Management Of SECURITY Issues And Risk Factors In ATMs Through AI & Machine Learning Technologies

B.V.Sree Rekha, Lecturer in Computer Science, Sri Durga Malleswara Siddhartha Mahila Kalasala, Vijayawada, India, vemurisrekha@gmail.com

Dr.R.Padmavathy, Lecturer in Commerce, Montessori Mahila Kalasala, Vijayawada, India, padmavathy.raavi@gmail.com

Abstract - Machine learning and artificial intelligence (AI) help to manage risks at ATMs in the present day world. The requirements and needs of the customer change day by day so there is certainly need to manage certain operations to the benefit of customers while processing their transactions. The efficient processing of transactions is the only key for ATMs which satisfy the customer requirements. Hence there is need to retrieve solutions for such problems to gain control over risk management. They are the latest booming technologies applying on large amount of datasets building data models to improve decision making and risk management occurred due to transactions done in ATM centers. The risks faced by the system while operating is mostly predictable but in few situations the system itself can't handle the operations to get fulfilled. In certain conditions risks are to be understood and solution for such problems is to be minded by anyone at anytime soon we identify it so that users can use the system efficiently without any errors or risks which are committed on the spot. ATMs are built for the purpose of customers for easy access as per their requirements at any time. Both are known latest technologies that enable the machines to get rid of the internal and external risk factors and implement logical operations to satisfy customers.

Keywords —AI, ATMs, booming, external risk factors, internal risk factors, technologies, transactions.

I. INTRODUCTION

Banks need to change the existing framework so that they can fit few well targeted enhancements for the designed models. Whenever the increased model complexity exists the cause of risks materialize machine learning models. These models act on larger data sets along with unstructured data such as images, audio and natural languages. The new software packages are designed in such a way that algorithms are framed with new interesting domains and compute well required infrastructure. The modifications made for the existing framework are to be practiced and tested to employ risk management dimensions while implementing them. Banks must ensure that certain risks associated with machine learning are addressed. Hence new choices in existing policies of bank result in new risks when implemented with new practices for the fulfillment of customer needs. One needs to understand and control the operations performed through initiation of bank services to the customers until providing warning signals that lead to misusage of the ATMs. In this paper we deal with the current machine learning and AI techniques being used and current applications of those techniques. We further explain about the role for fully AI solutions as the widespread adoption of machine learning in helping the organization to manage the risks in introducing certain technologies in ATMs for the benefit of customer transactions in day today life.

II. MACHINE LEARNING AND AI TECHNIQUES

AI is viewed as intelligence instructed by machines, with intelligence being defined with the help of instructions and with reference to what we view intelligence as in humans. As it matters to management risk we are particularly interested in artificial super intelligence that is machines instruct management specific intelligence higher than human intelligence. To differentiate two terms more technically we can conclude machine learning from data whereas AI involve additional requirements and implementation of techniques. The resultant situation is in terms of data identification, data testing and making decisions depending upon the tested data. Nowadays we find logical rules and complex coding in addition to machine learning with AI.

Machine learning casually involves manual data, identification and testing by the data scientist further human decisions are predicted with information. This section deals with the lack of technological advancements for AI and outline the core machine learning techniques applied to risk management. The starting and ending sections focus more towards AI as the logical step to follow rather than from widespread usage of machine learning techniques.

 DOI : 10.35291/2454-9150.2019.0446

Image/face recognition using real-time camera images and advanced AI techniques such as deep learning can be used at ATMs to detect and prevent frauds/crimes.

III. Applications For Operational Risk Management

Application of AI and Machine Learning to different functions within the ATMs working with banking industry has enabled them to offer a far more personalized and efficient customer service. By achieving that, ATMs have also been able to gain better insights into their customers' preference and expectations from the corresponding authorized bank. Accordingly, automation of back-end workflows has shown better outcomes. To identify the risk of direct or indirect loss of financial operational risks we need to know about the internal and external risks to manage them in time at ATMs. They may occur from people, system or failed processes or from frauds, failure in controls, neglected procedures, natural disaster, vulnerable computer systems respectively. For this reason due to tremendous increase in operational risk exposures, quantity and wide variety factors a path is mentioned towards machine learning and AI for best solution.

The use of AI techniques started to prevent losses such as ATM frauds under operational management undergone with cash which is now expanding to innovative ideas involving the analysis of extensive cash collections and the performance of repetitive processes, as well as the detection of notes placed in the machine that requires analysis of large datasets. Previous technologies such as classification and clustering techniques can be used to observe emerging patterns of behavior to predict risks and detect links between the customers regarding ATMs. Is also enables banks to generate and priority is given to receive alerts based on types of fraud activity and the level of involvement of risks at ATMs. They provide an excellent overview of the core AI techniques used in financial fraud detection and note the main techniques applied as being decision trees and neural networks.

Consider a practical application, where in ATMs cash transactions work in bank working days only. Most of the customers access them in odd hours of the day it means except bank hours they process transactions where they identify a risk that no cash is available in ATMs soon after bank hours are closed or sometimes in few hours depends on the withdrawal of cash by customers. Every customer who depend on the ATM to draw cash face the same problem at weekends because banks are closed mostly or festival days that occur depending upon their calendar. AI based technique will help comply with regulations and requirements related to the status of ATMs Utility. This technology implements data analytics to monitor cash transaction processes. For this reason, create a machine learning system is used to scan transactions by small and large business customers. To identify and circumvent false invoices and potential instances of fraud.

A study between working and non working hours of both government and private banks using real data gives us the outline of it. Most of these new techniques are grouped under "machine learning" drawing inferences from data rather than a statistical model. To some extent, machine learning allows the model to emerge from the data rather than the other way around. Machine learning can use any type of data, be they numbers, text, or images.

ATM Security

Over the past few years, though, criminals' use of "skimming" devices has replaced the traditional, physical robbery of ATM customers. Rather than mug a customer, thieves prefer to set up a "skimmer" that captures the magnetic stripe and keypad information from ATM machines, gas pumps and retail and restaurant checkout devices. ATMs - they're a valuable extension of your financial institution, and they are viewed by customers as an essential part of consumer banking. Always available; always ready to provide a variety of transactions, including cash. The physical security of these machines is an ongoing challenge.

Criminal acts against ATMs -- and their customers -- have always been a top concern for institutions. Additional surveillance cameras, electronic locks and other physical controls have been added at many institutions to make the ATM a secure place for banking transactions. The technology tools included in skimming are sometimes hard to spot. "It's been shown it is pretty easy to slap a skimmer onto an ATM. Cameras placed inside the ATM itself can catch a criminal placing a skimming device onto an ATM, but it's up to bank personnel and customers to be wary of anomalies which include "Make sure you keep surveillance on your locations, and most importantly make sure your customers are also aware of the issue, educating them is a good way to spot things at your locations that look out of the ordinary."

Tips for ATM Protection

As a result of ATM-related crimes, the ABA has renewed its awareness efforts.

Advice for ATM consumers includes:

Try to use the same ATM consistently;

Always inspect the ATM & make sure it doesn't look different than before. If it does, don't use it - and alert your banking institution;

Be aware of people behind you trying to "shoulder surf" to see your PIN number;

Be wary of those trying to help you, especially when an ATM "eats" your card. They may be trying to steal your card number and PIN;

DO NOT GIVE YOUR PIN NUMBER TO ANYONE OVER THE PHONE. THIEVES OFTEN STEAL CARDS AND THEN CALL THE VICTIMS FOR THEIR PIN, CLAIMING TO BE LAW ENFORCEMENT OR FROM THE ISSUING BANK. Their potential

 DOI : 10.35291/2454-9150.2019.0446

contributions to reducing credit risk are evident from the example.

AI and machine learning may also be useful in managing market risk, and especially trading-model risk. Trading models tend to work initially but then to go awry. Identifying the point at which the market turns against a model is critical, yet it is not always clear whether a model breaks down because of temporary or permanent market changes, and traditional testing techniques don't provide a reliable answer. That has created Operational risk is often harder to manage than financial risk, given that it involves human decision-making. AI and machine learning can help by handling atypical data – textual descriptions of transactions, network relationships, phone and messaging conversations – and have proven effective in detecting money laundering and fraud. For example, the Nordic KYC Utility, a creation of five major Scandinavian banks, uses a range of machine learning techniques, together with traditional detection tools, to ensure that banks fulfil their "know your customer" anti-money laundering obligations.

Another promising area for AI is regulatory compliance to include AI developments. One of the biggest players in this field is IBM, which makes use of its Watson expertise and has shown how important major tech companies are becoming to the effort. AI and machine learning can use natural language processing to detect regulatory non-compliance and to read and interpret new regulations. They can also help detect fraud by interpreting conversations between employees. There are, however, challenges.

First, risk management departments often don't have enough personnel trained in applying these techniques.

Second, older firms are generally not set up for the data sharing needs of AI and machine learning. These techniques need effortless sharing and storage of data in a uniform manner across the firm, and many companies keep data in silos and on separate systems.

Third, and perhaps most serious, AI and machine learning might themselves create risk for companies and even economies. Some machine learning techniques, like deep learning, are, at this early stage, black boxes in terms of how they arrive at conclusions. There is also the issue of fairness. All machine learning systems used in the U.S. and Europe for credit and lending have hard coded rules designed to prevent racial and other types of discrimination. However, no system is fool proof, especially considering the amount of data that these systems use. There has, however, been substantial progress in overcoming these challenges, and it will undoubtedly continue as an enormous amount of investment pours into the field. The future of AI and machine learning for risk management is, in a word, bright.

IV. Optimizing ATM Cash Management Using Machine Learning

Efficiently managing cash in automatic teller machines (ATMs) can reduce financial costs due to unused stocked cash. Predicting cash demand is challenging because of the unpredictability of withdrawals, but profitable because of the large number of machines. Over 3.5 million ATMs are used all over the world. More banks are shifting their attention to driving greater efficiency in how they manage cash in their ATM networks. Through currency management optimization, banks can avoid falling into the trap of maintaining too much cash and improve profits by mobilizing idle cash. Therefore, it is crucial to develop advanced algorithms to accurately predict cash demand for each ATM. An intelligent cash management system based on cash demand forecasting can then help banks lower operational costs and improve the return on their cash assets.

Advanced technology in Cash Management

The payments through Credit and debit card have rapidly evolved through the years while cash management technology has remained much the same. Hence security became the key role to be focused on cash transactions traditionally. Safes and vaults have grown increasingly more secure with innovations in the construction of materials and locking mechanisms. The cash management systems are more robust by providing the customers the same level of tracking capabilities and analytic functionality as derived from digital transactions. Currently, the primary component driving the demand for cash management innovation is the need to reduce the human costs associated with it, such as preparing a till, cashier balancing, cash forecasting, and managing shrinkage. Considering a cue from credit or debit to smart phone point-of-sale readers, manufacturers are introducing cash management systems that validate and process cash while providing real-time reporting, management and cash analytics. These new smart cash devices, including smart safes, cash and coin recyclers, and smart POS recyclers, expand upon traditional cash management systems – pairing innovative data collection functions with advanced security features.

Reducing the cost of cash, providing powerful analytics

A recent study found that the average cost of managing and processing cash is 10% of the value of their cash transactions but can vary from 5-15% which include hidden costs as they are part of the staff's duties to count, safeguard, transport and deposit cash. As the complexities arise on evolution of retail operations, there is need for improved processes such as enhanced loss prevention and proactive engagement in cash management, monitoring and protection. Retailers have always accepted the overhead costs associated with cash management, however, new cash automation systems allow retailers to reduce the cost of

 DOI : 10.35291/2454-9150.2019.0446

cash handling and represent a point of data collection that opens the door to an ever-expanding range of sophisticated real-time analytics. As a result, retailers save money by shifting to an automated cash management system. Retailers no longer need to accept cash handling expenses as the cost of doing business. With new technology that can do everything from automating counting and bill validation to providing analytics for cash forecasting, retailers can leverage data in ways that reduce what they spend on cash handling. One of the important challenges that is faced by Industry and not just ATMs in India is unavailability of people with right data science skills. With only small number of good data scientists available to do AI work, the industry needs to work with universities in India to develop skilled data scientists as well as develop in-house training programs to train employees on data science skills. Also identification of right use cases for AI implementation with the help of domain experts and data scientists can help banks in successful implementation of AI technologies for ATM functions. Cash forecasting is important aspect of effectively managing ATM networks. Cash management solutions make the process more agile and reliable by automatically generating a network-wide plan and making sure each of your machines has enough cash. Since machine learning techniques adapt to changes in demand, investing in machine learning solutions provides long-term ROI.

In an environment in which tighter compliance regulations challenge financial institutions, the ability to adapt can mean a distinct competitive advantage. The variety of payment and investment systems available to consumers today (such as crypto-currencies, shared economy, and marketplace lending) have brought about a new era in money laundering. The cases are more complex, not just because there are now more hidden digital networks but also because there are so many creative ways laundering can be orchestrated interweaving traditional and digital means. Also, consumers are more easily used as unwitting accomplices. Traditional investigative work by operations analysts may no longer scale. In order to scale, the ability of analysts to gather and integrate data, and incorporate new data into their models quickly and efficiently, is key. Even then, there is no guarantee that previous analytics would still work, given everything that's new. Using a variety of methodologies, AI, by means of deep learning and computer vision, can explore the data and find patterns quickly, an impossible feat using traditional approaches.

IV. CONCLUSION

Usually, ATM cash management and optimization is done manually, relying on corporate policies and personnel experience. However, financial institutions now have sufficient historical records of ATM transactions and the compute power to analyze these transactions using machine learning. For this reason, humans should hand over the primary responsibility of optimization to machine learning, and instead assume a supervisory role, identifying and addressing exceptions that historical analysis can't account for. An efficient ATM cash management system needs a cash demand forecasting model for each ATM. This forecasting model is mostly based on historical cash demand data. Cash withdrawals are subject to trends and generally follow weekly, monthly, and annual cycles. For example, people have a habit of drawing out comparatively large sums of cash at the start of each month. However, the cash demand for every ATM is different, changes over time, and is affected by several factors, including highly mobile users, paydays, holidays, and seasonal demand in specific areas.

REFERENCES

[1] Searle, J. (1980). Minds, brains, and programs. Behavioral And Brain Sciences, 3(03), 417 from http://dx.doi.org/10.1017/s0140525x00005756

[2] Theory of Mind. (2016, July 17). Retrieved April 18, 2017, https://psychcentral.com/encyclopedia/theory-of-mind/

[3] The Research Council of Norway. (2012, August 21). Computer program recognizes any language. Science Daily. Retrieved March 14, 2017 from from www.sciencedaily.com/releases/2012/08/120821094125.htm

[4] Machine learning. Encyclopaedia Britannica. Retrieved on 28 Mar 2017 from https://global.britannica.com/technology/machine-learning from

The Economist. (2017, January 5). Language:Finding a Voice. Technology Quarterly. Retrieved from http://www.economist.com/technology-quarterly/2017-05-01/language

[5] Neural network. Encyclopaedia Britannica. Retrieved on 28 Mar 2017 from https://global.britannica.com/technology/neural-network from

Libunao, J. (2015, November 13). Artificial brain learns to use human language. Futurism. Retrieved from https://futurism.com/artificial-brain-learns-to-use-human-language-3/

[6] Pavlus, J. (2015). Skype Translator: Impressive, but Imperfect. MIT Technology Review. Retrieved 18 April 2017, from https://www.technologyreview.com/s/534101/something-lost-in-skype-translation/

[7] Knight, W. (2017). What to expect of artificial intelligence in 2017. MIT Technology Review. Retrieved 18 April 2017, from https://www.technologyreview.com/s/603216/5-big-predictions-for-artificial-intelligence-in-2017.

[8] Levy, S. (2016). An Exclusive Look at How AI and Machine Learning Work at Apple. Backchannel. Retrieved 18 April 2017, from https://backchannel.com/an-exclusive-look-at-how-ai-and-machine-learning-work-at-apple-8dbfb131932

[9] Duffy, T.M. & Cunningham, D.J. (1996). Constructivism: Implications for the design and delivery of instruction. In D. Jonassen (Ed.), Handbook of research on educational communications and technology (1st ed., pp. 1-31). New York, NY: Routledge/Taylor & Francis Group.

[10] Schuh, K.L., & Barab, S.A. (2007). Philosophical perspectives. In J. M. Spector, M. D. Merrill, J. Van Merrienboer, & M. P. Driscoll (Eds.), Handbook of research on educational communications and technology (3rd ed., pp. 67-82). New York, NY: Routledge/Taylor & Francis Group.

[11] Winn, W. (2003). Cognitive perspectives in psychology. In D. Jonassen (Ed.), Handbook of

research on educational communications and technology (2nd ed.,pp. 79-112). New York, NY: Routledge/Taylor & Francis Group.

[12] Burton, J.K., Moore, D.M., & Magliaro, S.G. (2003). Behaviorism and instructional technology. In D. Jonassen (Ed.), Handbook of research on educational communications and technology (2nd ed., pp. 3-36). New York, NY: Routledge/Taylor & Francis Group.

 DOI : 10.35291/2454-9150.2019.0446