currently available systems. Some of the sources where information will be gathered are Google Scholar, Springer, IEEE Xplore among many other relevant sources.

6.3 System analysis and design

Thorough research will be carried out on existing technologies that can be used to implement the features of the project. The different technologies will be compared to, and the most appropriate ones will be chosen. For the frontend of the application, wireframes will be created and will be used as a skeleton. The system architecture will be designed through diagrams to illustrate the relationship between the different

components of the project. The database will be normalised prior to implementation to ensure optimal data management.

6.4 Implementation

As mentioned earlier, the agile methodology will be used for this project. The implementation with kickstart with the frontend implementation following the wireframes designs. Then the different features such as patient record management, use of AI for appointment system and the login system will be implemented. At the same time, the database will also be linked to the backend to enable data storage, retrieval and any altering that needs to be made.

6.5 Testing

Testing will be carried out after each feature implementation with respect to the agile methodology being used. Input validation will also be used to ensure data accuracy and prevent errors. At the last stage of the project, integration testing and user testing will be carried out to evaluate the system for errors and further improvements.

7 Project Plan

7.1 Milestones

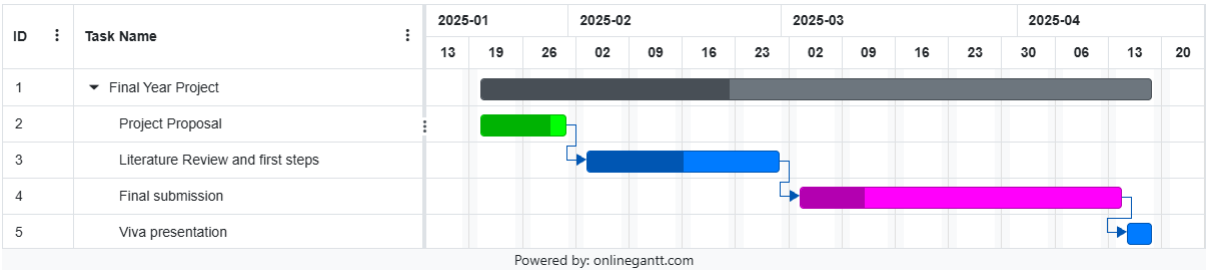

Figure 2 - Milestones

7.2 Main deliverables

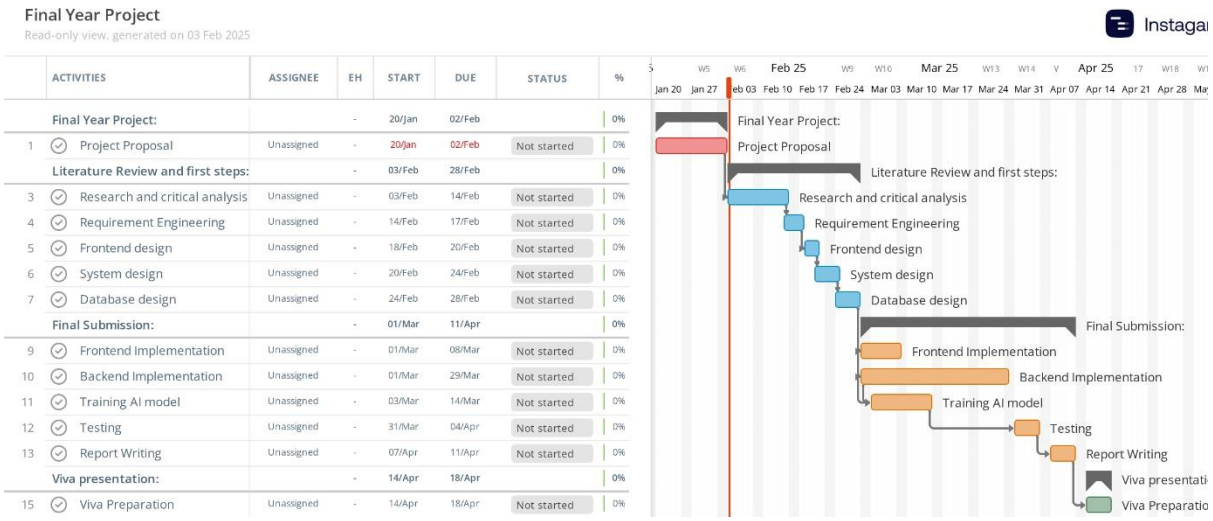

Figure 3 - Main deliverables

8 Project Resources

Personal laptop: Used for research, planning and report writing.

Project management tools

- GanttProject: Used to create Gantt chart for the project planning.

System design tools

- UMLet: Used for drawing UML diagrams for the system design.
- Figma: Used to design wireframes for the frontend.

Development tools

- Visual Studio Code: Used a the Integrated Development Environment (IDE) for the project.
- Github: Used for version control.
- Postman: Used to test APIs.

9 References

Diaz, A.G., Denise Gumtang, A., Orpiada, C.J.A., Balagot, A.S., Villanueva, E.A. and Manalang, M.A. (2024). PHIrecord: A Medical Record Management System for Rural Health Facilities in the Philippines. *2024 IEEE 6th Symposium on Computers & Informatics (ISCI)*, [online] pp.188–193. doi:https://doi.org/10.1109/isci62787.2024.10668022.

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