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Application of Artificial Intelligence in Prominent Ten Industries in Four Parts of the World: Case Study

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Abstract - Artificial intelligence is a fast growing technological field, especially machine learning. It is a cognitive science that enables humans to explore many intelligent ways for solving many problems. Artificial intelligence is expected to be a big influence in enterprise competitiveness in the near future. Industrial AI is a systematic approach to develop and use machine learning algorithms with repeating success. This paper conducted a case study about the ability of AI technologies in defining the competitive advantages among ten industrial areas in four parts of the world in coming years. Maybe the strategy of each company may differ. All the leading companies of the world are embracing AI technologies and benefits from the resulting product innovation and labor efficiency.

Keywords - *Industrial Artificial intelligence, AI in ten Global Companies.*

1. Introduction

Artificial intelligence is moving forward, and whether we like it or not, machine learning will play an essential role in our technological future. The largest and best companies in the world already know this, and they are investing heavily in AI[1]. Artificial intelligence is being embraced by several industries including manufacturing, automation, finance, agriculture, education, healthcare, and other industry verticals. Big companies like IBM, Amazon Web Services, and Siemens are funding AI start-ups and are also merging and acquiring small AI companies. Artificial intelligence has become an essential part of our everyday lives. It is used in financial processes, medical examinations, logistics, publishing, and in a wide range of other fast-rising industries. What do we mean by 'artificial intelligence'? For the purposes of our research, we define the term to mean technologies that can perform three core tasks[2]:

- Learn – Being able to continuously and automatically refine the knowledge and technological models of an AI system based on its interactions with digital data; increasingly, such learning is referred to as 'machine learning'[2]
- Recognize – Through training with a dataset, the ability to identify images, sound, voice, video, and other 'unstructured' data[2].
- Act – The ability to perform autonomous actions against data and insights derived through learning[2].

With the threat of technology companies driving them off the road, a number of global automotive manufacturers have entered the multibillion-dollar race to develop technologies. One of the world's largest automakers with fiscal 2016 revenue of US $237 billion, also created a new AI research centre in California's Silicon Valley, demonstrating the company's huge commitment to AI. The enormous spending on AI by some companies extends beyond companies like Toyota and Google that routinely

make big investments in information technology. For example, Big Four accounting firm Ernst & Young announced in 2016 it would spend $400 million in using AI to automate much of the labor involved in auditing clients' finances. Companies are using AI to enhance products and services to create entirely new offerings today that touch people's lives. Amazon and Google are competing over whose device – Amazon's Echo or Google's Home – will be your digital assistant. News organizations such as the Associated Press are churning out thousands of stories written by software, not by journalists. At the same time, Google, already motoring fast with its own self-driving car, is training its AI software, DeepMind, to detect two common types of eye diseases. Microsoft has been using AI for about eight years to improve its online search engine[2].

1.1 How are Global Companies Using A.I

Many, many products today run on embedded software, and not just the cars we drive: electronic toothbrushes, smoke alarms, and an increasing number of medical devices that report how patients are using them. What's more, aspects of nearly every function, from marketing and manufacturing to sales and HR, are increasingly online processes. Every Consumer Packaged Goods (CPG) company's marketing campaign has an online marketing component these days. Factories are wired so that computers and sensors report their operating condition continuously. HR departments increasingly pore over internal email and other networks to see patterns in communications.

All those products with digital sensors and wireless technology transmit what they're monitoring, spewing enormous volumes of digital data. Companies have never had such large amounts of data that they have coursing through their data centres today. The cost of crunching data has dropped for many years due to breakthroughs in processing power. More recently, it has been plummeting because of the rise of cloud service providers that rent out their data centres to companies that don't want to invest in huge server farms. Companies used to throw data away because it was too expensive to keep, says Mike Olson, chief strategy officer of Cloudera. These three trends have conspired to put artificial intelligence and its subdomain of machine learning on centre stage today. All of a sudden, large companies can use the technology to automate work that some employees do; help employees do far better, less mindless and more interesting work; and do work that wasn't possible to do in the past because it would have overwhelmed the workforce[2].

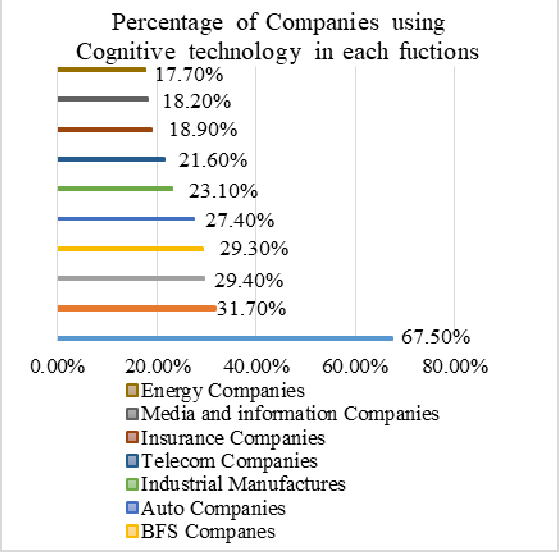


Figure 1: Percentage of companies using cognitive technologies

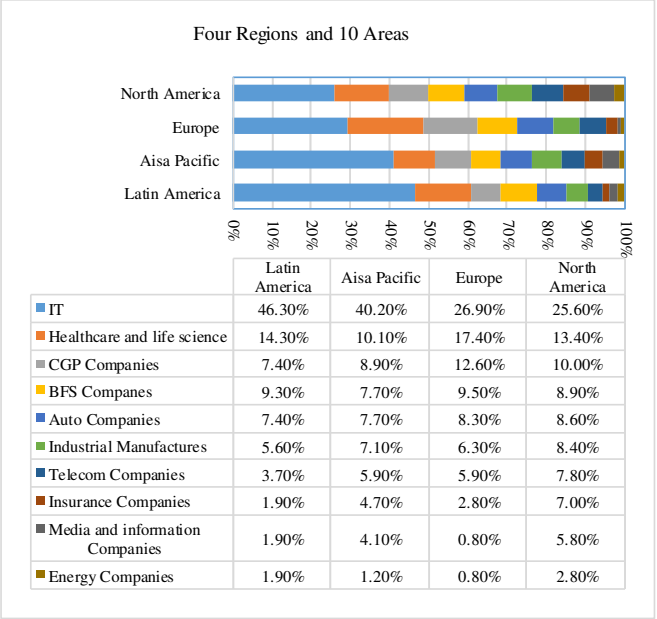
2. AI in Action at Big Companies in Four Regions of the World

A sample survey of 835 respondents working in large enterprises in four regions of the world were considered: North America (43%), Europe (30%), Asia-Pacific (20%), and Latin America (7%). The participants work in 10 industries, with the largest portion (22%) coming from banking and financial services, followed by high-tech (hardware and software businesses, 19%), industrial manufacturing (12%), and including automotive, energy, healthcare, life sciences, industrial manufacturing, and retail. The companies in our study had an average revenue of $20 billion, with a median of $2.8 billion. Large banks in the US use AI algorithms to help them sift through hundreds of thousands of transactions every month, automating the laborious task of complying with anti-money laundering regulations. The Corporate investments in cognitive technology are spreading across businesses of all kinds, in every corner of the globe. In this study, the vast majority of companies (84%) say they use cognitive tools today; the rest plan to do so by 2020.In a five-point scale, respondents across all four regions rated cognitive technology at 3.73, between moderately important and important. The importance that companies attach to cognitive technology varies significantly, however, by geography. Facebook is on a quest to build 1.5 billion artificial intelligence agents, about one per Facebook user, as the company plans a machine learning-based future for its social network. As part of its ongoing investments in AI, Facebook signed a deal to buy high-powered graphics processing units from NVIDIA[2].

3. 10 Facts on How 10 Industries Use AI

Through machine learning, Microsoft Corporation has significantly improved the products for which it has become known: the Bing search engine, Skype internet phone service, MS Office software suite, and more. (Up next: LinkedIn, the online business networking and recruiting tool, which Microsoft acquired in December 2016.) Machine learning has also become important for improving Microsoft's business processes in finance (for example, customer credit checking), IT (for example, detecting computer security threats), and other areas[2].

- Potential customer payment problems:- We found that 83% of leaders using AI in their corporate centre are using it to identify potential revenue and profitability problems from data in their financial systems[2].
- Hacking and other attacks on corporate computer networks:- Many big companies' information systems are attacked daily, according to one estimate, 317 million new pieces of computer viruses and other malicious software were introduced in 2014. A company's ability to detect and secure its networks is increasingly vital to protecting customer records, preventing proprietary and valuable intellectual capital from leaking out, and keeping the business running[2].
- Crucial products and services powered by digital technologies, and whose performance for customers can never slip:- The self-driving car is a perfect example. If the goal is to reduce accidents (and for taxi companies, to minimize personnel costs), then the product must have excellent accident-avoidance performance. Even Microsoft's use of machine learning for its Bing search engine is a great example of a product that has millions of digital interactions every day (customers' online search entries) that require better and better real-time responses[2].
- Buying of online advertising:- Of the companies using AI in marketing, 83% of them said they're using it for media buying. In the online world, computer programs buy more than 50% of online display advertising, according to ClickZ. However, the firm says the purchases are vulnerable to fraud and ad blocking software[2].



	Latin America	Aisa Pacific	Europe	North America
IT	46.30%	40.20%	26.90%	25.60%
Healthcare and life science	14.30%	10.10%	17.40%	13.40%
CGP Companies	7.40%	8.90%	12.60%	10.00%
BFS Companes	9.30%	7.70%	9.50%	8.90%
Auto Companies	7.40%	7.70%	8.30%	8.60%
Industrial Manufactures	5.60%	7.10%	6.30%	8.40%
Telecom Companies	3.70%	5.90%	5.90%	7.80%
Insurance Companies	1.90%	4.70%	2.80%	7.00%
Media and information Companies	1.90%	4.10%	0.80%	5.80%
Energy Companies	1.90%	1.20%	0.80%	2.80%

Figure 2: Use of ML in 4 regions of world

1. Improving product and service quality is most important for auto companies: The automotive industry has been talking about four disruptive and mutually reinforcing major trends—autonomous driving, connectivity, electrification, and shared mobility. Improvements realized through AI will play an important role for automotive companies, enabling them to finance innovation and cope with the trends ahead of them. AI applications in the automotive industry, you might first think of self-driving cars. But AI can do more than drive. It can keep us connected, on schedule, and safe even when we are driving ourselves. That all adds up to big business. The value of artificial Intelligence in automotive manufacturing and cloud services will exceed $10.73 billion by 2024. When it comes to driving cars with artificial intelligence, it offer two levels of functionality: driver assist and fully autonomous mode. For examples Google Waymo and Tesla[3].
2. BFS Companies believe AI is Crucial to their Ability to compete: While tech giants tend to hog the limelight on the cutting-edge of technology, AI in banking and other facets of the financial sector is showing signs of interest and adoption even among the banking incumbents[4]. Our BFS respondents use AI mostly to deter IT security breaches. Another prominent area of application is finance and accounting function. Leading up to 2020, radically transformed Bank models will emerge. A glimpse ahead shows an emphasis on innovative technologies to vastly facilitate banking - inclusive banking through

new types of Bank models, non-traditional alliances to make banking affordable, Fintech capabilities to make banking customer centric. Banking in the future will be collaborative, exciting and will raise the bar in setting new standards. Consolidation in the industry is therefore, inevitable. The Deloitte Point of View following on from here, touches upon the growth route of Mergers & Acquisitions, a Banking model in the form of Payment Banks and Innovation in Banking that is technology oriented – Cognitive Technology & Artificial Intelligence, Block chain Technology, Robotics Process Automation, Fintech and of course Cyber Security[5].

3. CPG companies primarily use AI in sales: Making intelligent business decisions is critical for any industry, but particularly so for the CPG segment. Effective decision-making across a variety of business areas forms the backbone of the CPG business. These decisions have to be made fast and with utmost accuracy. But how can businesses achieve this when they're bogged down by massive amounts of data? Coupled with the sheer amount of data is the challenge of not being able to leverage any manner of advanced technology to convert it into actionable intelligence. Until recently, retailers and consumer-packaged goods (CPG) companies have primarily focused their innovation efforts into ensuring that product discovery and transactional moments were quick and efficient. This isn't surprising, given the highly competitive landscape and the incredibly small margins in these industries. However, with Enterprise AI, machine learning (ML) and data science solutions becoming a benchmark for business practices, retailers and brands today have the unprecedented opportunity to shift the paradigm and leverage their data to elevate the customer experience in new, more meaningful ways. This is why AI is particularly important for CPG companies. AI and machine learning come together to create a powerful machine capable of harnessing high volumes of data into meaningful insights that the CPG business can use to improve business outcomes[6].
    - Trade promotion optimization
    - Marketing
    - Supply chain and operations

   With AI and new technologies radically transforming the way consumers engage with brands, products, and services in our everyday lives, there's hardly been a more exciting time to be in the retail industry[6].
4. Energy is a leading adopter of AI: The adoption of AI in the energy space not only increases energy savings, drives targeted demand response programs and achieves more efficient grid optimization. There are various advanced analytics technologies available to help solve problems in the power sector. As an example of AI's impact on the power sector, take a large electric utility that was seeing erratic changes in its demand profile due to increasing grid complexity and renewables which resulted in significant financial losses on the day-ahead market. There are practically limitless use-cases in the power sector, with financial impact easily reaching into hundreds of millions[7]. AI and disaggregation space for eight years now, and it's exciting to see how other vendors and energy utilities are embracing the technology. We want to extend a huge welcome to all companies attempting energy disaggregation science. There is no doubt that load disaggregation has crossed the chasm of early adoption[8].

5. Healthcare and life science use AI to improve the business: Healthcare and Life sciences companies are likely to begin experimenting further with AI in their workflows in the coming years, but they face challenges in AI adoption due to strict regulations. Most in the life sciences agree that artificial intelligence (AI) will reshape the sector from R&D through commercial. An AI application that detects cancer, detecting diseases, expert surgeon etc. Generating and harnessing mass pools of data, the healthcare and life science industries are particularly primed to profit from the potential of AI, offering the unearthing of hidden insights in a world of unstructured data. Frost and Sullivan predicts that the health AI market, valued at US$600 million in 2014 will reach a high of US$6.2 billion by 2022. The innovative analytics strategies behind AI and machine learning are increasingly having more impact on all stages of the life science industry and to a number of the basic processes in this sector. To name a few, the key laboratory, operational and clinical areas of which AI and machine learning are predicted to have a large impact, includes medical imaging analytics, drug discovery, clinical trials and clinical decision support[9,10].
    - Drug discovery: identifying promising drug molecules
    - Clinical trials: improving patient recruitment times
    - Beyond the development process: clinical decision support and medical imaging

6. High Tech companies use AI to detect and prevent attacks: In 2021, cybercrime losses will cost upwards of $6 trillion annually. It's no surprise, then, that

the cybersecurity industry is exploding as it grows to protect the networks and systems on which companies and organizations operate and store data. Because effective information security requires smarter detection, many cybersecurity companies are upping their game by using artificial intelligence to achieve that goal[11].

- Darktrace- is the world's leading machine learning company for cyber security. Darktrace's Enterprise Immune System uses AI algorithms that mimic the human immune system to defend enterprise networks of all types and sizes[12].
- Versive- is helps businesses and organizations identify crucial threats, helping teams save time that might otherwise be spent investigating alerts that don't require immediate attention. Which uses artificial intelligence to separate critical risks from routine network activity, identifying chains of activities that result in attacks and helping security teams to get ahead of those attacks[12].
- LogRhythm- provides an end-to-end security solution for companies and organizations to detect and quickly respond to cybersecurity threats. The company uses machine learning to profile and detect threats, compromised accounts, privilege abuse and other anomalies. A user interface allows security teams to more easily and quickly respond to threats[12].

7. Insurance spends the most on AI: The insurance industry outspent, investing on average US$124 million in AI systems. By comparison, the average investment made by the rest of the industries came in at US$70 million[13]. All of the insurance companies surveyed answered that they will be actively using AI by 2020, with 85% saying they currently employ the technology in one form or another. Insurers around the world are turning to AI to cut costs, boost sales and improve service efficiency. From helping predict customer needs to detecting fraud in real-time and predicting claims values, AI is powering insurers all along the insurance value chain. Allstate, the largest publicly held personal lines property and casualty insurer in the US, deployed cognitive artificial intelligence (AI) agent Amelia in 2017. Insurers' adoption of AI to drive sales is not coincidental. Increasing competition from born-on-the-web insurers and insurance aggregators that do not rely on large, expensive agency distribution channels are putting pressure on traditional insurers that do. In this environment, operationalizing AI to drive sales is critical but it is an area that is still not well understood by many insurers[14].

8. Developing a System that makes good and safe decisions is key for media and information companies: Artificial intelligence (AI) promises to transform the media and entertainment business – impacting everything from content creation to the consumer experience. AI will influence all parts of the media value chain, helping content creators to be more creative, helping content editors to be more productive, and helping content consumers to find the content that matches their interests and current situation, Microsoft's Media and Entertainment industry lead for the EMEA region. The media and entertainment industry is at the cusp of rapid transformation with digital media taking centre stage across all sub-sectors - TV, print, films, advertising, animation & VFX, gaming, OOH, radio and music. Digital media is not just an additional distribution platform but has emerged as a core revenue generation engine Media companies can leverage AI throughout their content supply chains to automate operations, drive decision-making and personalise the consumer experience. Media companies can also use AI to strengthen their predictive capabilities[15].

9. Telecom Generates the most value from AI: No longer limited to providing basic phone and internet service, the telecom industry is at the epicentre of technological growth, led by mobile and broadband services in the Internet of Things (IoT) era. This growth is expected to continue, with Technavio predicting that the global telecom IoT market will post an impressive CAGR of more than 42% by 2020. The driver of this growth? Artificial intelligence (AI) applications in the telecommunications industry are increasingly helping CSPs manage, optimize and maintain not only infrastructure, but also customer support operations. Network optimization, predictive maintenance, virtual assistants and RPA are all examples of use cases where AI has impacted the telecom industry, delivering enhanced CX and added value for enterprises[16]. Four AI Use Cases in the Telecommunications Industry:
    - Network optimization
    - Preventive maintenance
    - Virtual Assistants
    - Robotic process automation (RPA)

10. Industrial manufacturers view AI as important to competitiveness: The report shows that the use of AI

is spreading across almost all areas of companies. The biggest adopters of the technology today are IT departments, with about two-thirds of the survey respondents using AI to detect security intrusions, user issues and deliver automation. One third (32 percent) of companies think AI's greatest impact will be in sales, marketing or customer service, while one in five (20 percent) see AI's impact being biggest in non-customer facing corporate functions such as finance, strategic planning, corporate development, and human resources. AI is being used by companies include guiding customer service representatives to more quickly resolve customer problems and anticipate future purchases; quickly and securely reconciling mass overnight transactions for financial institutions; and saving human resources professionals time by enhancing the on-boarding processes for new hires[17].

4. Conclusion

Artificial intelligence is capable of team forming the global economy through scientific knowledge and technological contributions. Big industries have realized the potential of artificial intelligence and started adopting it. AI is capable of uncovering new and exciting applications that will bright both industries and consumers alike. Even big companies with huge turn over in different parts of the world are investing heavily in AI. Be it or not, in future all industries have to use AI to stay relevant in the competitive environment.

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