

Machine Learning and Data Science in Industry 4.0

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In today's era, when everything is automated, machine learning and data science have been proven to be a boon to the large-scale industries. These emerging technologies have revolutionized the world. They have great impact on human lives. In our day-to-day life, we can see how these technologies have been widely used and adapted. No field is untouched by the use of emerging technologies like Artificial Intelligence, Machine Learning, IoT, Blockchain, Big Data, cloud computing etc. For example, the Google search engine and other recommendation systems use Machine Learning to optimize its results., automated machines in our homes such as washing machine, air conditioner, refrigerators, remote controls etc. use Artificial Intelligence and IoT for their working Çelik & Altunaydin, (2018).

In other words, these technologies—which have demonstrated their enormous significance in businesses and the industrial sector—are the foundation of Industry 4.0. Machine learning, a type of artificial intelligence, enables systems and techniques to automatically enhance productivity in response to experience.

The industrial sector has experienced tremendous growth as a result of outcome optimization due to machine learning. The "industrial automation" or "smart factory" has been made possible by this efficiency and productivity improvements with ML.

Industry 4.0 are digitalized factories that continuously monitor production and gather data. They use smart devices, machines, and systems. Manufacturers can benefit from advanced analytics and data insights from this data collecting, which enables businesses to make better decisions Sarker (2021).

The ability of machine learning to boost efficiency without drastically altering existing resources is likely one of its most noticeable effects on the manufacturing sector. Smart factories can evaluate product quality instantaneously by using smart devices on the production floor. Video streaming devices with ML integration can examine a product during every stage of production.

This enables a pace of inspection in the production sector that the majority of enterprises could not previously afford when carried out manually. A faster production line results from the overall inspection time reduction, which increases business. This enables manufacturers to drastically lower downtime and scrap, which are now monitored by humans only seldom.

Furthermore, by offering predictive insights, machine learning systems can help manufacturers make the move from reactionary to error-prevention environments. It saves money by warning the team about prospective problems because preventative repairs are much less expensive than restoring a machine that is completely damaged or a process that has already produced thousands of dollars' worth of scrap Liao, (2017).

Data science and machine learning go seamlessly together. Considering the idea of machine learning, which is the capacity of a machine to extrapolate information from data Machine learning is severely limited in the absence of data. If anything, the expansion of machine learning across many industries will spur data science to become more relevant. Machine learning is only as effective as the data provided and the algorithms' capacity to use it. A fundamental understanding of machine learning will soon be expected of all data scientists.

In consideration of this, the capacity to assess machine learning is one of the most crucial data science competencies. There is enough of information available in data science to make the cutting-edge new algorithms function flawlessly. What it lacks, however, is an understanding of how things operate and how to deal with unusual difficulties; this is where machine learning will be useful.

The testing methodology that has historically been used in data analysis is rendered useless when dealing with large and heterogeneous data sets. Big data was criticised for being overhyped precisely for this reason. The complexity of developing new, reliable predictive models is strongly correlated with the amount of data that is available. Machine learning offers clever approaches to analysing enormous amounts of data as a response to this. By creating effective and quick algorithms as well as data-driven frameworks for legitimate processing of this data, machine learning can give accurate findings and analysis Michelle, (2022).

In other words, if you want to survive in the age of automation and artificial intelligence, you need to keep up with the latest developments. And you must be an expert in machine learning and, to a certain extent, data analysis to become a professional software or entrepreneur.

References:

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