



بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / سلوي محمود عقل

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى

مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد





**Computer Science Department
Faculty of Computers & Information Science
Ain Shams University**

Using Computational Intelligence in Developing a Knowledge –Based System For Credit-Card Fraud Detection

Thesis submitted as a partial fulfillment of the requirements for the degree of
Master of Science in Computer And Information Science

By

Hossam El-din Mohammad Abd El-Hamid

**Computer Science Department,
Faculty of Computers & Information Science,
Ain Shams University**

Under Supervision of

Professor Dr. Abdel-Badeeh Mohamed Salem

**Professor of Computer Science,
Computer Science Department,
Faculty of Computers & Information Science ,
Ain Shams University**

Professor Dr. Mohamed Ismail Roushdy

**Professor of Computer Science,
Dean of faculty of Computers & Information Technology
Future University in Egypt**

Dr. Wael Mohamed Hamdy Khalifa

**Lecturer of Computer Science,
Computer Science Department,
Faculty of Computers & Information Science ,
Ain Shams University**

**May 2022
Cairo**

Acknowledgement

I Would Like To Thank All Of Whom Joined Me In My Thesis Journey.

I Am Really So Thankful To All Of The People Supported Me In This Thesis To Be Done

First, I Am Really So Grateful To My Supervisors For Their Continuous Support All Of The Time Of The Search, Reviewing & Till Publishing This Thesis. I Have Learned A Lot From Your Science & Your Great Knowledge Also Your Grateful Advices Always, I Would Like To Thank Prof Dr. Abdel-Badeeh Salem For His Wealthy Knowledge And Valuable Feedback. I Would Like To Thank Many Professor Dr. Mohammed Ismael Roushdy Also For His Valuable Time And His Reviewing Of This Thesis And His Support For Me. Also I Like To Thank Many My Mentor Dr. Wael Khalifa For His Guidance & Practical Help.

I Would Like To Thank My Great Family For Their Continuous Support & Their Prayers, Their Pushing For Me To Work Well & Unstop Learn Science. I Am Really Grateful For Everything You Did For Me, Your Patience And Your Understand Of The Science Researching.

Special Thanks To My Great Mother For Helping Me.
Special Thanks To My Father For Trying To Make Me
Good Man. Special Thanks To My Great Aunt For
Supporting Me & Thanks To My Brother & Sister.

Finally, I Would Like To Thank All Of My Friends For
Helping Me In Search And Writhing Of Thesis By
Their Experience & Work, Special Thanks To Miss
Yasmin Omar & All People Helped Me.

Abstract

The term “fraud”, it always concerned about credit card fraud in our minds. And after the significant increase in the transactions of credit card, the fraud of credit card increased extremely in last years. So the fraud detection should include surveillance of the spending attitude for the person/customer to the determination, avoidance, and detection of unwanted behavior. Because the credit card is the most payment predominant way for the online and regular purchasing, the credit card fraud raises highly. The Fraud detection is not only concerned with capturing of the fraudulent practices, but also, discover it as fast as they can, because the fraud costs millions of dollar business loss and it is rising over time, and that affects greatly the worldwide economy. This Thesis introduce 15 different techniques of how data mining techniques can be successfully combined to obtain a high fraud coverage with a high or low false rate, the Advantage and The Disadvantages of every technique, and The Data Sets used in the researches by researchers Also Comparisons Of These Techniques & The Different Data Sets Used In These Systems, Of One Main Objective to decrees the rate of insufficient Leading to A Hybrid System By Using IOT how it can be detected using computational intelligent techniques and Internet of Things (IOT). Moreover, presenting recent results and challenges.

By Using Other Techniques of IOT, the process depends on the AI technique that contains the component determination process, which dependent on the filter strategy, the clustering method, and the classification process

All these methods and techniques are used to recognize fake cases before it occurs or during the handling of any online exchange that meets any misrepresentation decide that defined by the bank's risk department in the database. In This design, it concentrated on Map Reduce, one of the fundamental empowering approaches for satisfying expanded Misrepresentation frameworks needs by utilizing high equal preparation, information storage, investigation, and web-based handling on countless items.

List of Publications

1. Hossam Eldin M. Abd Elhamid, Wael Khalifa, Mohamed Roushdy, Abdel-Badeeh M. Salem **"Bio-inspired Computing For Credit Card Fraud Detection "**, Proceedings of VII-th International scientific and practical video conference «Digital ecosystems of the economy Southern Federal University, 2020 ,PP 123-130, ISBN 978-5-9275-3591-0.. **Indexed in Russian science citation index .**
2. Hossam Eldin M. Abd Elhamid, Wael Khalifa, Mohamed Roushdy, Abdel-Badeeh M. Salem "Machine Learning Techniques for Credit Card FraudDetection" Future Computing and Informatics Journal, Vol. 4 [2019], Iss. 2, Art. 5 ,PP 98-112 , Published by Arab Journals Platform, 2019 , **The journal is hosted on Digital Commons, Elsevier.** <https://digitalcommons.aaru.edu.jo/fcij/vol4/iss2/5>
3. Hossam Eldin M. Abd Elhamid, Wael Khalifa, Mohamed Roushdy, Abdel-Badeeh M. Salem "Computational Intelligence for Financial Fraud Detection under Internet of Things Environment: Techniques, Opportunities and Challenges" Proceedings of IEICE ICTF - Information and Communication Technology Forum, 2020, PP ISBN 978-83- 932602-8-7, September 10-12, Niš, Serbia.
4. Hossam Eldin M. Abd Elhamid, Wael Khalifa, Mohamed Roushdy, Abdel-Badeeh M. Salem "Machine Learning Techniques For Financial Fraud Detection Based On IOT Evironment" International Journal of Intelligent Computing & Information Science (IJICIS) <https://ijicis.journals.ekb.eg> **[Under Submission]**
5. Hossam Eldin M. Abd Elhamid, Mohamed Roushdy, Abdel-Badeeh M. Salem "Machine Learning Techniques &Computational for Financial Fraud Detection under Internet of Things Environment: Methods, Opportunities and TheChallenges" International Journal of Intelligent Engineering Systems (IJIES) Supported By The Intelligent Networks & Systems Society [INASS] <https://inass.org/treatise/hossam-eldin-m-abd-elhamid-5/#comments> **[Under Submission]**

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List of Abbreviation

AIN	Artificial Immune Network
AIS	Artificial Immune Systems
AISFD	Artificial Immune Systems Fraud Detection
ALCs	Artificial-Lymphocytes
ANN	Artificial Neural Network
BN	Bayesian Network
BPN	Back-Propagation Network
CBR	Case Based Reasoning
DCs	Dendritic Cells
EA	Evolutionary Algorithms
FDS	Fraud Detection System
FNR	False Negative Rate
GA	Genetic Algorithm
GANN	Genetic Algorithm Neural Network
GNN	Granular Neural Network
GP	Genetic Programming
ILP	Inductive Logic Programming
IOT	Internet Of Things
KNN	K-Nearest Neighbour
LR	Logistic Regression
NN	Neural Network
NSA	Negative Selection Algorithm
PAMP	Pathogen Related Sub-Atomic Example
RBF	Outspread Premise Work
RUS	Random Under Sampling
SOM	Self-Organizing Map
SOMNN	Self-Organizing Map Neural Network
SQL	Standard Query Language
SVM	Support Vector Machine
TPR	True Positive Rate

Chapter 1

Introduction

Chapter 1 Introduction

1.1 Problem Definition:

Credit Card or Visa is a mechanism of selling merchandise or administrations without having money close by. A Visa is a straightforward method of offering credit to a shopper consequently. Today, pretty much every MasterCard conveys a distinguishing number that helps in shopping exchanges quickness.

Extortion is a deliberate misdirection made for individual increase or to harm another client/individual; is false. Lawful definition shifts by lawful ward for extortion. Extortion is a common law infringement and furthermore a wrongdoing. Cheating individuals or substances of cash is a typical reason for extortion.

Although the Credit Card transactions of the USA are the highest, it has a minimum fraud rate. The tops of the list is Ukraine with astounding 19% fraud rate and it is followed by Indonesia with 18.3% rate of fraud amid the countries of high risk Credit Card which facing Fraud threat, in other countries like Yugoslavia (17.8%), Turkey (9%) and Malaysia (5.9%). [1] Authorized users are allowed for credit card transactions by using some measurement factors such as credit card