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The Role of Data Analytics in Leveraging Artificial Intelligence

Artificial Intelligence (AI) is the study and design of intelligent agents or systems in which those intelligent machines mimic human behavior autonomously. This branch of computer science utilizes crucial data techniques and processes, such as data analytics, machine learning, natural language processing, neural networking, speech recognition, machine vision, and other sub-branches of AI to enable systems to perform human-like tasks (Medium, 2021).

Likewise, Artificial Intelligence has become an integral tool in society's continuous pursuit of exponential growth, improvement, increased productivity, technological advancement, and business growth. Various AI techniques have been utilized to supplement and enhance human efforts with more precision, speed, and impact, and are here to help the world become a better place, all while enforcing humans to contemplate the ethical, practical, and sustainable usages of integrated AI (SAS, 2021).

In Temple University's Fox School of Business's MIS2502 course, Data and Analytics, with Professor Shin, business students gain the fundamental technical knowledge and hands-on experience with technology by using prevalent database management languages, such as, SQL and NoSQL, and statistical programming languages, such as R, while getting acclimated to their respective database environments, SQL Workbench, MongoDB, and RStudio. As they interact directly with the database management tools and techniques, the students are able to develop a deeper understanding of computer science basics, computational logic, programming syntax, the

utilization and importance of relational databases in relation to structuring information, the significance of clear and meaningful data visualization and storytelling, and the importance of data techniques, such as decision trees, clustering, and association to derive predictive analyses.

In MIS2502, Professor Shin's students learn that decision trees are "used to classify data according to a predefined outcome", clustering is "used to determine distinct groups of data based on data across multiple dimensions," and that association rule mining is used to discover "which events predict the occurrences of other events (Professor Jae Jung, Slidedeck 11, 2021)". Correspondingly, Artificial Intelligence's efficacy relies heavily on the management of big data, the collection of large and complex datasets, and the accuracy of predictive analyses. Predictive analyses derive from data mining, wrangling, and modelling techniques, especially critical data techniques based on concepts such as decision trees, clustering, and association rule mining.

The complexity of these techniques and systems has been significant towards the development and utility of Artificial Intelligence, which has permeated through the majority of society and manifested itself in each individual's life digitally. Not only has it allowed businesses to increase their productivity and efficiency in automating miniscule or repetitive tasks, it has also enhanced the quality of leisure time for society.

For instance, data and analytics is the central source of intelligence for popular streaming services, such as Netflix, as a result of the powerful results they are able to produce. These results include Netflix's exponential revenue, streaming, and subscription growth. Essentially, they are the products of the back-end data processing, manipulation, synthesis, and analysis involving the development of advanced AI. In terms of Netflix's AI development, Netflix's recommendation engine (NRE) is based on decision-tree based methods in which algorithms are responsible for successfully filtering and associating certain movies or shows to the Netflix

viewers based on historical data collected from their previous or most commonly watched movies or shows (Medium, 2020). Similarly to Professor Shin's discussion of data collection and analyses, Netflix continuously collects user data for more accurate recommendations to be presented to them and to make predictive analyses on the content viewers are most likely to be interested in the future. Therefore, the recommendations Netflix viewers are presented are parallel to the resulting leaf nodes of a decision tree, however, the more accurate comparison would be to neural networks, as "decision trees deliver results without an explanation of how the results were derived (DTREG, 2021)".

Nonetheless, Artificial Intelligence is the collection, mining, wrangling, visualization, and analysis of data to allow computers and other digital systems to work autonomously and to eliminate miniscule tasks which, unfortunately, enable inefficiency. The seemingly 'sentient' technology companies are able to provide are only products of AI. In being so, AI is a more complex, tedious, and repetitive process to unlocking meaningful data and deriving impactful results. There would not be the possibility of advanced AI without the existence of data and analytics.

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