

# **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

<b>Figure 2.1:</b> ‘Flowchart A’ for Securing the Medical records	7
<b>Figure 2.2:</b> Diagnosis process	8
<b>Figure 2.3:</b> Speck encryption round function	22
<b>Figure 2.4:</b> Speck round function decomposed into Feistel-like steps	22
<b>Figure 2.5:</b> Speck key expansion	23
<b>Figure 2.6:</b> Flowchart of NOA	30
<b>Figure 2.7:</b> Hyperledger blockchain in healthcare	37
<b>Figure 3.1:</b> Comparison Analysis of Encryption and Decryption time	42
<b>Figure 3.2:</b> Pie plot of the Dependent variable	43
<b>Figure 3.3:</b> Pearson Correlation of features w.r.t each other	44
<b>Figure 3.3.1:</b> Pearson's Correlation of features w.r.t target	45
<b>Figure 3.4:</b> Comparative analysis of all model basis on dataset splitting	46
<b>Figure 3.5:</b> Comparative analysis of all model basis on cross-validation	48
<b>Figure 3.6:</b> Comparative analysis of all model basis on Hyperparameter tuning	50
<b>Figure 3.7:</b> Comparative Analysis with existing model	51
<b>Figure 4.1:</b> Comparison Analysis of Encryption and Decryption time	55
<b>Figure 4.2:</b> Count plot for target feature	56
<b>Figure 4.3:</b> Pearson's Correlation of features w.r.t target	58
<b>Figure 4.4:</b> Comparative analysis of all model basis on dataset splitting	59
<b>Figure 4.5:</b> Comparative analysis of all model basis on cross-validation	61
<b>Figure 4.6:</b> Comparative analysis of all model basis on Hyperparameter tuning	63
<b>Figure 4.7:</b> Comparative Analysis with existing model	64

## LIST OF TABLES

<b>Table 1.1:</b> Literature Survey	2
<b>Table 2.1:</b> Speck Parameters	21
<b>Table 3.1:</b> Encryption and Decryption time analysis and Comparison	41
<b>Table 3.2:</b> Dataset Descriptions	43
<b>Table 3.3:</b> Splitting Evaluation Metrics on validation data	46
<b>Table 3.4:</b> Cross Validation evaluation metrics	47
<b>Table 3.5:</b> Model Optimization using Hyperparameter Tuning	50
<b>Table 3.6:</b> Comparative analysis with existing model	51
<b>Table 4.1:</b> Encryption and Decryption time analysis	55
<b>Table 4.2:</b> Dataset's feature Descriptions	57
<b>Table 4.3:</b> Splitting Evaluation Metrics on validation data	59
<b>Table 4.4:</b> Cross Validation evaluation metrics	60
<b>Table 4.5:</b> Model Optimization using Hyperparameter Tuning	63
<b>Table 4.6:</b> Comparative analysis of our model	64

# CONTENTS

<b>CHAPTER 1: INTRODUCTION.....</b>	<b>1</b>
1.1 Introductory Discussion.....	1
1.2 Literature Review.....	2
1.3 Objective.....	4
1.4 Organization of the Thesis.....	5
<b>CHAPTER 2: METHODOLOGY AND TECHNIQUES.....</b>	<b>7</b>
2.1 Flowchart/ Block Diagram.....	7
2.2 Algorithm of the work.....	9
2.2.1 Machine Learning and Ensemble Models Description.....	10
2.2.1.1 K-Nearest Neighbor Classifier.....	10
2.2.1.2 Logistic Regression.....	11
2.2.1.3 Random Forest Classifier.....	11
2.2.1.4 Logit Boost Classifier.....	12
2.2.2 Deep Learning Models Description.....	12
2.2.2.1 Multi-layer Perceptron.....	13
2.2.2.2 Bidirectional LSTM.....	13
2.2.2.3 Supervised Variational Autoencoder.....	14
2.2.3 Feature Selection.....	15
2.2.3.1 Pearson Correlation.....	16
2.2.4 Feature Scaling.....	16
2.2.4.1 Robust Scaling.....	16
2.2.5 Cross Validation Techniques.....	17
2.2.5.1 K-Fold.....	17
2.2.5.2 Stratified K-Fold.....	18
2.2.5.3 Shuffle Split.....	18
2.2.6 Metrics for Evaluation.....	19
2.2.7 Data Encryption Algorithm.....	20
2.2.7.1 Speck Cipher.....	21
2.2.8 Optimization Algorithms.....	23
2.2.8.1 Nutcracker Optimization Algorithm .....	23
2.2.8.2 HyperOpt.....	31
2.2.8.3 Optuna.....	33
2.2.8.4 Cuckoo Search.....	34
2.2.9 Hyperledger Blockchain.....	35

<b>CHAPTER 3: EYE STATE CLASSIFICATION.....</b>	<b>39</b>
3.1 Introduction.....	39
3.2 Implementation.....	40
3.2.1 Dataset Description.....	40
3.2.2 System Configuration.....	40
3.2.3 Results Analysis and Discussion.....	41
3.2.3.1 Encryption and Decryption time analysis.....	41
3.2.3.2 Dataset Overview.....	42
3.2.3.3 Correlation Matrix and Feature Selection.....	43
3.2.3.4 Dataset Splitting.....	45
3.2.3.5 Cross Validation.....	47
3.2.3.6 Hyperparameter Tuning.....	48
3.2.3.7 Comparative Study.....	51
<b>CHAPTER 4: PATIENT TREATMENT CLASSIFICATION.....</b>	<b>53</b>
4.1 Introduction.....	53
4.2 Implementation.....	53
4.2.1 Dataset Description.....	54
4.2.2 System Configuration.....	54
4.2.3 Results Analysis and Discussion.....	55
4.2.3.1 Encryption and Decryption time analysis.....	55
4.2.3.2 Dataset Overview.....	56
4.2.3.3 Correlation Matrix and Feature Selection.....	57
4.2.3.4 Dataset Splitting.....	58
4.2.3.5 Cross Validation.....	60
4.2.3.6 Hyperparameter Tuning.....	61
4.2.3.7 Comparative Study.....	64
<b>CHAPTER 5: CONCLUSION AND FUTURE SCOPE.....</b>	<b>65</b>
<b>REFERENCES/ BIBLIOGRAPHY.....</b>	<b>67</b>