Reading Big Data by Machine Learning: The Used of Computer Science for Human Life

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Abstract: Machine learning (ML) models use big data to learn and improve predictability and performance automatically through experience and data, without being programmed to do so by humans. Artificial Intelligence (AI) techniques are being increasingly deployed in finance, in areas such as asset management, algorithmic trading, credit underwriting or blockchain-based finance, enabled by the abundance of available data and by affordable computing capacity. The purpose of this study is to describe in detail how the power of artificial intelligence with its complex system can help the needs of digital technology in the banking sector. The research method used is the elaboration of great thoughts and facts about artificial intelligence. Scientific data is interpreted with analytical power that is as precise as possible, so as to produce a description that meets the logic of structured thinking. The data is taken from relevant and up-to-date literature, the work of scientists who have been disseminated in various weighty scientific publications at the world level. The report can help policy makers to assess the implications of these new technologies and to identify the benefits and risks related to their use. It suggests policy responses that that are intended to support AI innovation in finance while ensuring that its use is consistent with promoting financial stability, market integrity and competition, while protecting financial consumers. Emerging risks from the deployment of AI techniques need to be identified and mitigated to support and promote the use of responsible AI. Existing regulatory and supervisory requirements may need to be clarified and sometimes adjusted, as appropriate, to address some of the perceived incompatibilities of existing arrangements with AI applications.

Keywords: Big Data; Computer Science; Human Life; Machine Learning.

Introduction

Machine Learning (ML) is a subset of AI, which uses statistical tools to learn from data and then applies algorithms to solve problems. Well known algorithms include internet search engines, email SPAM filters, and online shopping recommendations. IBM's Watson is a machine learning system, which made worldwide headlines in 2011 when it beat the best players in the US quiz show Jeopardy (Ashta & Herrmann, 2021).

ML is an AI subset and describes the ability of software to learn from applicable data sets to 'self-improve' without being explicitly programmed by human programmers (e.g. image-recognition, prediction of borrower default, fraud and AML detection). The different types of ML include: supervised learning ('classical' ML, consisting of advanced regressions and categorization of data used to improve (O.E.C.D., 2021).

ML models use massive amounts of alternative data sources and data analytics that is referred to as 'big data'. The term big data was first coined in the early 2000s when Big Data was used to describe "the explosion in the quantity (and sometimes, quality) of available and potentially relevant data, largely the result of recent and unprecedented advancements in data recording and storage technology" (L'heureux et al., 2017). The ecosystem of big data encompasses data sources, software, analytics, programming and statistics, and data scientists who synthesis the data to signal out the noise and produce intelligible outputs (O.E.C.D., 2021).

One of the applications of machine learning is in the field of digital finance, an empirical reality that cannot be left behind for a second (Dixon et al., 2020). It is a necessity when machines that can think for themselves then make decisions based on the habits embedded in their memory system. This paper is simply a collection of arguments organized in such a way as to open greater insights. And in this research contect is application of ML in finance sector.

Smart FinTech is the new-generation FinTech, largely inspired and empowered by data science and artificial intelligence (DSAI) techniques (Katib et al., 2023). Smart FinTech synthesizes broad DSAI and transforms finance and economies to drive intelligent, automated, whole-of-business and personalized economic and financial businesses, services and system (Cao et al., 2021).

Furthermore, this paper will discuss how machine learning intersects with big data in the discourse of digital finance. The discussion starts with the definition of machine learning, big data and then the interaction between the two entities.

Method

The type of research used in this study is descriptive research with a qualitative approach. The data taken, identified in the following order: (1) data collection (2) data sorting (3) data analysis (4) conclusion making. As for data analysis, there is a predetermined sequence in accordance with the empirical steps taken, namely as follows: (1) Examination of data (2) suspected data findings, (3) Data confirmation (4) Diagnosis, (5) Action. In the diagram can be described as the flow of research as follows, namely as Figure 1.
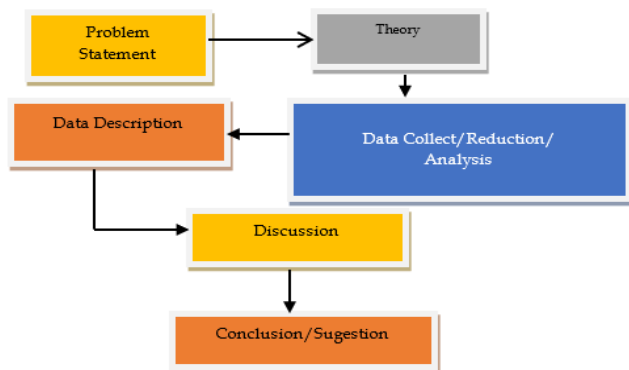

Figure 1. Flow of Research

The description of the data, presentation, analysis and findings that will be obtained from this study will be written in the paragraphs below, in the research discussion segment. The logical flow of this research begins with the researcher's five senses capturing a current phenomenon in connection with the increasingly sophisticated digital equipment, namely artificial intelligence. It then becomes an inseparable part of human life which is also increasingly complex. Of all the joints of life, business becomes sexy when it is inevitable from the uproar of modern human life. Artificial intelligence fulfills its destiny to become a business instrument, which in the discourse of this study is the marketing of various products, both from the government and from the business world, from micro to multinational scale (Wang et al., 2019). The financial supervision department further clarifies the supervision responsibility, applies artificial intelligence technology to supervision methods and means, and improves the degree of supervision automation and intelligence (Hu, 2020).

Result and Discussion

If we take capital and mechanical kinetic energy as the driving force of global modernization since the era of great navigation, then data will become the core driving force of the next technological revolution and social change. With the emergence of the Internet, mobile Internet, and the Internet of Things, data has shown explosive growth, and finance has accumulated a large amount of data in the course of business operations, including customer information, transaction information, and asset liability information (Lv & Song, 2019). The McKinsey research report takes the banking industry as an example and points out that for every 1 million in revenue generated by the banking industry, an average of 820 GB of data is generated (Bughin et al., 2017). Although financial data is difficult to obtain, it is one of the most valuable data of all data (Hu, 2020).

Artificial intelligence (AI) aims at "making intelligent machines" (Kersting, 2018). The concept of "AI-empowered" is gaining increasing popularity. Currently, key participants in modern finance are not entirely humans; instead, machines constitute a large proportion. They take over routine and structured tasks such as standardized analysis (Mondal, 2020).

Machine Learning and the use of big data

An AI system, as explained by the OECD's AI Experts Group (AIGO), is a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments (Baruffaldi et al., 2020). It uses machine and/or human-based inputs to perceive real and/or virtual environments; abstract such perceptions into models (in an automated manner e.g. with ML or manually); and use model inference to formulate options for information or action. AI systems

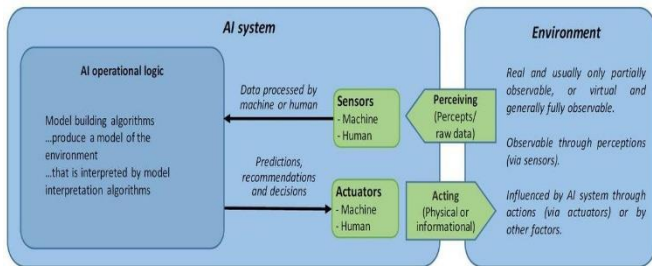are designed to operate with varying levels of autonomy (O.E.C.D., 2021).

Figure 2. As defined and approved by the OECD AI Experts Group (AIGO) Source : (O.E.C.D., 2021).

Central to many of these concerns is the role of humans in the evolution of AI: the necessity of involving people in using, monitoring and supervising AI (Duan et al., 2019). This article develops a regulatory framework for understanding and addressing the increasing role of AI in finance. It focuses on human responsibility, the 'human in the loop', as central to tackling the AI 'black box' problem, that is: the risk that AI results in processes and operations unknown to and uncontrolled by human beings, producing undesirable results for which, arguably, only the AI may be responsible (Buckley et al., 2021).

ML is an AI subset and describes the ability of software to learn from applicable data sets to 'self-improve' without being explicitly programmed by human programmer (Sherif et al., 2022). For example image-recognition, prediction of borrower default, fraud and AML detection (Xu, 2022). The different types of ML include: supervised learning ('classical' ML, consisting of advanced regressions and categorization of data used to improve predictions) and unsupervised learning (processing input data to understand the distribution of data to develop, for example, automated customer segments); and deep and reinforcement learning /based on neural networks and may be applied to unstructured data like images or voice (O.E.C.D., 2021).
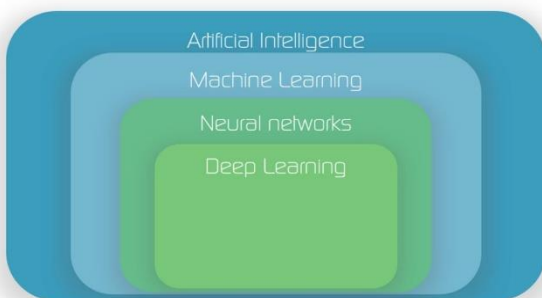

Figure 3. Ilustration of AI subset. Source : Hackernoon (2020)

Artificial Intelligence has made leaps and bounds since a long time ago, and it already shapes the future of

marketing (Johnsen, 2017). It's up to you to implement this technology in your business. But one thing for sure is that AI is the future. If you plan on running a successful online business in the coming years, using AI-powered marketing and tools is a must (Kumari, 2021).

For now, economic integration and cohesion cannot be avoided and AI contributed in this reality (Ortega-Fernández et al., 2020). In this case, something to be prominent is the occurrence of a single market and production base. At least, in that context, there is a movements (outflow-incoming) of materials and services are guaranteed for freedom (Setiawan, 2016).

Figure 4. Big data sources. Source of picture: Dell Technology (O.E.C.D., 2021).

Big data can include climate information, satellite imagery, digital pictures and videos, transition records or GPS signals, and personal data: a name, a photo, an email address, bank details, posts on social networking websites, medical information, or a computer IP address (Loor & Fdez-Arroyabe, 2018) & (Wu et al., 2016). Such data challenge existing methods due to size, complexity, or rate of availability and requires advanced digital techniques, such as ML models to analyse them. Increased use of AI in IoT applications are also generating significant sums of data, feeding back into AI applications (O.E.C.D., 2021). Artificial Intelligence (AI) in Marketing has gained momentum due to its practical significance in present and future business (Verma et al., 2021).

The benefits of using AI/ML and big data in finance

For financial services, AI is helpful in front-office activities that directly involve financial service customers (e.g., lending, investment management, and payment systems) and back-office activities (e.g., capital optimisation, risk management, and market analysis) (Qadiri et al., 2020). This distinction is helpful because it identifies two groups of activities, accounting for the revenue and the cost stream of financial institutions (E.U., 2021) .

Lending and credit risk prediction. Financial institutions typically have limited information about

prospective borrowers and their riskiness, which can be a fundamental problem because asymmetric information leads to market inefficiencies and even market breakdown (Bebczuk, 2003). *Insurance.* Financial institutions that provide insurance must identify the premia for different individuals and the level of risks (Hull, 2012). *Payment systems.* AI is already broadly adopted for processing payments, helping to detect fraud, fight money laundering, and making the payment networks more efficient, in fact, a mix of front-end and back-end activities (Han et al., 2020). *Robo-advising and Virtual assistants.* Robo-advisors are recommender systems designed to assist private investors in interacting with financial markets (Xing et al., 2019). *Asset and risk management.* An area where AI is becoming predominant in financial services is asset management with applications such as identifying assets to trade, portfolio optimisation, and automated trade execution (E.U., 2021).
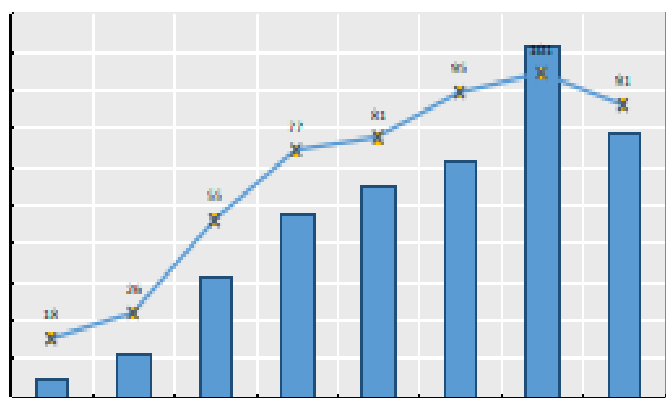

Figure 5. Funding of cyber start-ups that use AI as the core product differentiator. Source: OECD.AI (2020), Microsoft Academic Graph, Insights.

Conclusion

The research was premised on investigating the impact of AI on digital financial inclusion. Digital financial inclusion is becoming central in the debate on how to ensure that people who are at the lower levels of the pyramid become financially active (Tay et al., 2022). On the other hand, fintech companies are taking advantage of the availability of AI to apply its applications to ensure that the goal of digital financial inclusion is realized that is to include groups of low-income earners, the poor, women, youths, small businesses in the mainstream financial market. The study discovered that AI has a strong influence on digital financial inclusion in areas related to risk detection, measurement and management, addressing the problem of information asymmetry, availing customer support and helpdesk through chatbots and fraud detection and cybersecurity.

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