GREEN AI REVOLUTION MACHINE LEARNING FOR ENVIRONMENTAL-FRIENDLY COMMUNICATION NETWORKS

[1] Dr. Sangeetha Tamilarasu, Associate Professor, CSE Department, SAVEETHA SCHOOL OF ENGINEERING, SIMATS, Chennai, Tamilnadu – 600 057, India.
[2] Mr. Dinesh Kumar Ramalingam, Assistant Professor, CSE Department, Kommuri Pratap Reddy Institute of Technology (A), Ghatkesar – 500 088, Telangana, India.
[3] Dr. Sai Prasad Padavala, Associate Professor, CSE Department, St. Martin's Engineering College (A), Secunderabad – 500 100, Telangana, India.
[4] Dr. Kiran Sree Pokkuluri, Professor & Head, CSE Department, Shri Vishnu Engineering College for Women (A), Bhimavaram – 534 202, A.P, India.

ABSTRACT: As digital assets become more interconnected, cyber threats are growing at an unprecedented rate financial institutions need to invest in artificial intelligence-based solutions for identifying these threats and protecting their assets. Machine learning is a powerful tool for investigating complex financial security threats that constantly evolve and can be difficult to predict.

KEYWORDS: Artificial Intelligence, Cyber security, Machine learning, Threads, Financial Institution.

I.INTRODUCTION

By leveraging AI technologies such as natural language processing, algorithms, and automated reasoning systems, banks can develop a better understanding of potential risks and create more efficient controls around their data. In this paper, an artificial intelligence based cyber security threats identification has proposed in financial institutions using machine learning approach. Machine learning algorithms are constantly being improved to identify anomalies in the data that might indicate a security threat. This approach enables financial firms to identify and defend against malicious attacks using custom-made models that provide actionable insights into both internal and external risks.

Financial fraud refers to the use of fraudulent and illegal methods or deceptive tactics to gain financial benefits. Fraud can be committed in different areas of finance, including banking, insurance, taxation, and corporates, and more. Fiscal fraud and evasion, including credit card fraud, tax evasion, financial statement fraud, money laundry, and other types of financial fraud, has become a growing problem. Despite efforts to eliminate financial fraud, its occurrence adversely affects business and society as hundreds of millions of dollars are lost to fraud each year. This significant financial loss has dramatically affected individuals, merchants, and banks.

Nowadays, fraud attempts have increased drastically, which makes fraud detection more important than ever. The Association of Certified Fraud Examiners (ACFE) has announced that 10% of incidents concerning white-collar crime involves falsification of financial statements. They classified occupational fraud into three types: asset misappropriation, corruption, and financial statement fraud. Financial statement fraud resulted in the most significant losses among them.

Complex data patterns in medical field can be analyzed by using Artificial Intelligence techniques in an expanded range of database for diagnosis of symptomatic diseases [7]. Traditional diagnosis methods involve human interaction that is so efficient. Hence, there is a requirement of persistence traditional research that builds a concrete system for diagnosis in the field of medicine. As all doctors may not have optimal knowledge in every domain of medical fields, there may be a chance of

mistreatment taking place. Therefore, there is a need of developing an automatic diagnostic system that is efficient with human knowledge and accurate machinery [8].

II. LITERATURE SURVEY

Title: Evaluation Of Financial Statements Fraud Detection Research, A Multidisciplinary**,** 2019 A. Albizri, D. Appelbaum, and N. Rizzotto

Prior research in the fields of accounting and information systems has shed some light on the significant effects of financial reporting fraud on multiple levels of the economy. In this paper, we compile prior multi-disciplinary literature on financial statement fraud detection. Identifying financial statement fraud activities is very important for the sustainable development of a socio-economy, especially in China's emerging capital market. Although many scholars have paid attention to fraud detection in recent years, they have rarely focused on both financial and non-financial predictors by using a multi-analytic approach. With regards to the issue of the financial statement fraud, in practice, auditors have become limited in their ability to detect fraudulent financial statements. On the other hand, considering the ratio of cost and return it is impossible for auditors to spend the time required to discover all the fraud that occurs. As a result, some accounting firms and companies have begun to use data mining techniques such as cloud auditing to identify fraudulent financial statements (FFS). Financial reporting fraud detection efforts and research may be more impactful when the findings of these different domains are combined. We anticipate that this research will be valuable for academics, analysts, regulators, practitioners, and investors.

Title: Interpretable Fuzzy Rule-Based Systems For Detecting Financial Statement Fraud, 2019, P. Hajek

Prior research in the fields of accounting and information systems has shed some light on the significant effects of financial reporting fraud on multiple levels of the economy. Systems for detecting financial statement frauds have attracted considerable interest in computational intelligence research. Diverse classification methods have been employed to perform automatic detection of fraudulent companies. However, previous research has aimed to develop highly accurate detection systems, while neglecting the interpretability of those systems. Here we propose a novel fuzzy rule-based detection system that integrates a feature selection component and rule extraction to achieve a highly interpretable system in terms of rule complexity and granularity. Specifically, we use a genetic feature selection to remove irrelevant attributes and then we perform a comparative analysis of state-of-the-art fuzzy rule-based systems, including FURIA and evolutionary fuzzy rule-based systems. Here, we show that using such systems leads not only to competitive accuracy but also to desirable interpretability. This finding has important implications for auditors and other users of the detection systems of financial statement fraud. In this paper, we compile prior multi-disciplinary literature on financial statement fraud detection. Financial reporting fraud detection efforts and research may be more impactful when the findings of these different domains are combined. We anticipate that this research will be valuable for academics, analysts, regulators, practitioners, and investors.

III. NEURAL NETWORK AND FUZZY LOGIC FOR SELF DIAGNOSIS

The main concern of this paper is to understand the current working models and reinforcement of iterative models for clearly

understanding the needs and deficiency that are to be rectified and focus on specific technicalities for building an accurate technique that is highly compatible in medical field. In this process symptoms of various diseases are stored in the database with respective treatment for disease.

Artificial Intelligence is a vast area of subject dealing with technology in which Machine learning is a branch of it. In machine learning techniques a machine is trained with algorithms to perform the task by itself that are assigned to it. Machine learning primarily deals with the algorithm which is called as supervised learning. Supervised learning means training a machine under the guidance of an expert in that field. In such learning we already know the inputs given and the result generated as it requires a little involvement of the expert. In such case we may not have idea about what kind of result is generated.

In supervised learning a machine is trained for understanding the concept which accepts inputs by the set of examples that generates data patterns by separating objects from one another.

Machine learning is a branch of artificial intelligence which trains and enables machines to perform activities without human intervention. The working model of ML is explained briefly as given below.

1) Data Collection: The first and major task is data collection as it defines the quality of the project and data collected defines the performance standards of any system. Generally data is collected basing on target of the model proposed.

2) Data Preparation: Data is preprocessed after the data is collected. In this step raw data collected is converted to beneficial data, on such data the technique is applied. This process can otherwise be termed as data cleaning.

3) Choosing the Model: For representing a preprocessed data in the form of a model, a relevant algorithm is chosen basing on the requirements of task.

4) Training of a Model: In order to improve the accuracy of decision making system in machine learning a supervised learning is performed to train the data and working model.

5) Model Evaluation: Designed model can be evaluated by using various parameters. These parameters are derived from the objects. Finally, evaluated models are compared with already existing models.

6) Parameter Tuning: Parameters are gathered from the objects and they are tuned with following parameters such as training steps, supervised learning, input values, distribution and outcome etc.

7) Prediction: The proposed model can be evaluated in comparison with real time working models. It is essential to make some predictions for output basing on test datasets. When these predictions are obtained as expected by the domain experts then the project is developed further.

FUZZY LOGIC IN MEDICAL DIAGNOSIS:

Fuzzy logic is an efficient technique which is well known in current applications that stores information and gives output in the semantic articulation format. This logic works on the basis of probabilities of medical research. Diagnosis process is made better by using such fuzzy logic techniques. Fuzzy methods are applied on healthcare sector to explain the uncertainty in existing system. The main elements of this framework are symptoms and disease. Where symptoms are considered as input that identifies the kind of disease and gives as output. The framework of fuzzy logic is explained in step by step manner below:

• **Fuzzifier:** A Fuzzifier is used to perform Fuzzification process. A fuzzy set is generated by processing the input values. Therefore, fuzzifier is used to map input values into fuzzy sets.
• **Inference engine:** Database of the framework is processed with a set of instructions by an inference engine after completion of the fuzzification process.
• **Knowledgebase:** The main concept of fuzzy logic system is knowledgebase. The entire process of this framework depends on knowledgebase. It consists of formatted, unformatted data and set of instructions which is also called as database.
• **Defuzzifier:** Taking in input as Crisp logic by using inference engine, the output is generated in the form of fuzzy sets. Later, Fuzzy values are taken as input and defuzzification is performed for mapping fuzzy values to input crisp value.

Neural Network & Fuzzy logic:
This system is designed to overcome the drawbacks in current system and to help the practitioners for diagnosing the disease basing on the symptoms identified through digital intervention. A set of predefined dataset is added into the database of this framework for symptoms on different conditions. For conducting subjective diagnosis the medical history of the patient is gathered for allocating score to the symptoms. Physicians analyze data for differential diagnosis. Basing on the score points and possibility of disease to the patient are derived by the fuzzy inference using predefined datasets. The projections are validated by the physicians basing on the inference. It also updates the predefined dataset if required for performing diagnosis.

In supervised learning a machine is trained for understanding the concept which accepts inputs by the set of examples that generates data patterns by separating objects from one another.

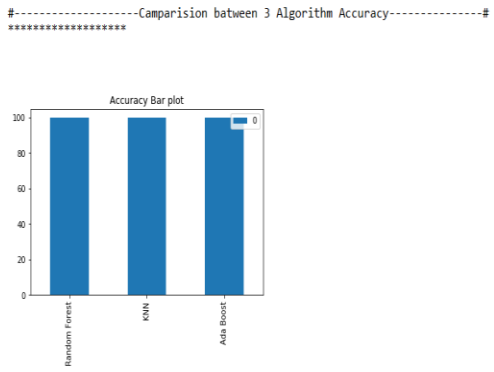

Fig.Accuracy of algorithms

This process works with a simple framework basing on antecedent and consequent roadmaps. For example, in a particular condition antecedents are converted to one numeric value. Later, using formal logic inference engine that numeric value is integrated with membership functionality of respective consequent data for generating aggregated member functions. This process is performed utilizing Logical OR Operator. In medical field it is represented as 'Either 1 OR 2 OR 3'. Finally the generated result member function undergoes defuzzification for deriving a crisp diagnosis answer.

IV.RESULTS

Artificial intelligence developed various medical diagnosis techniques that have been facing the challenge of data acquisition. Data volume, volatility and confidentiality are inaccurate in present systems. The current working models are working with minimal human interaction, such that the system is dependent. As the data storage and processing speed is an expensive task, there is a great demand to work on these drawbacks to upgrade the system. Since, these real time systems are not compatible and feasible there is a requirements of spontaneous decision making framework for better and accurate result generation.

Basing on the observed datasets, discussion and comparison of various artificial intelligence techniques is performed in this paper. Artificial intelligence techniques are very efficient such algorithms have potential to contribute an efficient framework to the medical field most particularly on diagnosis system. Nevertheless, to acquire high potentiality of AI for storing the medical data this framework is designed that is targeted to overcome major issues in the present field of medicine.

AI based diagnostic systems have to overcome few drawbacks like Diagnosis, Quality of Training, Clinical Translation, Medical Data Characteristics, Standardization and Interoperability and Secure Diagnosis.

The artificial Intelligence techniques are proven to be more efficient techniques for performing self-diagnosis by using different techniques. In this paper, a novel technique with the combination of fuzzy logic and neural network is used in combination for storing the patient data in electronic health record (EHR) more safely and the physician makes use of these techniques to obtain best accuracy when compared to traditional practices in the field of medicine.

Different kinds of AI techniques like Support Vector Machine (SVM), K-Means Clustering, Fuzzy system and the proposed model called neural network & Fuzzy logic are compared with the proposed neural network & fuzzy logic based technique for showing its accuracy in terms of time taken, memory utilized, processing speed, Accuracy and Human intervention in the Artificial Intelligence (AI) techniques. As shown in graph below in Table.

S.no	Test Case	Expected Result	Result
1	Upload dataset	Data uploaded successfully	Pass
2	Preprocess data	Data preprocess successfully	Pass
3	Handling Missing values	Handling Missing values generated successfully	Pass
4	Before Label Encoding	Successfully Encoding Before Label	Pass
5	After Label Encoding	Successfully Encoding After Label	Pass
6	Data splitting	Data splitting successfully	Pass
7	Classification	Classification successfully	Pass

8	Prediction	Prediction successfully	Pass

Table: Test cases

V.CONCLUSION

An approach to utilise the Random Forest algorithm, KNN and Adaboost algorithm for fraud detection in financial statements. We call the approach the three algorithms on datasets with significantly reduced dimensionality. The Classifications classifier gives high accuracy results that are comparable or superior to other fraud detection techniques in spite of working with reduced data and compared with graph. Cyber-attacks are constantly growing and changing, improving their malicious performance with the application of AI technologies. The malicious use of AI has transformed the landscape of potential threats in the cyber environment with technological advancement. Technological evolution demands up-to-date studies to defend against AI being used as a malicious tool by cyber criminals. Networked manufacturing devices connected via the Internet provide a greater surface for cyber-attacks. Attackers exploit this interconnectivity to amplify their actions. This literature analysis addresses the types of cyber-attacks, defense countermeasures, application of ML and DL for cyber security in Industry 4.0, advantages, and disadvantages of using AI for security

In future, discovery of additional information based on cause-event Fraud detection well as prediction of detection based on cause events, etc. The working of the proposed approach in web application.

Future research may use this present work as a reference to address AI-based cyber security issues in the context of Industry 4.0. Our approach in this research allows the improvement of the state of the art of this study, generating insights for the research community to structure defenses against potential cyber threats. As future work in this area, there is a need for constant updating of the requirements to implement cyber security actions, arising from the cybernetic technological evolution applied for both defense and attack in the context of the Industry 4.0 ecosystem.

VI.REFERENCES

[1] A. C. Jamgade and S. Zade, “Disease prediction using machine learning”, International Research Journal of Engineering and Technology, vol. 6, no. 5, pp. 6937–6938, 2020.

[2] [101] F. Ali, S. El-Sappagh, S. R. Islam, D. Kwak, A. Ali, M. Imran, and K.-S. Kwak, “A smart healthcare monitoring system for heart disease prediction based on ensemble deep learning and feature fusion”, Information Fusion, vol. 63, pp. 208–222, 2020.

[3] W. Wang, J. Lee, F. Harrou, and Y. Sun, “Early detection of parkinson’s disease using deep learning and machine learning”, IEEE Access, vol. 8, pp. 147 635–147 646, 2020.

[4] W. Wang, J. Lee, F. Harrou, and Y. Sun, “Early detection of parkinson’s disease using deep learning and machine learning,” IEEE Access, vol. 8, pp. 147 635–147 646, 2020.

[5] T. Lewick, M. Kumar, R. Hong, and W. Wu, “Intracranial hemorrhage detection in ct scans using deep learning,” in 2020 IEEE Sixth International Conference on Big Data Computing Service and Applications (BigDataService). IEEE, 2020, pp. 169–172.

[6] A. Holzinger, G. Langs, H. Denk, K. Zatloukal, and H. Müller, “Causability and explainability of artificial intelligence in

medicine," Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery, vol. 9, no. 4, p. e1312, 2019.
[7] A. C. Jamgade and S. Zade, "Disease prediction using machine learning," International Research Journal of Engineering and Technology, vol. 6, no. 5, pp. 6937–6938, 2019.
[8] E. Choi, M. T. Bahadori, A. Schuetz, W. F. Stewart, and J. Sun, "Doctor AI: Predicting clinical events via recurrent neural networks", in Machine Learning for Healthcare Conference, 2019, pp. 301–318.
[9] N. A. Al-Sammarraie, Y. M. H. Al-Mayali, and Y. A. B. El-Ebiary, "Classification and diagnosis using back propagation Artificial Neural Networks (ANN)," 2018 International Conference on Smart Computing and Electronic Enterprise (ICSCEE), 2018.
[10] D. Kartchner, T. Christensen, J. Humpherys and S. Wade, "Code2Vec: Embedding and Clustering Medical Diagnosis Data," 2017 IEEE International Conference on Healthcare Informatics (ICHI), Park City, UT, 2017, pp. 386-390.
[11] C.-H. Weng, T. C.-K. Huang, and R.-P. Han, "Disease prediction with different types of neural network classifiers," Telematics and Informatics, vol. 33, no. 2, pp. 277–292, 2016.
[12] P. Bhattacharjee, D. P. Edelson, and M. M. Churpek, "Identifying patients with sepsis on the hospital wards," Chest, vol. 151, no. 4, pp. 898–907, 2015.
[13] M. Sinha, J. Jupe, H. Mack, T. P. Coleman, S. M. Lawrence, and S. I. Fraley, "Emerging technologies for molecular diagnosis of sepsis," Clinical microbiology reviews, vol. 31, no. 2, 2013.
[14] M. S. M. Aras, F. A. Ali, F. A. Azis, S. M. S. S. A. Hamid, and M. F. H. M. Basar, "Performances evaluation and comparison of two algorithms for fuzzy logic rice cooking system (matlab fuzzy logic toolbox and fuzzytech)," in 2011 IEEE Conference on Open Systems. IEEE, 2011, pp. 400–405.
[15] G. Licata, "Employing fuzzy logic in the diagnosis of a clinical case", Health, IEEE,2010, vol. 2, no. 03, p. 211.
[16] M. Rana and R. Sedamkar, "Design of expert system for medical diagnosis using fuzzy logic," International Journal of Scientific & Engineering Research, vol. 4, no. 6, pp. 2914–2921, IEEE, 2003.