Challenges in Using AI in Online Commerce

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Abstract

With the sharp rise in digitalization, we see an increase in human-machine interaction. In the context of the pandemic, online commerce has risen sharply and so have the challenges both retailers and customers face. This article explains the role of Industry 4.0 in accelerating economic development in general, it defines the categories of bots (robots) that can be used in different types of activities/services, it presents the challenges, advantages - disadvantages of technology and of artificial intelligence use in global development.

We present an analysis of the current general situation while investigating the future trends regarding the increasingly accelerated use of artificial intelligence in industry and services.

The article is based on studies conducted during this period regarding the role of artificial intelligence in the current economic context, as well as those regarding the human-machine relationship. It represents a kind of explanatory research on this huge challenge caused by unprecedented scientific and technological development.

Key words: online commerce, machine learning, industry 4.0, the fourth industrial revolution, RPA
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1. Introduction

The complex interconnection that comes with Industry 4.0, accelerated by the 2020 pandemic (Koetsier, 2020), leads digital users to more frequent interactions with online entities that use intelligent algorithms to simulate human behavior. The ever-increasing volume of online commerce attracts the usage of these algorithms which are incorporated in expert systems thus exposing users to Artificial Intelligence (intelligent agent). These software systems are used for both benign and malign purposes. Although the methods used are different, the separation line between them is blurred with profit being the main drive.

2. Theoretical background

Man-machine interaction is at the core of this complex subject and the problems that arise are as prevalent in the IT sector as it is in social sciences (Irving & Askell, 2019). The main factor between winning and losing is the technical edge one has on the competition, a fragile attribute that can be easily modified while adding or subtracting the possible implications of the new technology. Simulating humans is a very profitable use of these software systems and there are major reverberations felt throughout the commercial sector (de León, 2020).

The year 2020 brings intelligent agents that accurately predict the needs and wants of humans but it also brings intelligent agents that disrupt Christmas shopping. (Molloy, 2020).

2.1. Artificial intelligence (intelligent agents)

Intelligent agents in Artificial Intelligence are computational systems that solve (narrow realm) tasks that can be performed by humans. The naming itself - intelligent - can bring an unmerited note of autonomy to these systems and can also bring some unwanted demonization of the subject purely on a semantic basis (Leetaru, 2019).

The recent breakthroughs in the Artificial Intelligence field were made by machine learning, a type of AI that can process big data inputs and predict outcomes. Machine learning is mainly based on simulating neural networks - a type of programming that allows the system to learn by itself and perform specific tasks better and faster than humans. The core of all this is computational intelligence, software that needs to be configured and trained by humans which in the end simulates only a small part of human intelligence.

How intelligent is artificial intelligence? As of the time of writing the level is considered *narrow* - as in a very narrow field that each intelligent agent can be used. Processing power on the rise and a bigger and stronger network leads to a growth in AI research but that's not enough. Since 2012, the computational power used for training AI has doubled every three months (Hao, 2019). Still, we are at *narrow* level AI and research on quantum computing can give us a time frame for the next big step for AI, *general* level.

One of the trends is to create, as accurate as possible, digital twins for each person connected to the network. This trend is set to continue with even more (and better) data, faster processing, and even smarter algorithms. These are the three main factors for AI progress. *Digital twins* is a concept that works great in engineering and have successfully entered the daily operations of many businesses via process automation. Robotic process automation uses intelligent agents to create digital workers. Because of this, productivity is set to increase and operational costs to decrease abruptly over the next decade.

2.2. Bots

The word bot originates from (ro)bot implying that some kind of automation takes place with a certain degree of autonomy. It defines a purposely built software that is usually used in an online environment to simulate human behavior. As opposed to robots who are categorized by appearance, software bots are categorized by their purpose. That purpose can be benign - conversational chatbots, web crawler bots that index the internet for your search engine, information gathering bots that dynamically change the content the user is seeing, and tailor the experience for that user. On the other end of the spectrum, some bots scan for vulnerabilities and infect unprotected systems, shopping bots that buy limited stocks of highly sought-after products, rapidly moving big stocks to the gray market.

Chatbots are agents that simulate a conversation with a human partner using NLP - natural language processing. Although unnecessary, the academic goal is to beat Turing's test (Prasad, 2020) with the end goal being to engage humans/customers/users more ergonomically. Chatbots can be used as text only or can have a text-to-speech component installed so the conversation is done through spoken language. Chatbots are mainly used for customer service applications although they are used in all fields that require (or seek) human interaction. Using them to recommend services, receive feedback, and guide the user through the purchase process takes a load of human resources and the parity between human and AI customer service agents is set to grow. Forecasts about interactions with retail chatbots anticipate they will reach a very effective 50% conversion rate by 2024 without the need for a human operator to intervene (Juniper Research Ltd, 2020). Decreasing operational costs, round the clock availability are some of the evident advantages of chatbots.

Another example is the sneaker bot, an automated software created with the sole purpose to scan online stores and buy the latest and most coveted pairs of sports shoes which are then sold on back channels. This method is still in a gray legal area even though the US deems illegal the same practice for concert tickets. The same flavor of bots was also used not only to buy game consoles but any product where demand is bigger than the supply of limited-quantity items. This leads to a negative shopping experience for customers. At the core, this problem is actually about human detection.

"I'm not a robot" is a statement every internet user has made at least once. This is the display

window to a cybersecurity battle between building algorithms to separate human users from malicious software bots and algorithms that pose as humans. The ping-pong game between the side doing their best to simulate human shoppers and the other to detect them is taking place in the market but also in the academic world for the last two decades with no signs that either side has the upper hand (Ye et al., 2018)

3. Research methodology & results

The article investigates the way in which various specialized studies describe and explain the role of the Fourth Industrial Revolution, that of artificial intelligence (AI), in the economic area and the interface created between man and machine. The researched problem is related to the advantages/disadvantages of using robots for different types of activities, but especially in the area of online commerce, as well as how far one can go in terms of replacing a man with a machine in the relationship with another man. Investigating the specialized literature and the way in which various authors have related to these phenomena, we have identified the answers given by them, answers which confirm our research hypothesis, i.e., artificial intelligence is not yet "that intelligent" and we are not in the phase of thinking about the systematic and exhaustive replacement of the man by a machine.

Omnipotent data and omnichannel marketing (Juniper Research Ltd, 2020) are the need for those who want the upper hand in the market. Collecting and storing high-quality data on the customers' habits is one part of the equation with better processing that data being the other. Choosing the right AI is a challenge and is dependent on the task at hand as is being aware of what constitutes junk data that can only hinder the process.

Although the global chatbot market is expected to reach 1.25 billion USD by 2025 (Grand View Research, 2017), brand dehumanization is a potential pitfall for those using chatbots and automated processes. Although more than 70% of users prefer interaction with a non-human chat partner when looking for answers to simple questions (Schneider, 2017), using only chatbots to address the customers can shift the perspective on that brand. Limits imposed on chatbots by either unsatisfactory programming or just technical difficulties can drastically worsen the user experience and that reflects directly on the brand using it and not on the platform or programmer. Human supervision is still needed thus creating hybrid AI which works by integrating humans in the workflow. As the EU tightens privacy rules, AI privacy issues have to be tackled in new ways. There is a new information flow that needs to be regulated and global AI rules are still not in place (Knight, 2019). Adding the doubling of Internet of Things (IoT) connected devices from an estimated 30 billion in 2020 to 60 billion by 2024 (Statista, 2018) creates a new set of problems that should be tackled interdisciplinary.

Ethics and long term social impact are challenges to be addressed. Professional culture clash (Edmondson, 2017) is still an issue and as the Fourth Industrial Revolution picks up pace, social sciences and IT representatives on all levels should start balancing the wants and the needs of humanity as a whole.

Corporate social responsibility can help in this area with ergonomic information and proactive education targeted at both consumers and businesses. Education is crucial for emerging markets and helps new technology to be viably integrated into tomorrow's business landscape. While the US is focusing on AI patents, China has a growing high-quality number of AI papers, the EU needs to further invest in talent and research in order to overcome its internal inclusion issues by technology advancement (Figure no. 1).

Figure no. 1. Share of top 10% of AI papers
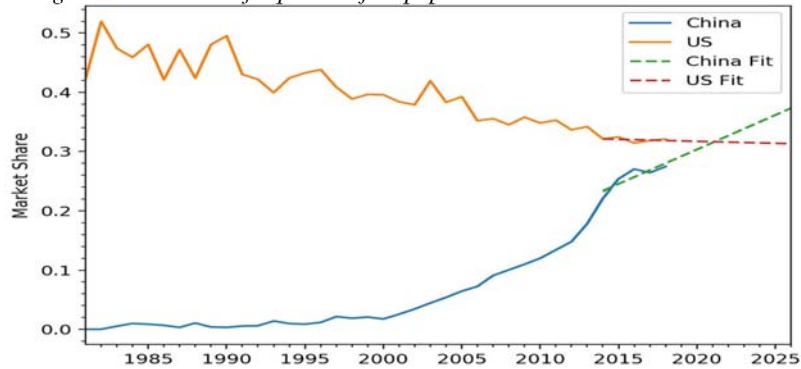
Source: (Schoenick, 2019)

4. Conclusions

Processing power, as shown before to be a crucial factor in AI development, is disproportionately split between the private and the academic sector (Murgia, 2019). Research in universities has to be further increased using the resources of the private sector so that AI technology can remain as open as possible.

Keeping the academic research sector competitive should, in theory, keep the technology open and avoid balkanization via either regulation or patent claims.

Keeping the interconnectivity promise of the Fourth Industrial Revolution, all technology must work together for the needs of the human race. As Amazon's Digital Turk (Schwartz, 2019) has humans working as nodes in a more comprehensive algorithm network, the near future will bring a connection that will make extended intelligence a reality.

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