

Artificial Intelligence and Fraud Detection of Listed Deposit Money Banks in Nigeria

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Abstract

The study examined the impact of artificial intelligence on fraud detection of listed deposit money banks in Nigeria. Fraud detection was used as independent variable while Artificial intelligence was used as the independent variable. The determinants of artificial intelligence in this study will be automated chatbot, deep learning machine, machine learning solutions and natural language processing. The geographical coverage of this study will be in Nigeria. The study will cover 11 years spanning from 2012 to 2022; within this period CBN introduced cashless policy into the Nigerian Financial system. More so, a lot of Banks introduced artificial intelligence into their operations within this period. This study employ survey design, Therefore the study employed a survey method of data collection, via a self-administered questionnaire. The data was collected from deposit money banks in Kaduna state. Out of the 14 Listed Deposit money Banks in Nigeria, 10 banks will be selected based on simple random Sampling Technique. The tool will be statistical Package for Statistical sciences (SPSS) version 20. Regression analysis will be used to predict the effect of the independent variable on the dependent variable and also used to either accept or reject null hypothesis. Validity and reliability test will be carried out. The result from Table 4.6 reveals that automated chat boat has a coefficient value of 0.413 and P-value 0.000. This signifies that automated chat boat has a positive and significant influence on deposit money banks. The regression model in Table 4.6 indicated that deep learning machine has a coefficient value 0.212 and P value 0.009. This signified that deep learning machine is positively and significantly impacting fraud detection among deposit money bank. From the Table 4.6 it was observed that machine learning solution has a coefficient value 0.172 and P value 0.069. This shows that machine learning solution is positively but not significant in detecting fraud. From the Table 4.6 the finding shows that natural learning process has a coefficient value -.207 and P value 0.230 this indicates that natural learning process is insignificant on fraud detection. Huge investment in acquisition of deep learning machine should be ensured in order to boost fraud detection and protection in credit issuing and assessment in order to improve corporate performance of banks.

Keywords: *Artificial Intelligence, Fraud Detection, Automated Chatbots, Deep Learning Machine, Machine Learning Solution and Natural Language Processing.*

1.1 Introduction

The financial system plays a critical role in an economy. It enables the financial intermediation process, which facilitates the flow of funds between savers and borrowers, thus ensuring that financial resources are allocated efficiently towards economic growth and development. The Banking sector is one of the most critical sectors in an economy arising from its wide effects on the magnitude and direction of economic growth. According to Kajola, Alao and Ojunrongbe (2019), the banking sector leads to economic growth because the role of the sector involves channeling of funds from the surplus unit to the deficit unit to finance feasible and viable investment. In spite of the fact that the banking industry in Nigeria immensely controlled and regulated fraud has been on the increase, for instance fraud in the Nigeria banking industry has been one of the major issues affecting the banking industry in Nigeria. According to Oseni (2006) the incessant frauds in the banking industry are getting to a level at which many stakeholders in the industry are losing their trust and confidence in the industry, the fear is now widespread that the increasing wave of fraud in the recent years, if not prevented might pose certain threats to the survival of financial institutions and the performance of the banking industry as a whole. Fraud has been a major case of corporate failure. Cases such as Enron, WorldCom, Global Crossing and Tyco are among the most prominent ones who had suffered from the devastating impact of fraud. These costly scandals have increased global concerns about fraud, wiping out billions of dollars of shareholder value, and led to the erosion of investors and public confidence in the financial markets (Peterson & Buckhoff, 2004; Rezaee, Crumley & Elmore, 2004; Brody & Pacini, 2006). According to The Association of Certified Fraud Examiners (ACFE) fraud is defined as the use of one's occupation for personal enrichment through the deliberate misuse or misapplication of the employing organization's resources or assets (ACFE, 2002). Also, Kasum (2007) states that frauds in Nigerian banking industry are so common that almost all cadres of staff are involved in one form of fraud or the other irrespective of their post. Also, the level at which the Nation is negatively affected by fraud requires urgent attention. In recent years fraudulent activities are increasing at a tremendous rate which banking sector is not exempted from such act (Enofe, Aigbepue & Ochuwa, 2017). These frauds have resultant damaging effect both to the developing economy, banks and investors/individuals. Therefore, fraud is to enrich oneself by intentionally reducing the value/worth of an asset in secret. According to Nipion (2015), fraud usually occurs in different form and can lead to bankruptcy, inflation, increase in crime, reduced income per head, unemployment, and can also affect the economic system of a country.

Fraud detection has been employed as Fraud detective controls are designed to provide warnings, or evidence that fraud is occurring. Effective internal controls are one of the strongest deterrents to fraudulent behavior and fraudulent actions. Simultaneous use of preventive and detective internal controls enhances any fraud risk management program's effectiveness (Josiah, Samson & Akpeti, 2012). Fraud detection methods need to be flexible, adaptable, and continuously changing to meet the changes in the risk environment. The emergence of artificial intelligence technologies has created new avenues for enhancing various aspects of investigative firms and financial institutions. Investigative agencies and banking institutions use artificial intelligence technologies such as machine learning, deep learning machine to monitor, detect, and mitigate financial misconduct. Artificial intelligence will be used as the independent variable in this study as a determinants financial fraud detection of listed money deposit banks in Nigeria. Accenture (2018) defines artificial intelligence as, a computer system that can sense, comprehend, act and learn. That is, a system that can perceive the world around it, analyze and understand the information it receives, take actions based on that understanding, and improve its performance by learning from what happened the use of machine learning algorithms is use as a fraud detection tools. Artificial intelligence

powered chat bots and virtual assistants to provide personified customer support. These virtual agents can handle routine customer inquiries, assist with account management, provide product recommendations, and offer routine support that enhancing customer experience and reduce the workload on human customer service representatives. Likewise in Risk assessment and credit scoring artificial intelligence algorithms is used to analyses customer data, credit histories, and financial information to assess creditworthiness and determine the risk associated with lending decision.

Deep learning and machine learning solutions are forms of artificial intelligence that are used for credit risk assessment and cyber security assessment. Lastly natural language processing enables the analysis of textual data such as chats, transcripts, emails to identify fraud related content. According to Need good and Kennedy (2021) postulated that artificial intelligence detect and predicts irregularities before they occur and develops into actual incidents, this shows a relationship between artificial intelligence and fraud detection. The central question of this study is whether artificial intelligence has been able to improve fraud detection in listed money deposit banks in Nigeria. Professionalism and ethics of banking appeared to have been grossly undermined in the banking sector. The banks over the years have lost substantial amount of their quality assets and integrity to the local and international communities, due to the activities of fraudsters in which majority of them were bank officials (The Association of Certified Fraud Examiners, 2014). According to Nigerian deposit insurance corporation NDIC (2014), the increase in expected/actual loss in fraud and forgeries was largely due to astronomical increase in the occurrence of online banking/ATM and fraudulent transfer/withdrawal of deposit funds as well as insider fraud. A significant fraud case in an organization does not only undermine or shake up the financial stability of the company but, also ruins the company's reputation, thereby posing a threat to stakeholders, shareholders' and other investors. The Financial institution training centre (FITC) Reports of 24th August 2023 reveals a significant increase of 276.98 % in the total amount involved in fraud cases in financial institution, during second quarter of 2023, compared to the first quarter. The sum increased from N2.58 billion to N9.75 billion. In the second quarter of 2023, there was a 6.40% decrease in outsider involvement in fraud cases, with the number dropping from 12,351 cases in the previous quarter to 11,561 cases. However, staff involvement in fraud increased by 22.22 % rising from 72 cases in first quarter to 88 cases in second quarter of 2023. Bank branch-related fraud saw a remarkable increase of 1834.88% escalating from N361.2 million to N6.99 billion. According to Oluwakemi Abimbola (2023), that Banks recorded 117% increases in customers' complaints on the modularity of their financial transaction. The complaints of customers to five banks rose from 3,156,704 to 6,865,217.

In addition to the aforementioned challenges facing Nigeria banks, Few studies have been conducted on artificial intelligence and fraud detection of banks at different times in developed as well as developing countries, most of which are well documented in accounting and finance literatures. Most research done on artificial intelligence in the Nigerian financial sector is primarily focused on reducing operational costs, combating fast-paced market competition, expanding reach of the unbanked, increasing speed in handling complex business, It highlights the overwhelming importance and essential role of artificial intelligence in improving accuracy, convenience, transactions, fraud detection and credit risk assessment. For example Eneh, Okeke and Amahalu (2023); Choi and Lee (2018); Mytnyk, thachyk, shakhovska and syerov (2023); Dayyabu, Arumugam and Balasingam, (2023); Poudel and Dhungana, (2022); Ikhsan, Ednoer, Kridantika and Firmansyah (2022); Oboh (2023); Richman (2019); Shittu (2020); Yujie (2023); None of these studies to the best of the researcher's knowledge have been able to establish a clear, direct and quantitative link between artificial intelligence and fraud detection using the combination of variables used in this study. Therefore is need for empirical study in Nigeria that will include the combination of variables which are automated chatbot, deep learning machine, machine learning solution and natural language processing in order to address variable inclusion gap.

Also Bank focused theory, stakeholder's theory, fraud diamond theory and machine learning theory will be used to underpin the link among the variable of this research in order to address theoretical gap in this study.

From the review of relevant literature on artificial Intelligence most studies were focused on conceptual frameworks and exploratory literature reviews, exploratory Survey, and conceptual frameworks, and are mostly expressed in qualitative form. For example Alarfaj, Malik, Khan, Almusallam, Ramzan, Ahmed (2022); Lakshmi and Kavilla (2018); Minastireanu and Mesnita (2019). This study utilized the quantitative form of research, based on that descriptive, correlation, and regression analysis alongside robust tests like normality test will be carried.

Finally the review of literatures indicates that most research was for other countries other than in Nigeria and their findings may not be applicable in Nigeria due to differences in code of governance practice and differences in technology software used for example Lakshmi and Kavilla (2018); Reddi, Bhanushali and Venkata (2023); Yujie (2023).

Therefore this study intends to bridge a gap on the limitations of the reviewed literature and to fill the existing gaps by examining the impact of artificial intelligence on fraud detection of listed deposit money banks in Nigeria. The specific objectives of this study are to:

- i. Evaluate the effect of automated chat-bots on fraud detection of listed deposit money banks in Nigeria.
- ii. Investigate the effect of deep learning machine on fraud detection of listed deposit money banks in Nigeria.
- iii. Investigate the nature of the effect of machine learning solution on fraud detection of listed deposit money banks in Nigeria.
- iv. To investigate the effect of natural language processing on fraud detection of listed deposit money banks in Nigeria.

2.0 Review of Related Literature

2.1 Conceptual Review

2.1.1 Artificial Intelligence

According to Suresh, Aishwary and Akalya (2020), Artificial Intelligence is intelligence exhibited by machines contrary to the usual intelligence displayed by people. It is the ability of a machine or a computer to copy from something that is natural, in terms of acquiring and applying knowledge and skills. When a machine mimics a human mind by thinking for itself, likewise Richman (2019), refers to Artificial Intelligence as a suite of modeling techniques that bring together some combination of huge data sets, non-traditional (i.e. including unstructured and changing) data, demonstrating complex relationships between variables sometimes result in opaque ("black box") models, and models with rapidly time varying structures. Simply put, Artificial Intelligence is the ability of machines in gathering and analyzing both structured and unstructured data and produces a particular result where humans sometimes have no understanding of how it works.

According to Lee, Roy and Baucus (2019), that artificial are intelligent systems created to use data, analyze and observe to perform certain tasks without needing to be programmed to do so. Artificial intelligence is the ability of a system to identify, interpret, make inference, and learn from data to achieve predetermined organizational and societal goals. According to Mikalef and Gupta (2021) artificial does not necessary replaces humans, but instead as an augmentation agent for performing difficult and time-consuming tasks. Jeane (2018) describes artificial intelligence as computing systems that exhibit some form of human intelligence, which covers a number of interlinked technologies including data mining, machine learning, speech recognition, and image recognition and sentiment analysis. This according to him is exemplified by machine learning which may be used to automatically code accounting entries.

2.1.2 Automated Chat-bots

According to Morgaji, (2021) identified Chat-bots as computer programs designed to simulate a conversation, both voice and text with human users, especially over the internet. They are described as a never-sleeping, cost-efficient and powerful way to consumers. Also Adeshina (2020) observed chat-bot technology has been a tool that has driven the banking sector to efficiently serve its customer better. The ability to understand language and engage in discussions enables chat-bots to provide customers services and enhance customer experience by reducing the effort required by consumers and permitting customers to allocate their time better (Mimoun Poncin & Garnier, 2017). According to Shashank (2021), chat-bot is a software application that listens to a user's query in natural language and responds accordingly. Chat-bots are divided into 3 types based on their intended function. Menu/button based chat-bots, keyword recognition chat-bot and contextual chat-bot.

Menu/Button-Based Chat-bots is commonly used and the simplest type of chat-bots in the market today is the menu based chat-bots, which are in form of buttons and top-down menus. These chat-bots follow the principles of decision trees, where you make your decisions to get the ultimate answers. The user is instructed to make these decisions by selecting their options and dig deeper towards the appropriate response from the AI. However, these menu-based chat bots are comparatively slower in terms of performance and cannot be completely reliable to get the desired answer. Also, Keyword Recognition-Based Chat-bots recognizes specific keywords in order to produce a desired result. They listen to what the users enter and respond accordingly.

Contextual Chat-bots are one of the most technologically chat-bot determines an appropriate response to the user by using the algorithms. Advanced chat-bots in the market today they use voice recognition, speech-to-text etc.

2.1.3 Deep Learning Machine

Deep learning machine is a branch of machine learning that make use of machine learning functionality, and moves beyond its capabilities. Deep learning algorithm is interpreted as a layered structure that replicate the structure of the human brain Dietmar (2023). According to Quinio, Harfouche, Skandrani and Marciniak (2017) deep learning is based on creating deep neural networks with several hidden layers, where the layer closest to the data vectors, learns simple features, while the higher layers learns higher level features.

According to Amitha, Amudha and Sivakumari (2021) that deep learning machine is a class of machine learning which performs much better on unstructured data. What differentiates deep learning machine from the more traditional learning machine is the use of an artificial neural network architecture, (Afiouni 2019;Wamba-Taguimdje,Kamdjou&Wanko, 2020).Deep learning is a type of machine learning and artificial intelligence that imitate the way humans gain certain types of knowledge. Computer programs that use deep learning go through the same process as a toddler learning to identify things or data. Unlike the toddler who takes weeks or even months to understand the concept of a dog for example, a computer program that uses deep learning algorithms can be shown a training set and sort through millions of images, accurately identifying which images have dogs in them, within a few minutes. Deep learning is currently used in, image recognition tools, natural language processing and speech recognition software's, all types of big data analytics application, language translation, medical diagnosis, stock market trading signals, network security. Deep learning differentiates itself from machine learning through the way it solves problems. Machine learning requires domain experts to identify most applied features. On the other hand deep learning understands features incrementally thus eliminating the need for domain expertise. Currently deep learning is used in common technologies such as in automatic facial recognition systems, digital assistants and fraud detection according to (Alexander2023). Deep learning methods are, conventional neural network (CNN), recurrent neural network(RNN), denoising auto encoder(DAE),deep beliefs network(DBN) ,and long short-

term memory(LSTM).CNN is a technique generally employed for image processing applications. RNN is designed to recognize sequence and patterns such as speech, handwriting, and text. DAE is a technique that learns features from a noisy datasets. DBN is used for high dimensional learning of data. LSTM is technique that is used as feedback connections (Amir ,Sina,&Annamaria2020; Awad&Khanna2015) as (cited in Martin, Suneel&Maddulety2019) observed that Deep Learning Machine has been highlighted as a tool that can be applied to various problems, especially in fields that require data to be interpreted and acted upon. It was concluded that the future of deep machine learning in the banking and financial industry is well recognized, and it is expected that the field of risk management will also seek to apply deep machine learning techniques to enhance their capabilities. In the opinion of Liebergen (2017) as cited in Martin, et al (2019); Deep learning techniques have been proven to perform better than traditional statistical techniques, both in classification and also predictive accuracy especially in credit risk assessment. The usage of deep learning Machine is not just constrained to creating an accurate, segmented evaluation of creditworthiness but also, entitled substantial and greater access to credit.

2.1.4 Machine Learning Solution

Machine learning solution empowers the machine to “learn” without explicit programming. This learning process is accomplished by machine itself through collecting data, analyzing data, and making predictions (Wang et al, 2019).According to Afiouni(2019) Machine learning is a subset of AI that is capable of learning from data and making predictions and /or decisions without human dictated rules .Machine learning solution can be divide into four categories: supervised, semi-supervised, unsupervised and reinforcement learning (Wang et al., 2019).In supervised learning the training data include the target value (Schmidt, Zimmermann, Moehring, Mahrng & Keller, 2020).For unsupervised learning approach target value is not include in the training set rather the system has to analyze the training data to solve the problem(Afiouni, 2019). Despite the far-reaching development artificial intelligence has brought to the banking sector in terms of cost savings, accuracy and speed in transaction processing, efficiency and return on assets, this will never be fully appreciated without taking adequate security measures in order to ensure reliable information protection systems of combat the scourge of cyber security threat. Therefore machine learning solution is needed in the banks in assessing cyber security. According to Jibril (2020) the term cyber security has many different definitions but could be summarized as the field of computer systems and data protection, both in hardware and software, as well as protection from misleading guidance that is provided by digital and physical services. Simply put, cyber security is the application of technologies, processes, and controls to protect systems, networks, programs, devices and data from cyber-attacks;

Machine learning solution preemptively stamps out cyber threats and bolsters security infrastructure through pattern detection, real-time cybercrime mapping and thorough penetration testing. It can help banking institutions withstand cyber-attacks, prevent data leaks, and ensure maximum security of their operations. Machine learning is increasingly being used by banks to uncover threats and automatically squash them before they can wreak havoc. As hackers get more and more creative with their tactics, banks face increased pressure to stay ahead of criminals when fighting financial crime, especially fraud and money laundering. Supervised machine learning solution, plays a pivotal role in fraud detection. This technique involves training a model using labeled data to recognize patterns associated with fraudulent transactions. Financial institutions, for instance, can use historical transaction data to build models that learn the characteristics of legitimate and fraudulent transactions. These models can then be used to classify new transactions as either normal or suspicious, allowing for real-time fraud detection.(Muhammad, Muzamil and Abbas,2023).This study will adopt the definition of Afiouni (2019).According to Afiouni (2019), Machine learning is a subset of AI that is capable of learning from data and making predictions and /or decisions without human dictated rules.

2.1.5 Natural language processing

Natural language processing is a branch of artificial intelligence that gives computers the ability to interpret, manipulate, and comprehend human language. According to Irum, Hussain, Buller, Mirani and Anam (2020), Natural language processing is Natural language processing (NLP) is branch of artificial intelligence which actually deals with natural language processing and computer interpretation. Natural Language processing (NLP) is subfield of artificial intelligence which focuses computational linguistics interpretation. This field encompasses several areas of textual and audio interpretation by integration of machine learning methods which behaves statistically. It is also covers the area of the pragmatic research of computational linguistics became very vast and powerful by implementation of various techniques. Li and Chen, 2016) Natural language processing techniques enable the analysis of textual data, such as chat transcripts, emails, or social media posts, to identify fraud-related content. Sentiment analysis and named entity recognition are examples of Natural language processing applications in fraud prevention. For instance, sentiment analysis can identify negative sentiments expressed in customer reviews that may be indicative of fraudulent practices or dissatisfaction with a product or service.

Concept of Financial Fraud Detection

The concept of fraud has been defined by various scholars. According to the Association of Certified Fraud Examiners defines fraud as “any illegal acts characterized by deceit, concealment or violation of trust. These acts are not dependent on the application of threat of violence or of physical force”. Frauds are perpetrated by individuals and organizations to obtain money, property or services; to avoid payment or loss of services; or to secure personal or business advantage.

Awe (2005) he defined fraud as the intentional alteration of records accompanied by the defalcation of asset in order to deceive certain group of people for the benefit of the perpetrator. Although not all fraud is accompanied by the defalcation of asset but majorities of frauds perpetrated by low and middle officers normally involve the defalcation of asset. According to KirkPatrick (1985), fraud means an act of dishonest, deceit and imposture. A person who pretend to be what he’s not is a fraud, a snare a deceptive trick and a cheat. Fraud covers a range of irregularities and illegal acts characterized by intentional deception. It can be perpetrated for the benefit of or to the detriment of the organization and by persons outside as well as inside the organization. It can also be described as diverse means used by resourceful people to get an advantage over another by suppressing the truth, trickery misinformation, false suggestions, cunning, deceit, and other methods by which to cheat. By extension, fraud is clued embezzlement, theft, or any attempt to steal or unlawfully obtain the assets of banks. Bank Administration Institute (1989). Employees, customers, in conjunction with others within and outside the Bank can commit fraud. Frauds are not new in banks; they are as old as the industry itself. Fraud has been classified in various ways and using various parameters. Also Idolor (2010), defines fraud as a conscious and deliberate action by a person or group of persons with the intention of altering the truth or fact for selfish personal gains, and it has now become the most single veritable threat to the growth of banking industry. However this study will use the following classification of fraud, employed by the perpetrators criteria stated by Adeyemo (2012) Management of the banks (otherwise referred to as management fraud), Insiders (perpetrators are purely the employees of the banks), Outsiders (These include customers and/or non-customers of the banks). Outsiders/Insiders. (This is a collaboration of the bank staff and outsiders as described).

2.2 Theoretical Framework

2.2.1 Machine Learning Theory

In 1959, Arthur Samuel pioneered the study of artificial brain power. He described machine learning as “the study that gives computers the ability to learn without being explicitly programmed.” This theory holds that a machine has to be intelligent and responsive in a manner that cannot be differentiated from that of a human being. He argued that machine learns from the past experiences (input data) and makes future predictions. In order to perform the task, the system learns from the data-set provided. According to Avrim (2014), Machine Learning Theory also has a number of fundamental connections to other disciplines. This is dependent on the specific needs to which machine learning model can be put in order to optimize performance especially in fields that requires data to be interpreted and acted upon. The machine learning theory suits the deep learning and machine learning solution, banks can use machine learning model to analyze real time data on the basis of the most recent transactions, current market conditions, and relevant current events. To access to semi-structured sources such as mobile phone usage, text message activities, social media usage and activity to enhance the rating precision of loans.it can help banking institutions withstand cyber-attacks, prevent data leaks, and ensure maximum security of their operations. Thereby enabling institutions to mitigate regulatory sanction and improve profitability. This theory will underpin or explain the deep learning and machine learning solutions.

2.3 Empirical Review

Eneh, Okeke and Amahalu (2023) examined Artificial Intelligence and fraud detection of deposit money banks in Nigeria. The variables were artificial intelligence and fraud detection. *This study* adopted field survey research design. The population was six hundred and fifty one (651) staff of the sampled fourteen deposit money banks. Taro Yamane formula was employed to determine the sample size of 248. Of the 248 copies of administered questionnaire, 174 copies were collected. Descriptive statistics was employed, while inferential statistics using Cronbach Alpha, Spearman’s Correlation and Paired Sample T-Test were employed to test the hypotheses with the aid of SPSS version 23. The specific findings revealed that Facial recognition artificial intelligence has a significant and positive effect on transaction monitoring (t-statistic = 6.9622; p-value = 0.000); Chatbot artificial intelligence has a significant and positive effect on transaction monitoring (t-statistic = 4.909; p-value = 0.000); Digital assistant artificial intelligence has a significant and positive effect on transaction monitoring (t-statistic = 6.5659; p-value = 0.000) of deposit money banks in Awka-South Anambra State, Nigeria at 5% level of significance respectively. This study recommended that firms should employ the artificial intelligence tools to provide better security and surveillance opportunities, which would also let human identification be fully automated hence enhancing productivity while also raising the rate of accuracy and the detection of fraud.

Yujie (2023) examined Credit card Fraud Detection Using Machine Learning and Deep Learning. The study explore different deep learning and machine learning models. Logistics regression was used to analyze the dataset. Secondary data was used for the dataset for fraud detection containing credit card transactions made by European cardholders in 2013. The finding revealed that credit card is significant problem that affects both financial institutions and individuals worldwide. Deep learning machine and machine learning solution has shown also to detect and prevent credit card fraud. Lastly deep learning machine and machine learning solution models which are borderline smote, decision trees, random forest and neural networks also helps to detect credit card fraud.

The study above relates to the study of Komakula and Jagadeeshwa (2023) examined An Exploration of Deep Learning Algorithm for Fraud Detection using Spark Platform. The study compares the performance of deep learning approaches for credit card detection with other machine learning algorithms. Secondary sources of data were utilized. The dataset used were European card data, small card data and tall card data. All 3 data

sets in the study was labeled with a class of value of 0 indicating no fraud and a class of value of 1 indicating fraud. The findings revealed that deep learning algorithm has influence on the fraud detection.

Akindutire, Ayodeji and Oniwura (2023) examined the impact of Bank verification number on fraud prevention and detection in Nigeria. Descriptive and regression analyses were conducted using data from respondents in the Nigerian Banking sector. The result of analysis indicated that bank verification number does not significantly effect to detect and prevent fraudulent practices in Nigerian banking system. The study concluded that bank-related factors such as average customer size, total deposit and staff strength had significant impact on the effectiveness of BVN in preventing fraud in Nigerian banking.

Buyuktepe, Shakhovska, kar and Syerov (2023) examined food fraud detection using explainable artificial intelligence. Food fraud detection was the independent variable and dependent variable was explainable artificial intelligence (XAI) This study covers numerous use cases of food fraud risk prediction using explainable artificial intelligence techniques, such as LIME, SHAP and WIT. Secondary data was used in this study. The dataset was retrieved from the Rapid Alert System for Food(RASSF) and Feed system and economically motivated adulteration database(EMA).The game theory was use to underpin the study. The study scope was from 2005-2015.The finding shows that explainable AI tools can provide information to interpret the model and result of deep learning and also data source EMA and RASSF has greatest impact on the model's prediction. The adoption of artificial intelligence help to reduce food supply chain fraud.

Manyo, Ezekiel, Bassey, Wonah, Omang, Ekpo and Chike (2023) examined the effect of fraud on commercial banks' performance in Nigeria. The study utilizes secondary sources of data extracted from the Nigerian Deposit Insurance Corporation (NDIC) Annual Report and CBN Statistical Bulletin from 1994 to 2020. Statistical methods such as descriptive analysis, Pearson correlation and OLS regression techniques were employed in the evaluation of the data. The result of the hypotheses revealed number of fraud cases as well as the total amount lost to fraud had a positive and significant impact on bank performance while the total number of staff involved in fraud was found to be negative and significant on deposit money banks performance in Nigeria.

Mytnyk, Thachyk, Shakhovska and Syerov (2023) examined application of Artificial Intelligence for Fraudulent Banking Operations Recognition in Ukarine. This study focuses on machine learning algorithms as a tool well suited for analyzing and recognizing online banking transactions. The study also details various methods for improving detection accuracy, i.e., handling highly imbalanced datasets, feature transformation, and feature engineering. Secondary data was used, experimental research design was used in this study as well regression analysis. The finding shows that artificial neural network, increases the accuracy of detecting fraudulent transactions.

Oboh (2023) examined emotional intelligence and fraud tendency: a survey of future accountants in Nigeria. Emotional intelligence was the independent variable and fraud tendency was use as the dependent variable. The study adopts a survey strategy and uses a self-administered questionnaire to obtain primary data from participants. The population consists of 493 registered final-year accounting students from three southwest Nigerian universities, made up of 210 students from the University of Lagos (UNILAG), representing federal universities, 220 students from the Lagos State University (LASU), representing state universities and 63 students from AfeBabalola University Ado-Ekiti (ABUAD), representing private universities, all sourced from the accounting departments of the respective universities. The study uses Yamane (1967) sample formula to determine the sample size as 335 participants who are future accountants. The sample was drawn from the population using a random sampling design after grouping the participants into three strata according to their universities. The study employed Pearson correlation and regression analysis to test its hypothesis. The study found that future accountants in Nigeria are emotionally intelligent and have a high fraud tendency. Also, it found a significant fraud tendency, suggesting that future accountants that are emotionally intelligent

have a higher tendency to rationalize and engage in occupational fraud. In addition, the study found that academic intelligence, a control variable, positively associates with fraud tendency.

Dayyabu, Arumugam and Balasingam (2023) the application of artificial intelligence techniques in credit card fraud detection in Malaysia: A quantitative study. The independent variable used in the study was artificial intelligence techniques and the dependent variable was credit card fraud detection. Primary data was used in this study, the data acquired from 100 respondents across the accounting and finance industry using SPSS. Regression analysis, Pearson correlation coefficient and reliability analysis was conducted. The finding revealed that artificial intelligent techniques machine learning, data mining and fuzzy logic have a significant positive relationship with credit card fraud detection. The study concluded that artificial intelligence provides experts with better accuracy and efficiency in detecting fraudulent transactions.

Poudel and Dhungana (2022) examined artificial intelligence for energy fraud detection in Nepal: a review. The period of the study covered was from 2009-2011, secondary data was used in this study, the time series energy usage data were collected from various energy sector. The data consists of 5000 residential household and 600 business consumers. The data was retrieved from Irish social science data archive centre. The analysis was carried using regression analysis, comparative analysis as well as performance metric. The findings of the study revealed that artificial intelligence which is machine learning and deep learning machine has significant influence on the fraud detection energy firms.

Ikhsan, Ednoer, Kridantika and Firmansyah (2022) examined Fraud Detection Automation through Data Analytics and Artificial Intelligence. his study employs a qualitative method with a scoping review approach to discuss the implementation of data analytics and artificial intelligence in fraud detection automation. The study used secondary data from 24 journal articles in online media indexed by Scopus and Sinta according to the theme of the discussion. The scoping review steps in this study are to identify research questions: "How is the implementation of data analytics and AI in fraud detection automation. This study concludes that various fraud detection models based on data analytics and artificial intelligence have a high accuracy value in improving audit quality. These models with various algorithms, variables, and input data can be a blueprint for developing a fraud detection system following the organization's characteristics.

Sylvester and Chioma, (2022) examined assessment of knowledge and practice of criminal intelligence and staff profiling for fraud prevention in Nigerian banks. The study adopted the mixed method research design of descriptive survey and key informant interview. Multistage sampling technique was used to select the sample population for the study a total of 324 respondents was sampled using the Taro Yamane formula for sample size determination. Questionnaire and key person's interview were used as data collection instrument. The findings of the study conclude that bank staff is aware and knowledgeable of criminal intelligence and staff profiling as an effective tool for fraud prevention. Beyond the awareness, bank staff are also knowledgeable on the application of criminal intelligence and staff profiling, while they also agreed that the extent of application of criminal intelligence and staff profiling in the recruitment, placement and monitoring of staff is low. However, the study recommends that senior management of banks should be given adequate training and this training should be regularly updated on criminal intelligence and monitoring, as well as staff profiling. This would facilitate a greater uptake of credible intelligence and the prevention of bank fraud and other criminal activities.

Akpanobong and Essien (2022) examined Artificial intelligence adoption for financial services optimizations and innovation by commercial banks in Nigeria The variables of the study were AIs for fraud detection and personalized banking experience. A sample size of 143 selected from a population of 174 comprising accounting lecturers in public universities in Akwalbom State and bank managers, operational staff and key personnel in commercial banks operating in Uyo, Akwalbom State were used for the study. Descriptive survey research design was employed for the study. The research instrument used for the study is a researcher-developed questionnaire tagged "Artificial Intelligence Adoptions for Financial Process Innovation Questionnaire" (AIAFPIQ). The data generated was analyzed using Mean, standard deviation and t-test

Analysis. Findings of the study reveal that AI can be applied for fraud detection and personalized banking experience. Furthermore, Experts (Bankers and Accounting Lecturers) do not differ significantly on their responses on adoption artificial intelligence (AI) in fraud detection, and personalized banking experience in promoting financial process innovation by commercial banks in Nigeria. It is recommended among others that AIs should be systematically implemented by banks not just as a form of competition but as an overall business strategy.

Aminat, Ezekiel and Obafemi (2023) investigated The Impact of Internal Control Mechanisms on Fraud Detection and Prevention in Nigeria Deposit Money Banks. This research used primary data to ensure relevance. The population will include 22 deposit money banks (DMBs), formerly commercial banks. A purposive sampling technique choose five systemically significant banks (SIBs), comprising tier-one institutions First Bank, UBA, Guaranty Trust Bank, Access Bank, and Zenith Bank. These banks were chosen for their enormous assets and dominance among deposit money banks. Twenty management staff members were randomly selected from each purposely sampled bank based on their financial fraud training and experience in deposit money banking. Regression analysis was used to analyze the data. Discoveries from the study revealed that the control environment exerts a positive significant relationship with fraud detection and prevention in Nigeria. Control activities exert positive insignificant impact on fraud detection and prevention in Nigeria. Hence, the study suggested that the management of DMBs should adopt proactive actions towards its internal control; risk assessment of DMBs should be constantly carried out by the management.

Martin, Michael, and Alexander (2020) examined relationship between AI-based chat bots and users compliance. The study used experimental research design. The hypotheses were tested by means of a randomized online experiment. The online experiment was conducted with 153 participants. The findings revealed that humans acknowledge chat agents as source of persuasive messages. This is not to say that chat agents are more or less persuasive compared to humans, but rather that the degree to which humans comply with the artificial social agent depends on the techniques applied during human-Chabot communication.

This findings above, agrees with the studies of Shittu (2020) the Impact of Chat bots in the Nigerian Banking Sector. The study used descriptive research/conceptual paper review. The study found out that, technology has been a tool that has driven the banking sector to efficiently serve its customer better. The study concluded that if stakeholders in the Nigerian banking sector intend to be relevant in the industry of the future, adoption of a dynamic plan is necessary as the future promises an exciting partnership between human professionals and Artificial Intelligence.

Cîmpeanu, Dragomir and Zota (2023) examined Banking Chat-bots: How Artificial Intelligence Helps the Banks. The study was solely on qualitative research. The study used, several methods that are part of qualitative research. The several methods used are case study, participant observation, focus on group and the study of documents. The finding revealed that chat-bots offers customers facilitates customer/bank communication and reduces the time required to conduct these operation.

Choi and Lee (2018) examined an artificial intelligence approach to financial fraud detection under IoT environment in Korea. The independent variable used was artificial intelligence approach using deep learning and machine as the determinant of AI, while dependent variable was fraud detection. Experimental research design was used, based on real financial data in Korea. The financial fraud method using machine learning and deep learning methodology from 2016-2018. The finding shows that machine learning has the higher fraud detection rate as compare to deep learning machine.

Richman (2019) investigated the Impact of Artificial Intelligence on Financial Sector in Nigeria. The study adopted the qualitative approach. The findings shows that artificial intelligence has revolutionized, and this will unlock significant opportunities that would transform retail lending, product design, and the overall banking model to the mass market. Also the findings revealed that developments in machine learning are

opening the way for advanced applications. Data on which the amount of data is set to grow even faster in Financial Industry, since Artificial Intelligence is fed by data

3.0 Methodology

This study employed survey research design. This is because it aim is to gather relevant and first-hand information necessary for intensive study and analysis. Therefore the study employed a survey method of data collection, via a self-administered questionnaire .The data was collected from deposit money banks in Kaduna state for quick responses and avoidance of delay, as well as getting first-hand information about the research. The study is conducted in Nigeria, focusing on quoted deposit money banks in Nigeria Exchange Group from 2012 to 2023. The choice of the sectors is premised on the fact that deposit money banks in Nigeria is one of the intermediary companies between depositors and borrowers in Nigeria. Population is 14 Listed Deposit Money Banks that are quoted on the floor of the Nigerian Exchange group as at 31st December 2023. The study used purposive sampling technique to select 10 quoted banks out of the total population as the sample size. The data collected was analyzed using descriptive statistics, correlation matrix and regression analysis.

Model Specification

This represents the techniques employed in analyzing the data collected. The study adapted the Model of Andre Francis (2008). $Y=f(x_1 + x_2+ 3x + x_4)$

The model was modified to suit the variables used. Hence the model for the study is anchored on the specific objectives

$$FD = F(ACB, DLM, MLS, NLP)-----1$$

This can be econometrically expressed as

$$FD_{it} = \beta_0 + \beta_1 ACB_{it} + \beta_2 DLM_{it} + \beta_3 MLS_{it} + \beta_4 NLP_{it} + \epsilon_{it}.....2$$

Where,

- FD_{it} = Fraud detection i at time t,
- ACBS = Automated chatbots banking
- DLM = Deep learning machine
- MLS = Machine learning solution
- NLP = Natural language processing

- 1 = constant
- μ = Error term
- n =No of Banks

β 0 = Constant term (intercept) of the study model.

β 1– β 4= Coefficient of artificial intelligence

U_{it}= Error term (stochastic term) of firm i at time t,

ε_{it}= component of unobserved error term of firm i in period t,

i= firm identifier (10banks),

t= time variable (2011, 2012,2023) – (Eleven Years)

μ = Error term

Decision Rule

Accept Null if P-Value is greater than 5% and reject Alternate

Accept Alternate if P- Value is less than 5% and reject Null

4.0 Data Analysis

4.1 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
FRDICT	146	2.13	4.75	3.7495	.58120	-.669	.201	-.316	.399
AUCB	146	2.17	5.00	3.8287	.58312	-.621	.201	.556	.399
DLMR	146	2.00	5.00	3.7225	.70523	-.772	.201	.114	.399
MLS	146	2.00	5.00	3.5931	.69663	-.421	.201	-.377	.399
NLP	146	1.75	5.00	3.7101	.78950	-.379	.201	-.401	.399
Valid (listwise)	N 146								

Note a mean above 3.0 indicate accepted, mean below 3 indicate unaccepted and finally mean = 3.0 is undecided.

The descriptive statistics is where minimum, maximum, mean, and standard deviation of the data for the variables used in the study are presented below.

Table above Indicates that fraud dictation has a mean value of 3.75 with a standard deviation of 0.58, and a minimum and maximum value of 2.13 and 4.75 respectively. This shows that statements measuring fraud dictation have a mean value of 3.75, and the acceptable level is above 3.00. This implies from the response of the respondents above that, chances of dictation fraud using artificial intelligence is high when properly use among deposit money banks in Nigeria; this is because the mean value is above 3.00 which is the bench mark set for the study.

Table 4.2.3 indicates that automated chat boat has a mean value of 3.83 with a standard deviation of 0.58, and a minimum and maximum value of 2.17 and 5.00 respectively. This implies from the response of the respondents that, automated chat boat is highly effective in detecting fraud among deposit money banks in Nigeria; this is because the mean value is above 3.00 which is the bench mark set for the study.

Table 4.2.3 shows that deep machine learning has a mean value of 3.72 with a standard deviation of 0.71, and a minimum and maximum value of 2.00 and 5.00 respectively. This implies from the response of the respondents above that, deep learning machine is highly effective in detecting fraud among deposit money banks in Nigeria; this is because the mean value is above 3.00 which is the bench mark set for the study.

Table 4.2.3 also reveals that machine learning solution has a mean value of 3.59, with a standard deviation of 0.70, and the minimum and maximum value of 2.00 and 5.00 respectively. This suggested that machine learning solution is highly effective in detecting fraud among deposit money banks in Nigeria; this is because the mean value is above 3.00 which is the bench mark set for the study.

Table 4.2.3 further reveals that natural language processing has a mean value of 3.71 with a standard deviation of 0.79, and a minimum and maximum value of 1.75 and 5.00 respectively. The value of the result shows that statements measuring the impression of the respondents have a mean value of 3.71 which is above the 3.00 set as the acceptable level in this study. This implies from the response of the respondents that, natural language processing is highly effective in detecting fraud among deposit money banks in Nigeria.

4.2 Correlations

	FRDICT	AUCB	DLMR	MLS	NLP
FRDICT	1				
AUCB	.500**	1			
DLMR	.427**	.481**	1		
MLS	.393**	.598**	.431**	1	
NLP	.189*	.574**	.282**	.573**	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

From the above correlation matrix in Table above, which depicts the relationship between the independent variables (automated chat boat, deep learning machine, machine language solution, & natural language processing), and the dependent variable (fraud detection), and the relationship between the independent variables themselves. The study further adopt a threshold according to Pearson (1920) where a range from 0.1 to 0.3 will be treated as a weak relationship while 0.3 to 0.5 is average and 0.5 to 1 is treated as a strong relationship. The result depicts above considers the relationship between fraud detection as dependent variable and all the independent variables used in the study, also test the individually relationship between the variables and jointly the relationship between the independent variable and the dependent variables of the study among deposit money banks in Nigeria.

From the above result it shows a positive relationship that exist between fraud detection (FD) and automated chat boat(AUCB), this is inferred by the correlation coefficient of 0.50, this show that (FD) and (AUCB) have an average positive relationship and they are moving in same directions. Deep learning machine (DLM) has a positive moderate relationship with fraud detection (FD) as derive by the correlation coefficient of 0.43. Likewise, there is an average positive and relationship between fraud detection (FD) and machine learning solution with a coefficient of 0.39 and finally, (FD) has a weak relationship with Natural language processing (NLP) which can be seen by the correlation coefficient of 0.19.

Deep learning machine (DLM) has aa average and a positive relationship with automated chat boat (AUCB) derive from a correlation coefficient of 0.48, also, strong relationship between machine learning solution (MLS) and automated chat boat (AUCB) with a correlation coefficient of 0.60, likewise, Machine learning solution (MLS) with Deep learning machine (DLM) with a correlation coefficient of 0.43 which all shows an average relationship.

Lastly, Natural language processing (NLP) and automated chat boat (AUCB) has a strong positive relationship with statistical inferences of 0.57. Moreover, natural language processing (NLP) has a positive but weak association with Deep learning machine (DLM) as shown from the coefficient result of 0.28. Finally,

Natural language processing (NLP) and Machine learning solution (MLS) as seen by the correlation result which depicts 0.57 correlation coefficient value which means a strong relationship exists between them.

4.3 The Regression Analysis

Multiple regression analysis method was used to explain the variability of the impact of the independent variables and fraud detection as a dependent variable among deposit money banks in Kaduna state. The multiple linear regression analysis was used because of its unique and robustness in determining the impact of multiple independent variables on a dependent variable.

R=0.571		N=146		F Statistics 17.055		P value = .000	
R ² =0.326		STD Error of the estimate = 0.48385					
Adjusted R Square =0.307							
	B	Error	Beta	T-values	P-values		
(Constant)	1.588	0.287		5.429	0.000		
AUCB	0.412	0.097	0.413	4.259	0.000		
DLMR	0.175	0.067	0.212	2.630	0.009		
MLS	0.144	0.079	0.172	1.829	0.069		
NLP	-.152	0.067	-.207	-1.291	0.23		

Source; field survey (2022)

The R² value which stands as one of the major coefficients of determination, in structural model evaluation used in this study (Hair et al., 2014; Henseler et al., 2009). Which indicates a model fit for a quantitative dependent variable and measures how strongly the independent variables come together and relate to the dependent variable, R² will also measure and check how fit is the data in the model developed by this study, and will also report the significant relationship of each of the variables. For this study R² will be calculated as the total variance less unexplained variance, and the value of R² ranges between 0% to 1%, Significant level as the threshold, which means that anything above 1% significant level will be rejected.

Therefore, from Table 4.6, The result indicates that the value of the R² model which is the coefficient of determination is approximately 0.33. This signifies that all independent variables used in the study explained 33% of the variation in the fraud detection among deposit money banks in Kaduna state. The remaining 67% were explained by other factors that influence fraud detection among deposit money banks that were not captured by the model of this study. F statistics resolved from the ANOVA shows a value of 53.350 and a corresponding p-value of 0.000 at 1% significant level. This signifies that the model is fit; variables were properly selected and combined in the study.

The result from Table 4.6 reveals that automated chat bot has a coefficient value of 0.413 and P-value 0.000. This signifies that automated chat bot has a positive and significant influence on deposit money banks. This implies that fraud detection using automated chat bot is highly significant in detecting fraud. Hence, automated chat bot should be improved on, so as to help in preventing data leaks, detecting pop-up fraudulent emails, as well as detecting management fraud, which is in line with stakeholders theory as proposed by (Freeman 1999; & Kapoor 2010) also the finding is in line with (Eneh, Okeke & Amahalu 2023; Cîmpeanu, Dragomir & Zota 2023; & Shittu 2020) which established a positive significant relationship and as a result of that which led to the refusal to accept the hypothesis earlier established that, automated chat bot does not significantly affect fraud detection among deposit money banks in Kaduna State.

The regression model in Table 4.6 indicated that deep learning machine has a coefficient value 0.212 and P value 0.009. This signifies that deep learning machine is positively and significantly impacting fraud detection among deposit money banks. This means that the deep learning machine is effective in assessing

customer's credit worthiness, credit and debit card fraud detection. This is in line with machine learning theory by freeman (1999) This is in line with (Alarfaj, Malik, Khan, Almusallam, Ramzan & Ahmed 2022; Sanober, Alam, Pande, Arslan, Rane, Singh & Shabaz 2021; Buyuktepe, Shakhovska, kar & Syerov 2023) However, contrary to Yujie(2023)which prior study reveals negative relationship. Therefore this study fails to accept the hypothesis earlier established that deep learning machine does not significantly affect fraud detection among deposit money bank.

From the Table 4.6 it was observed that machine learning solution has a coefficient value 0.172 and P value 0.069. This shows that machine learning solution is positively but not significant in detecting fraud. Which means that machine learning solution needs to be giving more attention in terms of detecting fraudulent activities which include cyber-attack, customer's information leakage and management inefficient, with effective machine learning solution fraud can easily be detected. Which also support the Stakeholders theory by freeman (1999) which the study contradict prior studies of (Hancock, Bauder, Wang & Khoshgoftaar 2023; Minastireanu & Mesnita 2019; & Sundara,Hasan,Kumar,Mahajan & Bansal2023) which has a positive and significant relationship on machine learning solution and fraud detection. Therefore, this study fail's to reject the hypothesis earlier established which state that, there is no significant relationship between machine learning solution and fraud detection among deposit money banks in Kaduna State.

From the Table 4.6 the finding shows that natural learning process has a coefficient value -.207 and P value 0.230 this indicates that natural learning process is insignificant on fraud detection. The implication of this result is that, if natural learning process is effective it will detect fraud such as customer in personation, identifying fraudulent email by fraudsters, hacking of customers account hacking. This is in line with stakeholders' theory as propounded by freeman (1999). This result contradicts the findings of NLP Fernand (2020), which found positive and significant relationship on natural language process and fraud detection. Therefore the study fails to reject the hypothesis earlier established that there is no significant relationship between natural language process and fraud detection.

4.3 Policy Implication of the Findings

The result of this study has policy implications especially for the owners and managers of deposit money banks and corruption agencies such as Economic and Financial Crime Commission (EFCC) DSS and other government anti-corruption agencies. The result of this study have shaded light on the explanatory variables that have an important effect in explaining the explained variable (fraud detection) among deposit money banks in Kaduna State of Nigeria. Automated chat boat, and deep learning machine were found to have a significant impact on fraud detection and machine learning solution and natural language process were found to be positive but insignificant on fraud detection. This finding implies that machine learning solution and natural language process have little influence on fraud detection.

Therefore, automated chat boat should be improved on, so as to help in preventing data leakages, detecting pop-up fraudulent emails, as well as detecting management fraud.. The finding implies that when all this are detected it will inspire the customers to trust the system and even the shareholders too.

Similarly, deep learning machine was found to have a significant relationship on fraud detection this means that the deep learning machine is effective in assessing customer's credit worthiness, credit and debit card fraud detection which will help in curtailing the problem of fraud in the deposit money banks in Kaduna State which will positively help in improving the banking service which indirectly will affect the customers positively by way of boosting their trust on the banking system.

Also, machine learning solution was found to be positive but not significant which means it does not help in detecting fraud among deposit money banks in Kaduna State.

Finally, the natural language process which was also found to be negative and insignificant in terms of detecting fraud among deposit money banks in Kaduna State.

5-0 Conclusions and Recommendations

This study in which the researcher investigated the effect of artificial intelligence on firm growth using 10 deposit money banks quoted in Nigeria Exchange Ltd for the period of 2012-2023. It was discovered that all the independent variables used for this study Automated Chatbots (ACBS), Deep Learning Machine (DLM), Machine Learning Solution (MLS) and Natural Language Processing (LP), tested. The researcher therefore concludes that artificial intelligence significantly affects fraud detection of deposit money banks in Nigeria.

Recommendation

Based on the findings and conclusion drawn, the following recommendations are made for managers/ owners of listed deposit money banks in Kaduna State, Nigeria so as to ensure improvement on fraud detection.

Adequate measures should be put in place by various banks owner or managers to support the existing mechanisms set in place to ensure effective good automated chat boat system by banks. This includes using good and latest versions of automated chat boat in the banking hold and also, hiring competent personals that can manage the system, which will help in detecting fraud of any kind.

From the above results which deep learning machine shows positive and a significant on fraud detection which is used to interpret large amount of data such as risk assessment of loans at a quicker pace. Banks are encourage to use the right personal so as to improve on preventing and detecting fraud. Machine learning solution shows a positive but insignificant from the above results indicates that, machine learning which is used for making predictions and /or decisions without human dictated rules should be giving priority because it will go a long way in detecting fraud.

Natural language process which from the above result reveals negative and insignificant should be looked upon so as to strengthen and improve fraud detection among listed deposit money banks in Kaduna State, Nigeria.

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