بسم الله الرحمن الرحيم

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بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

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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

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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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AIN	**A**rtificial **I**mmune **N**etwork
AIS	**A**rtificial **I**mmune **S**ystems
AISFD	**A**rtificial **I**mmune **S**ystems **F**raud **D**etection
ALCs	**A**rtificial-**L**ympho**c**ytes
ANN	**A**rtificial **N**eural **N**etwork
BN	**B**ayesian **Network**
BPN	**B**ack-**P**ropagation **N**etwork
CBR	**C**ase **B**ased **R**easoning
DCs	**D**endritic **C**ells
EA	**E**volutionary **A**lgorithms
FDS	**F**raud **D**etection **S**ystem
FNR	**F**alse **N**egative **R**ate
GA	**G**enetic **A**lgorithm
GANN	**G**enetic **A**lgorithm **N**eural **N**etwork
GNN	**G**ranular **N**eural **N**etwork
GP	**G**enetic **P**rogramming
ILP	**I**nductive **L**ogic **P**rogramming
IOT	**I**nternet **O**f **T**hings
KNN	**K**-**N**earest **N**eighbour
LR	**L**ogistic **R**egression
NN	**N**eural **N**etwork
NSA	**N**egative **S**election **A**lgorithm
PAMP	Pathogen Related Sub-Atomic Example
RBF	Outspread Premise Work
RUS	**R**andom **U**nder **S**ampling
SOM	**S**elf-**O**rganizing **M**ap
SOMNN	**S**elf-**O**rganizing **M**ap **N**eural **N**etwork
SQL	**S**tandard **Q**uery **L**anguage
SVM	**S**upport **V**ector **M**achine
TPR	**T**rue **P**ositive **R**ate

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