A Study of the use artificial intelligence in the accounting field and the challenges thereon

Overview

In this study, I have explored the extent of artificial intelligence ("AI") used in the accounting industry. Undeniably, AI is one the most widely used technologies nowadays that already immersed in our daily life (Chakraborty, 2021). It is especially good at analyzing big dataset and performing rule-based human tasks in a fast and precise way. There are more and more discussions around the effects of using AI in different professions. Out of which, there is increasing awareness as to the use of AI in the accounting and auditing industry which is also a rule-based intelligence profession. The market leaders of the accounting and auditing field are collectively known as the "Big Four". The Big Four represents the four largest accounting and financial consultancy firms in the world, namely Deloitte, EY, PricewaterhouseCoopers (PwC) and KPMG. These four international accounting firms accounted for over 70% of the market share (Gyorkos, 2021) and could affect the development of the accounting industry. Currently, all of the Big Four have their own AI initiatives (Faggella, 2020) and have already invested billions of dollars (Kapoor, 2020) in AI and data analytics products. The study will therefore focus on how AI is being used in the Big Four, analyses the benefits and challenges to the profession.

Introduction

For a long time, people have a question in mind: Can machines think? Since *John McCarthy* held his first conference in this field in 1956 (Chakraborty, 2021), it takes scientists and computer specialists more than half a century to work out a *YES* answer to it: the artificial intelligence, the AI.

So what is AI? Literally, it is man-made intelligence. The ultimate goal of it is to make a machine with the aid of computer programs thinks and learns as a human being (Kumar, 2019). AI in fact is a combination of advanced computer technologies, extensive datasets and machine learning (deep learning) for the purpose to assist people in problem solving (IBM Cloud Education 2021).

AI could be divided into three main categories based on their capabilities (Hewlet Packard Enterprise, ND; IBM Cloud Education, 2021; Ghanchi, 2020):

- Artificial Narrow Intelligence (ANI) or weak AI – AI that is trained to perform certain programmed tasks only. It has very strong data mining power but functioned for a specific purpose.
- Artificial General Intelligence (AGI) or strong AI – AI that has learning power, reasoning ability and self-awareness like human beings. It has strong clustering analysis power so the answer would not be a merely programmed one, just like a human.
- Artificial Super Intelligence (ASI) – AI perform that surpass human brain due to its superior data processing, memory, and decision-making abilities. ASI is a futuristic technology, and no real-world examples exist as of today.

Nowadays, AI becomes our every day's life: speech recognition, google translate, online chatbots, purchase recommendation from Amazon prime, automated stocks buying… all are using AI. This is usually with the aid of peripheral tools and technologies such as augmented reality, 5G networks communications, drones, digital sensors used to create an 'internet of things', and blockchain, etc. (Department for Business, Energy & Industrial Strategy, 2021).

These AI applications usually work by apply special designed algorithms (the AI algorithms) on a particular dataset (big data) enable it to generate an expert system so as to be capable of

giving people ground advises and suggestions. It is especially good at digging out relationship from the sea of data. This ability, somehow simulates the process of a human professional. A professional is someone who gains his or her expertise after digested a lot of data (experience) and based on which make recommendations. Accounting and auditing is one of the fields that is capital intensive and relied heavily on trained professionals and therefore is more likely to have greater impact by this new technology.

The accounting and auditing industry

The regime of accounting could be divided into three categories:

1. ***Record keeping and preparation of financial statements***: These functions mainly involve the bookkeeping and accounting that include the collection of financial data in financial statements according to prevailing accounting standards and analyse them to assist management in decision making.
2. ***Compliance***: Such as auditing taxation and corporate government; which are to ensure the financial data are fairly presented and reported in accordance with applicable standards and legislations; or ensure that the way how a company is directed and managed complies with required a set of internal control processes for complying rules and regulations and for the best interests of stakeholders.
3. ***Advisory and consulting***: Tax consultants typically advise clients on the tax risk and tax planning, while financial consultants advise clients their financial decision such as corporate restructuring, merger and acquisitions, investment decision and retirement, trust and estate planning.

Case study: The Big Four

Starting from the 20th century, the global accounting and auditing services are dominated by several global network firms. After several mergers over these firms that leave the Big Four. They are: Deloitte, EY, PricewaterhouseCoopers (PwC) and KPMG. According to a survey carried out by the International Accounting Bulletin in 2021, the Big Four network firms accounted for about 75% of the market share in term of audit revenue in 2020 and they took over audit of 70% to approximately 90% of the listed companies in major stock exchanges except for China (IAB surve, 2021). The Big four are often refer to as the "watch dogs" of the financial industry. They play a very significant role in the financial sector in assuring the integrity of financial data.

To cope with the growing sentiment of AI, all Big Four have invested heavily on AI and related technologies and already implemented them in their daily work flows. Their AI technologies could be categised into the following:

1. ***Analysis of unstructured data***: They use AI technologies to analyse and extract useful information from text analysis to extract significant terms from sales contracts, lease agreements, board minutes using NLP to extract useful information therefrom (Schatsky et al., 2015; Boillet, 2017; Faggella, 2020).

2. ***Automating massive tasks with process mining techniques***: There are massive repetitive work during an audit such as checking to supporting documents and identifying irregularities in the accounting ledgers. Since an enterprise has large volume of transactions in a year and auditors could not review every single of them, therefore auditors traditionally adopt an approach of random representative sampling and extrapolate the results in case of error found. These procedures, even performing test checks, still consume a substantive time. Naessens stated in 2020 that EY Digital Audit employs data mining and analysis which allow auditors to scan the entire population of transactions and

they further extend the use of this technique to spotting internal control weaknesses to aid their risk assessment. The other Big Four also have similar AI tools.

3. ***Performing tasks with physical constraints***: Perform stock takes using computer vision to enable airborne drones to monitor inventory (ISCA Journal, 2019) in areas where difficult to be reach by human. Previously alternative procedures are used such as estimation or sampling. With the new technologies, audit evidence could be gathered at a higher confident level which increase the quality of audit work.

4. ***Provision of financial advices and AI performs to client***: All of the Big Four are enthauthisic to invent new AI tools for client, usually they are event predicting tool or Utilizes NLP to design a model to predict future events and even convert customer calls to unstructured text, which is then streamlined to identify keywords, customer sentiment and predict future trends (KPMG, ND). While the first three AI initiatives resulted in cost saving, this one resulted in direct revenue generate in provision of value added services to clients.

Big Four start these AI initiatives for the purpose of saving of time costs, improving their quality of work and provide added value services to clients. And they seems to be satisfaction with the results and they rush to advertise their success: Deloitte claimed that its document review platform has reduced the workload by 92% and increased efficiency by 45% (Schatsky et al., 2015);s EY also claims that with the aid of AI technology, 70%-80% of the simple lease and 40% of the complex lease agreements could be reviewed by AI (Boillet 2017) and so and so. However, beyond the rosy picture, are these AI tools works as smooth as they claimed?

Difficulties in implementation

The Big Four seems to be satisfactory about their AI initiatives time costs are saved while quality of audit work improved. However, they are not implemented that good as they claimed.

Friends of mine working in Big Four in Hong Kong experienced difficulties in implementing the new technologies in their works. One of the reason is that they find it difficult to implemented because the automations are to be perform under specific conditions. Clients that adopt the initiative needed to be sufficiently advance in technologies and highly automated. Client does not benefit directly from the improvement of audit quality, while it is generally accepted to perform test check, they do not have a reason for scanning all its supporting documents for your machine to perform vouching?

Naessens (2020) said: ".,, In fact, the EY Digital Audit is our only remaining audit methodology." I am not saying it is not possible but it takes a long way to achieve it.

Social impact

Beside implementation problem, one of the major impact that AI brings along is the threat of being replaced. There has been an extensive discussion as to will accountants being replaced by AI?

Not only in the accounting industry, research carried out by Department for Business, Energy & Industrial Strategy in 2021 point out that jobs of unskilled labour has the highest possibility of being replaced by the emerging technologies, but will create more jobs for people with higher. AI can do a lot, but at the same time there is still a lot it cannot do (Boillet,2017), for example, skeptism judgement. Compliance works are roughly rule-based and easily being replaced. But accountant do a lot more than compliance. This profession actually involves a lot of judgement, especially in the area of auditing and tax planning. These are areas that is much closer to the legal consultants. The accounting standard is not a black and write guideline but a series of standards of opinion and there is no straight yes or no answer. *(Griffin, 2019).* The opinions are

specific to company and involve human judgements. Judgements comes along with cognitive limitation. The problem is we don't know what cognitive limitation will be when using the big data. Until we solve this problem, AI could not totally replace human judgement.

The accountants, however, also need to equip themselves in the data science technology in order to master the technology.

Legislative reform

In developing AI in auditing, the Big Four have been very careful to limit the use of such technology in assisting the audit team but not replacing human judgement. On one hand AGI is still at incubation stage and, as mentioned above, accounting standards are very complicated; on the other hand, the advance in technology brings along new problem.

The AI algorithms are so complicated that there is a lack of transparency. It is difficult to ensure it does not have bias. What if something wrong in the programming that cause incorrect opinion? Who is going to bear the responsibility? The developer or the accounting firm? Can the accounting firm stand up in count saying that the reason why some fraud cannot be spot is due to the program bug?

It is not until the first lawsuit on failure of AI audit that one could answer these questions. However, no one want to be the genie pig. Accountants are trained to be prudent, they rather wait and see.

Conclusion

As point out above, the level of AI employed by the Big Four remains at the ANI level. Currently AI are being used in assisting the audit process but not replacing it. Like it or not, I believe that AGI is in a not-far-away future. In fact, I think human and machine are not mutually exclusive. They could co-operate and form a good team. In accountancy industry, I would expect the future use of AGI as a second opinion that provide well researched ground guidance for accountant to exercise their judgement.

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