Blockchain Enabled Secure Medical Record Management with Optimization Algorithm based Diagnosis model

Thesis to be submitted in partial fulfilment of the Requirement for the degree

Of

M.Sc. in Computer Science

By

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CERTIFICATE

This is to certify that we have examined the thesis entitled "**Blockchain Enabled Secure Medical Record Management with Optimization Algorithm based Diagnosis model**", submitted by **Kumarjit Gupta** (Roll Number: 573) a post-graduate student of **Department of Computer Science and Electronics** in partial fulfilment for the award of degree of M.Sc. in Computer Science. We hereby accord our approval of it's as a study carried out under the guidance of Dr. Arindam Sarkar, Head of Department, Department of Computer Science and Electronics, Assistant Professor of Ramakrishna Mission Vidyamandira and supervised by Prof. Sarbajit Manna, Assistant Professor at the Department of Computer Science, Ramakrishna Mission Vidyamandira, Belur Math and presented in a manner required for its acceptance in partial fulfilment for the Post Graduate Degree for which it has been submitted. The thesis has fulfilled all the requirement as per the regulation of the Institute and has reached the standard needed for submission.

The work presented in this report is an authentic record of our own efforts. The matter presented in this Project Report has not been submitted for the award of any other degree elsewhere

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Signature of the Student

This is to certify that the above statement made by the students is true to the best of my knowledge.

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ABSTRACT

The healthcare industry has seen significant advancements in recent times, leading to the creation of vast amounts of electronic health records (EHRs). To manage this huge amount of data and ensure its security, a new Blockchain Enabled Secure Medical Record Management with Optimization Algorithm based Diagnosis (BESMRM-OAD) model has been developed. This model employs various stages, including encryption, key generation, Hyperledger blockchain-based secure data management, and diagnosis using machine or deep learning-based techniques with hyperparameter optimization Algorithm. The Proposed model enables the user to manage data access, allow hospital administrators to read and write data, and notify emergency contacts. It uses the SPECK block cipher algorithm for encryption and the Nutcracker Optimization algorithm (NOA) for the best key generation at the same time to increase the effectiveness of encryption. Moreover, the exchange of medical data occurs via the multi-channel Hyperledger blockchain, which uses a blockchain to store information about patient visits as well as linkages to EHRs that are stored in other databases. Finally, a optimization algorithm based diagnostic model is used to detect the presence of the illnesses once the data have been decrypted at the receiving end. Using two benchmark medical dataset, the BESMRM-OAD model's performance is validated, and the results are examined using a variety of performance metrics. The experimental data demonstrates the superiority of the Proposed methodology over state-of-the-art approaches.

Keywords: *Blockchain, Electronic health records, SPECK Cipher, Machine Learning, Deep learning, Optimization Algorithm*

LIST OF FIGURES

LIST OF TABLES

CONTENTS