2021 Final Year Project (Computer Science)

UMS UNIVERSITI MALAYSIA SABAH

FACULTY OF COMPUTING & INFORMATICS

ENHANCING PREDICTIVE REHABILITATION MANAGEMENT SYSTEM WITH HOMOMORPHIC ENCRYPTION SCHEME

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ABSTRACT

The Predictive Rehabilitation Management System (Predictive RMS) has been developed in 2017. The aim of the Predictive RMS is to manage operation based on different access control level in order to aid in better decision making of a clinic or hospital provided with the descriptive and predictive information delivered. However, there are some limitations of the developed Predictive RMS causing the delay of implementation in Sabah hospitals and clinics recently. These limitations include: (i) data protection is limited to data storage and focuses on integrity; (ii) the data collection form is fixed for certain disease only and cannot adapt for future changes; (iii) predictive analytics and report visualization module lack of patient's privacy control. To address these limitations, this project aims to enhance the existing Predictive RMS with Homomorphic Encryption (HE) scheme. HE scheme is a special kind of encryption scheme, where it allows any third party to operate on the encrypted data without decrypting it in advance.

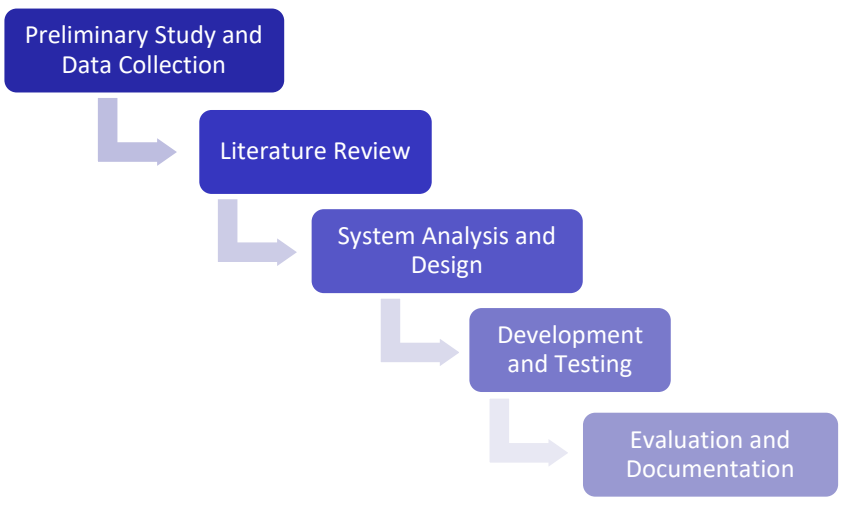
PROBLEM STATEMENT

- Risks of disclosing Patient's Data Privacy during data transmission and transformation.
- The protection of data storage is limited in assuring data integrity.
- The changing data fields in existing Predictive Rehabilitation Management System static web forms are limited to support with the new requirements.

OBJECTIVES

- ✓ To investigate the efficiency of homomorphic encryption scheme in securing the patient's data of the Predictive Rehabilitation Management System based on speed and security of the algorithm.
- ✓ To design and develop the proposed Predictive Rehabilitation Management System by integrating the selected homomorphic encryption scheme in PO1.
- ✓ To evaluate the performance of the proposed Predictive Rehabilitation Management System by using Alpha User Acceptance Testing. Alpha User Acceptance Testing is a software performance testing to identify all possible issues/bugs before releasing the product to everyday users or the public.

METHODOLOGY



CONCLUSION

Overall, the Enhanced Predictive RMS has successfully developed with completed all objectives that stated in this project. In future, this system will further deploy in real time live server for rehabilitation daily usage and support the local hospital. Other than that, this system will aims to support the postquantum cryptography and also provide more predictive analytics algorithm for rehabilitation daily usage. Lastly, maintenance of the system come in a part of future work where the system requires keep up to date and provide more features in the system.

IMPLEMENTATION

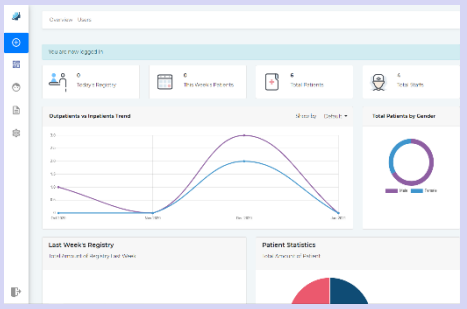


Figure 1: Dashboard

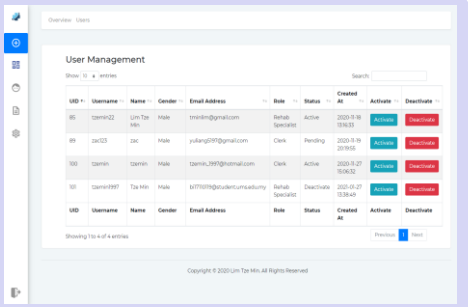


Figure 2: User Management

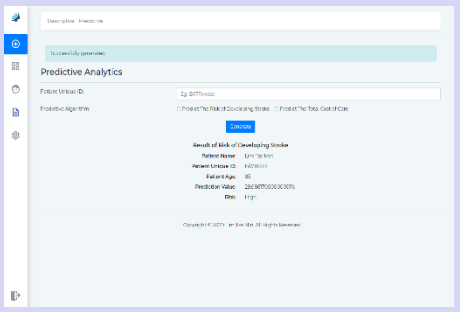


Figure 3: Predictive Analytics

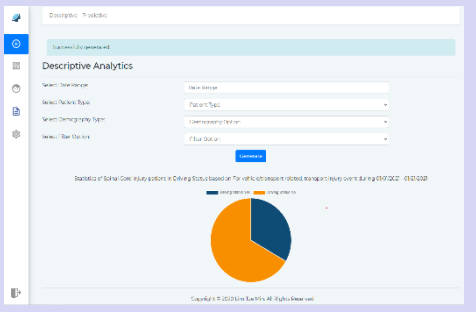


Figure 4: Descriptive Analytics

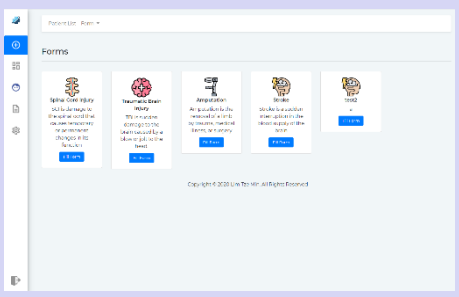


Figure 5: View Dynamic Form

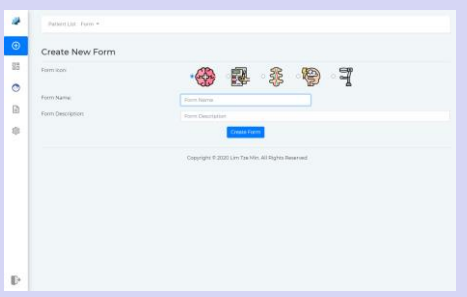


Figure 6: Create Dynamic Form

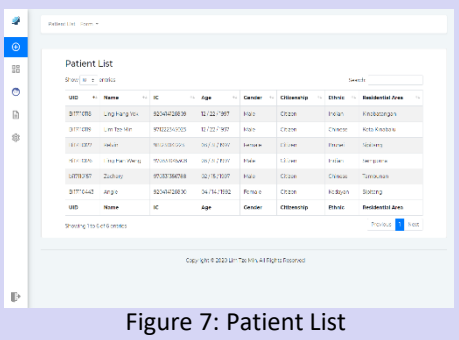


Figure 7: Patient List

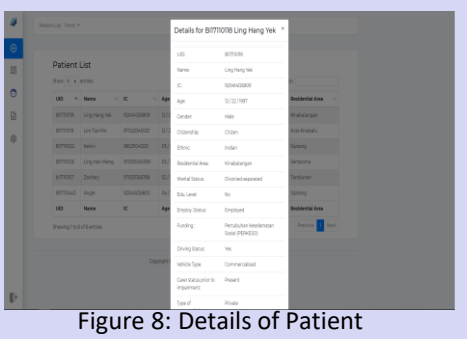


Figure 8: Details of Patient

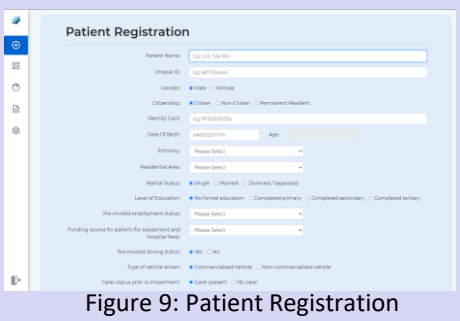


Figure 9: Patient Registration

Figure 10: History of Patient Record