



School of Computing and Mathematics

PRCO303

Final Stage Computing Project
Project Initiation Document

BSc (Hons) Software Engineering

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Smart Health Monitoring and Alerting System

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1. Introduction

When the patients are admitted to a hospital, they are treated and their health conditions are monitored. The most important vitals that need to be monitored are the blood pressure and the body temperature as the stability of a person's health depends on these two. Currently, on a patient basis, these vitals are not recorded and profiled, and in order to monitor a patient, the medical staff have to check on the patient time to time. Sometimes, some patients will be needed for prolonged monitoring even after they're released to their homes. But other than with a dedicated medical personnel, an effective remote monitoring system is yet to be implemented. It's also necessary to store a brief medical history of patients to be used in case of an emergency situation for better preparation to handle the patient on the hospital's side.

It's more efficient to have a centralized computer based patient monitoring system where the medical staff of a hospital can monitor vitals of the admitted patients (who needs to be constantly monitored) and the released patients who also may need to be monitored, using remote monitoring, all in the same centralized system. If the medical staff gets alerted of a medical emergency of a patient with the access to that patient's medical history, it'd help them immensely to get ready for the patient (if the patient is in remote monitoring, sending an ambulance to collect the patient), by arranging the hospital before the patient arrives at the hospital. This system would also be beneficial even when monitoring the already admitted patients, for quick attendance to the need.

2. Business Case

2.1. Business need

The existing patient monitoring mechanisms used which involves the constant attendance of medical staff can be inefficient when monitoring a large number of admitted patients and in remote monitoring. Medical staff does not get immediately notified of medical emergencies and does not have ready access to the medical history of the patient undergoing the medical emergency. This results in long response times.

2.2. Business objectives

Automating parts of the patient monitoring scenario which enables the medical staff to

- Constantly monitor a large number of patients at the same time removing the need to manually attend to the patient whenever the staff wants to know about the patient vitals.
- Effectively monitor the released patients remotely (when it's necessary).
- Keep records of the medical history of patients under their profiles to be accessed in a medical emergency.
- Enables the staff to reduce the response time in a medical emergency or a patient undergoing unstable health conditions.
- Enables the staff to get ready for a patient before the patient arrives at the hospital (in an ambulance in a medical emergency).
- Enables the medical staff to send ambulances to pick up the patient undergoing a medical emergency. (Notifying the ambulance is done by the medical staff the regular way and not through the system. The system provides the information for the medical staff that are necessary to make their decisions.

2.3. Background

This project does not have a funding client. But it's possible to offer this system to a client once it's completed. The client most likely would be a medical institution. This project is being done as I believe there is a need for a system like this in hospitals.

3. Project Objectives

1. Analyze the existing patient monitoring procedures.
2. Analyze the existing patient data recording procedures.
3. Analyze the existing technologies applicable to the proposed solution.
4. Implementation of the system as a prototype.
5. Documentation of the system.

4. Initial scope

1. The processes of the system are identified through observation and interviews.
2. The processes of the system are documented with UML diagrams.
3. The databases of the system are identified through observation and interviews.
4. The databases of the system are documented using EER diagrams.
5. The proposed system will allow
 - a) The medical staff to view the vitals (blood pressure and body temperature) of each and every patient.
 - b) The medical staff to view the medical details of each and every patient.
 - c) The medical staff to register patients in the system.
 - d) The medical staff to remove patients in the system.
 - e) The medical staff to receive alerts regarding emergency health conditions of the patients.

5. Method of Approach

Agile software development life cycle will be used in developing the system.

Possible technologies are Arduino equipment and Arduino programming language, Java native application or a web application using appropriate technologies. SQL for databases.

Proper evaluation of the technologies will be done during the project in order to select the best and the most suitable technologies for implementing the system.

6. Project Plan

Stage	Deadline	Products/Deliverable/ Outcomes
1. Problem Definition	19 th October 2019	Project Proposal
2. Initiation	5 th November 2019	Project Initiation Document
3. Investigation and Requirements	15 th November 2019	Analyzing the existing system. Identification of the suitable technologies for the development of the system.
4. High-Level design	1 st December 2019	Designing the system. (UML, EER, Interface designs)
5. Increment 1	18 th December 2019	Progress Video Working Health Monitoring Device
6. Increment 2	13 th January 2020	Interim Report 1 Dashboard of the system with patient registration, patient profiles and patient health data storing and displaying capability.
7. Increment 3	18 th February 2020	Interim Report 2 Displaying real time patient vitals (blood pressure, temperature) under the patient profile
8. System and User acceptance testing	3 rd March 2020	Testing of the completed system. Testing the emergency alert functionality.
9. Assemble and Complete the final report	3 rd April 2020	Final Report Completed System

6.1. Control Plan

End stage reports and reviews, risk management, communication plan and quality plan are employed.

6.2. Communication Plan

Multiple supervisor meetings will be held regularly per week basis and feedback meetings will be held as necessary.

7. Initial Risk List

Risk	Management Strategy
Schedule overrun	Contingency has been introduced into the project plan. The project will be conducted under a project plan approved by the supervisor under the supervision of the supervisor.
Difficulty using/learning the development technologies	Multiple technologies will be tested by developing simple prototypes before finalizing a main technology to be used for the entire process. Online tutorial usage.
Technology Failure	Regular backups of the working systems are kept so that in case of a failure of code, there's a working version to resort back to. Video proof of the working system are taken.

8. Initial Quality Plan

Quality Check	Strategy
Requirements	Requirements will be checked to make sure that they are relevant, useful, correct and achievable.
Design Validation	Databases will be normalized. Interface designs will be checked against HCI guidelines.
Hardware Validation	Hardware will be tested for reliable operation. Output will be tested against expected output and the reliability of the output is checked. Individual components are tested.