**RyHealthP-Run your Health Profile: PROFILE OWNER MANAGEMENT: A CASE STUDY**

2022-132

Project Proposal Report

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February 2022

# **Declaration**

We declare that this is our own work, and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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| --- | --- | --- |
| Name | Student Id | Signature |
| I.T. Jayarathna | IT19151366 | A picture containing text, insect, clipart, sign  Description automatically generated |

the supervisor/s should certify the proposal report with the following declaration.

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

Name of supervisor: Mr.Nalaka Dissanayake

Signature of the supervisor: Date:

# Abstract

Nowadays with technological advancement many organizations and other developers tend to develop systems, web-based applications, mobile applications and more for healthcare industry to reduce people’s burdens. Therefore, so many systems were developed, and people are using those systems. But there is no application or a system for having person’s medical records, health predictions, telemedicine, doctor-patient connection, and lab reports are all together. From our research we are trying combine all these facilities together. In this case I have to implement the health profile owner’s profile. In here I am including health profile owner’s (HePrOw) medical history record, predictions of HePrOw health and connection between HePrOw and dependent. The medical history holds immense value to both people and doctors. Keeping track of medical records can be difficult if your health information is in multiple places and in a format (such as paper) or you are dealing with several doctors. Nowadays doctors and other medical staffs are maintaining persons’ medical records in their own way. but many people are seeking to have their own medical records of their past appointments, test results, prescription and more. Another thing is people are taking daily tests about their diseases like diabetics, heart diseases, blood pressure and more they are note down those records to a book, but this method is not secure. Therefore, it will be easier to have a system that can keep records of persons’ medical history records, prescriptions and lab test records as a text type or image type or pdf in digitally and give predictions about person’s health. In here dependent have access to HePrOw’s profile.

**Key words:** *health predictions, health profile owner (HePrOw), dependent, diseases.*

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# **1. Introduction**

## **1.1 Background Study**

Healthcare systems are a very important part of the economy of any country and for the public health. And the increasing number of patients needing continuous care is a responsibility for medical staff. In our modernized world, even though we have come a long way in technological advancement, our healthcare industry is still burdened with giving proper medical assistance to patients. Despite the many technological advances in health care over the past few decades, the typical patient record of today is remarkably similar to the patient record of 50 years ago. In term of health, there is an increasingly urgent requirement for hospitals to improve their management and public health levels [1]. Hospital information construction has become an important means to improve the level of medical environment and management [1].  Nowadays there are so many patients all around the world having several diseases. These patients are vising hospitals for daily checkups and going to the labs for tests. While doing these checkups and tests they are receiving records about their checkups and lab tests. They must keep those records securely in order to visit to the doctor for to check their health. To provide effective and continuity of care, personal medical data need to be shared and they must be in control of their own medical record. Then they can collect and manage their own health information (e.g., medical history, past surgeries, medications, lab tests, and allergies). Allowing people to access their own medical records and giving health predictions will encourage people to be involved in their own healthcare and that will further strengthen the people–provider relationship.

In recent years, there has been a rapid development in the domain of health care. The development of Internet technology and the development of medical information have produced patients’ medical history record and patients’ health prediction systems. Most of the people are happy to have these systems instead of having paper-based medical records. Today many solutions have been developed with different technologies to help people.

## **1.2 Literature survey**

The 6th International Conference on Digital Arts, Media and Technology (DAMT) and 4th ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunications Engineering (NCON) introduce health management platform based-on seamless Electronic Medical Record (sEMR) approach. the system is designed for exchange emergency patients’ data between the community hospital and the health promoting hospital. This system is using electronic medical records for emergency patients. They present real-time visualization and data exchange between community hospital and health promoting hospital to help medical staff for real-time health management [1].

In September 1998, a new National Health Service (NHS) strategy was launched in the U.K. [1]. A key goal is to create electronic health records (EHRs) by 2005. The realization of the strategy will have a number of advantages, such as improving patient booking and appointment systems and providing speedier diagnosis, test results, on-line advice, and information to patients and cares. They used framework called Ariadne to overcome challenges in developing a telematic system for process support is properly capturing and supporting the processes and the interactions between the various parties involved. They used data mining techniques to find patterns that can have implications for future healthcare requirements and recommendation [6].

HHIMS [7], an open-source medical record software developed for the out-patient clinic (primary care) and inward encounter management in state hospitals, aimed at replacing paper records. The system is currently implemented and managed by the Information Communication and Technology Agency (ICTA). The system implements a paperless workflow through patient registration, doctor’s notes, laboratory tests and their results and prescriptions. It provides a single screen overview of all past clinical details of the patient in subsequent encounters.

E-health grew out of a need for improved documentation and tracking of patients’ health and procedures performed on patients, particularly for reimbursement purposes, such as by insurance companies. E-health makes use of a wide array of digital technologies. They used Kiosks, which are freestanding devices (usually computers), are used in e-health to provide interactive information to the user. Most information is provided through a series of interactive prompts on a touch screen. Kiosks can also be used to collect data and information from users [8].

Disease prediction using patient treatment history and health data by applying data mining and machine learning techniques is ongoing struggle for the past decades. Many works have been applied data mining techniques to pathological data or medical profiles for prediction of specific diseases. These approaches tried to predict the reoccurrence of disease. Also, some approaches try to do prediction on control and progression of disease. The recent success of deep learning in disparate areas of machine learning has driven a shift towards machine learning models that can learn rich, hierarchical representations of raw data with little preprocessing and produce more accurate results [5].

The paper [12] “Disease Prediction using Machine Learning” used KNN, Naïve Bayes, Logistic Regression and Decision Tree algorithms to make a disease prediction system which can predict the disease on the basis of symptoms and implemented using grails framework.

As per the above researchers, articles, and findings it is clear that the need of the person’s medical history record in digitally are increasing and the functionalities of them are increasing with the developing technologies and according to the demand of the society.

## **1.3 Research Problem and Research Gap**

### **1.3.2 Research Gap**

There are many systems or applications for patient’s health records to replace traditional paper-based methods. These systems and applications are giving a facility to store or manage patient’s medical records but only doctors and any medical stuffs have the access to the records. Simplex Himes is a software, developed for as a healthcare solution [9]. In this software people can enter their medical records and their family member’s name. but they don’t have any facility to predict health condition.

Avalon EMR is a healthcare mobile app that provides patients to access their updated records, anytime and anywhere, with secure access to charts, and lab results [10]. In here patients cannot enter their medical records only physicians have the permission to manage and enter patient’s data.

E-health Technologies is the leading provider of medical record retrieval and organization services and image-enabled Health Information Exchanges [11]. They give a facility for patients to see and get a copy of their own medical records. But patients don’t have any access to manage their own records.

The gap between profile owner management and other software or applications about patients’ medical records is illustrated in Table 1.3.1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Referring to [10]  Avalon EMR | Referring to [9]  Simplex Himes | Referring to [11]  E-health Technologies | Suggested solution - RyHealthP |
| Maintain and store health history records digitally as a traceable timeline. | A picture containing text, clock  Description automatically generated | A picture containing text, clock  Description automatically generated | A picture containing text, clock  Description automatically generated | A picture containing text, clock  Description automatically generated |
| People have access to add their daily health records as an event. |  | A picture containing text, clock  Description automatically generated |  | A picture containing text, clock  Description automatically generated |
| People can see and filter their medical records. | A picture containing text, clock  Description automatically generated | A picture containing text, clock  Description automatically generated | A picture containing text, clock  Description automatically generated | A picture containing text, clock  Description automatically generated |
| Able to store reports as a text type. |  | A picture containing text, clock  Description automatically generated |  | A picture containing text, clock  Description automatically generated |
| Able to store reports as an image type. |  |  |  | A picture containing text, clock  Description automatically generated |
| Able to store reports as a PDF type. |  |  |  | A picture containing text, clock  Description automatically generated |
| Able to manage HPOs’ dependents’ Profile. |  | A picture containing text, clock  Description automatically generated |  | A picture containing text, clock  Description automatically generated |
| Predictions about HPO's health. |  |  |  | A picture containing text, clock  Description automatically generated |

Table 1.3. 1 comparison between existing system

As a remedy, this research is intended to introduce a multi-functional module called profile owner management. In here we are giving people to manage and enter their own medical record, they can filter their medical records when they need, connect dependent, and give predictions about their health.

### **1.3.1 Research Problem**

Healthcare industry and technology are growing day by day and people’s need of healthcare and use of technologies are also increasing in these days. when it’s comes to the healthcare, most people are still having paper-based medical records and visiting to the doctor or labs to have daily checkups. They are having a book to keep their records. But if this book lost or misplaced, they don’t have any recovery method and they will lose these medicals records then they have to go to the doctor or labs for to do checkups since the beginning. But in these days because of the technological advancement, we can see there are many systems, mobile applications, and web-based applications for healthcare solutions. With this people are trying to use these technologies than going with traditional methods. When considering the current solutions, they don’t give permission to the people to access to their records, don’t give any predictions about people’s health and there’s know way to keep records about normal people until they become a patient or visit to the doctor or hospital. Because of these reasons these solutions are not fully benefits to the people. In these days people are too busy to visit to the hospitals, to labs and to the doctor for checkups and Some people are like to keep their daily health records and get a prediction about their current health condition even they are not a patient for certain diseases. While looking at these problems we can see that there are no proper solutions for these problems.

## **2. Research Objectives**

## **2.1 Main Objective**

Main Objective of the proposed solution is implementing a comprehensive software system with following features. Manage the health histories of Health Profile Owners (HePrOw) digitally, improve communication between doctors and Health Profile Owners, and locate a nearest suitable pharmacy and laboratory to HPO. The aim is to provide advanced profile to HePrOw’s to enter medical records to the profile as an event and maintain medical health history records digitally in an efficient manner. Not only to manage health history records but also give predictions about HePrOw’s health.

## **2.2 Specific Objectives**

Objective 1: Prioritize health records and store.

Prioritize health records and use cloud-based mongodb to store these records safely.

Objective 2: Give full authorize to the HePrOw to manage health profile records.

HePrOw can manage his/her medical records by updating records and deleting records.

Objective 3: Give predictions of HePrOw’s health.

Using Machine Learning algorithms, give health predictions to the HePrOw by using HePrOw symptoms.

Objective 4: Connect with dependent

HePrOw can connect any dependent to the profile then that dependent has access to see HePrOw’s medical records.

Objective 5: Filter health history records

When HePrOw needs specific records that records should be filter with a respectively manner.

**3**. Research Methodology

This section explains the methodology of the planned work. This section gives you an understanding of the technology and tools we'll employ to ensure the system's success.

In this work we are planned to implement a health profile to keep HePrOw’s medical health history records and give health predictions by using symptoms. There are three features in this section.

* Keep and track HePrOw’s medical history records.
* Give predictions by using symptoms.
* Connect dependent to the profile.

We used different information gathering techniques to gather more information about this module. We conducted a survey by using google survey and questionnaire to gather information from the people. And we used UCI repository to gather dataset. We did documentation review and case studies.

We planned to use graphs, slides, popup buttons, eye catchy colors and fonts for design. and to give HePrOw to user-friendly interfaces for to use our system application we are planned to use html, css, JavaScript and JavaScript frameworks as our technologies for user interface designs. A cloud-based system should be used to store medical records. The approach helps to improve the security of electronic health records that are stored in a centralized database. The suggested solution uses Mongo DB, an opensource NoSQL database, to handle unstructured and large data gathered from many sources.

When comes to the health prediction The first step is to figure out what the problem is. Then it's time to go to work on the dataset. After that, we visualize our data using scatter plots, distribution graphs, and other tools to identify abnormalities, missing values, and other flaws, and to make our dataset ready for prediction. Finally, the most important component will be Machine Learning, which will employ algorithms such as Decision Tree, Random Forest, Naive Bayes, and KNN to accurately forecast disease for early detection and better patient treatment. We used Python as a platform to run our Machine Learning algorithms for this model. Manage health profile by having medical history records and giving health predictions by using datasets and algorithms are the challenges I am going to address

## **3.1 system overview**

Diagram

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Figure 3.1. 1 system overview diagram

The proposed system is Web-based and mobile-based so HePrOw and healthcare providers can access it from any location. Moreover, the architecture is cloud based so large amount of data can be stored without any restrictions. With appropriate access controls, HePrOw can allow portions of the HePrOw’s medical records to be made available to dependent, doctors, and others.

First, after registering to the system, system creates a profile for these registered people then they can enter their medical records like their daily blood pressure, daily sugar level, fever temperature and more illnesses and lab records as a pdf or image or text type into the system then system will store these records to the cloud-based database. When it comes to predicting health profile owners(heprow), the system allows heprow to share their symptoms and issues. Then the system processes heprow’s symptoms to check for various illnesses that could be associated with it using machine learning algorithms. Here we use some intelligent data mining techniques to guess the very most accurate illness that could be associated with heprow’s symptoms. And also, dependent have access to see HePrOw’s medical records when HePrOw add dependent and make the connection.

## **3.2 Flow Chart**

Diagram

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Figure 3.2. 1 Flow Chart

## **3.3 Gannt Chart**

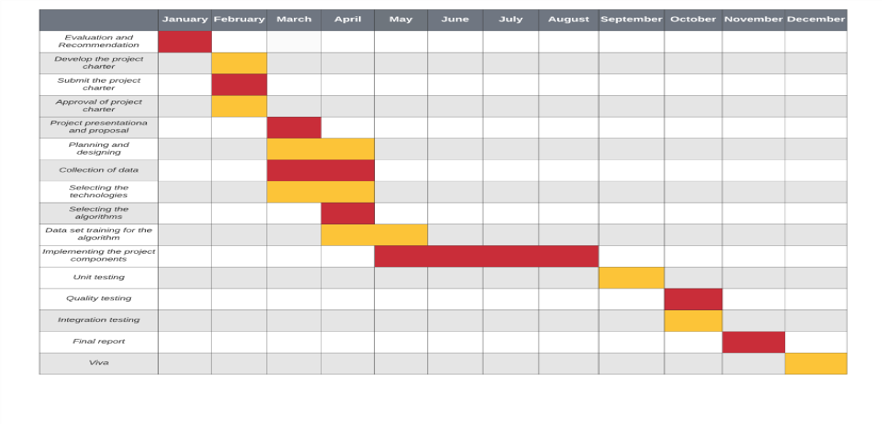


Figure 3.3. 1 Gannt Chart

# **4. Project Requirements**

## **4.1 Functional Requirements**

* Store records when entered events

When HePrOw enter medical records as a events system should be able to store those records to the database.

* Update or delete records

When HePrOw needs to delete or update any medical history records system should allows HePrOw to maintain data.

* Generate predictions

System should be able to generate health predictions using HePrOw’s symptoms.

* Filter records

When HePrOw select record to filter system should be able to filter those records.

* Connect dependent

System should connect dependent when HePrOw gives dependent name.

## **4.2 Non-functional Requirements**

* Availability

System services are need to available when HePrOw need to use.

* User-friendly

System interface should be user-friendly to helps HePrOw to use our system freely.

* Accuracy

Records should be always true in order to gain HePrOw’s trust.

## **4.3 User Requirements**

This suggested system requires a device to be accessed. Therefore, HeprOw should own or need the access for a personal computer or a mobile device.

# **5. References**

[1] Intawong, Kannikar, Parichat Ong-artborirak, and Waraporn Boonchieng. "Seamless Electronic Medical Record for Health Management System in Emergency Patients." *2021 Joint International Conference on Digital Arts, Media and Technology with ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunication Engineering*. IEEE, 2021.

[2][Empowering\_patient\_through\_personal\_healthcare\_system\_using\_interoperable\_electronic\_health\_record.pdf](file:///E:/Backup%20K/lec%20notes/4y1s/RP/Empowering_patient_through_personal_healthcare_system_using_interoperable_electronic_health_record.pdf)

[3] <https://www.ncbi.nlm.nih.gov/books/NBK233055/>

[4]<https://www.researchgate.net/publication/325122514_The_History_of_the_Patient_Record_and_the_Paper_Record>

[5] <https://www.leadingindia.ai/downloads/projects/HC/hc_11.pdf>

[6] James, A., Y. Wilcox, and R. N. G. Naguib. "A telematic system for oncology based on electronic health and patient records." *IEEE Transactions on Information Technology in Biomedicine* 5.1 (2001): 16-17.

[7] Hospital Health Information Management System [Internet]. [cited 2019 May 18]. Available from: <http://www.hhims.org/>

[8] <https://www.britannica.com/science/e-health>

[9] https://www.simplexhimes.com/mobile-app-patient-portal/

[10] <https://www.curemd.com/avalon.asp>

[11] <https://ehealthtechnologies.com/record-retrieval/customer-solutions>

[12] Pingale,Kedar., Surwase, Sushant., Kulkarni,Vaibhav.,Sarage ,Saurabh., &Karve, Prof. Abhijeet .(2019). Disease Prediction using Machine Learning.International Research Journal of Engineering and Technology, 6(12) , 2810-2813.