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An Opinion on Applications of Edge Computing and Explainable Artificial Intelligence

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Introduction

In the past ten years, Artificial Intelligence (AI) and its applications have experienced impressive experimental development and are currently the foundation of many decision support systems. There are innumerable models and algorithms with various typologies, and their configurations and use cases are extremely diverse. Additionally, there are now more tools available that make it easier to apply all of the current algorithms, and there are also effective systems for visualising data [1]. Numerous use cases have shown AI to be successful. Because they make it possible for anyone without prior knowledge of AI, machine learning, deep learning, etc. to design algorithms, new graphical tools encourage their use. These tools enable end users to create AI algorithms and directly apply them, despite their lack of AI experience, because they are geared toward end users who are experts in a particular application domain. Even for AI or subject matter experts, many algorithms still function as opaque black boxes that process input and provide incomprehensible output.

Currently, one of the main forces influencing industrial progress is Artificial Intelligence (AI). Only recently have ethical issues surfaced as a result of model predictions that can and do have unfavourable effects. Examples of prejudice against gender and ethnicity can be seen in AI models employed in criminal justice for hiring and sentencing. The aim is to develop a regulatory or certifying organisation that will issue permits for the commissioning of artificially intelligent systems and education programmes addressing the issue have been started in order to prevent such problems and finally take care of safety. Due of these issues, AI safety, a relatively new scientific field, has emerged [2].

Description

With the use of communication and technology, industry 4.0 refers to the intelligent network of equipment, machinery, and systems for many industries. Industry 4.0 is being enabled by the development of AI and the deployment of Machine Learning (ML) and Deep Learning (DL) based approaches. Automatic pattern detection in data has been a challenge that AI applications have progressed in overcoming. When it comes to sophisticated information and tactics, AI-based solutions can support subject matter experts while they do evaluations in the background of their work activities [3]. A successful operationalization and integration of cognitive insights into the business processes may result from the targeted application of data-driven and decision-making in the industry sectors. One of the fundamental ideas of AI is described by the subfield of ML. Instead of just following directions, it gains knowledge through experiences or datasets. By training, ML based techniques automatically learn and improve system performance. These techniques look at each identifiable pattern's end result and attempt to reverse-engineer elements to produce an output. It creates a framework for forming judgements and decisions based on prior experiences.

Technologies that enable software, systems, machines, and devices to detect, perceive, develop, understand, and learn from their own experiences or to expand human activities are combined to create Artificial Intelligence (AI). AI enables industrial production systems to accomplish extraordinary tasks better than people. AI can also enable robots to carry out activities that humans would not, such handling delicate or hazardous raw materials or microscopic components. This puts into perspective the fact that many industrial robots already in use are not as intelligent as people. Even though they have limited programming, they are nonetheless capable of doing many skilled tasks in a variety of settings [4].

On real world datasets from two separate manufacturing lines, researchers can deploy and assess the QARMA (Quantitative Association Rule Mining) suite of algorithms based on the industrial IoT platform. When there is a large amount of data available, QARMA algorithms produce excellent RUL prediction outcomes. On the provided datasets, QARMA methods fared better than other well-liked models and algorithms. On the other hand, in the other use case where sensor data were not accessible, QARMA has not been properly deployed. This has shown that quality control measures on Work In Progress (WIP) cannot be utilized to forecast machine maintenance requirements [5].

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Conclusion

The use of XAI and AI models to enhance systems, enabling the concurrent application of knowledge processing and data-treatment techniques. In a white box approach, wherein experts are able to create AI algorithms and where the results may well be justified based on the input data, this makes it possible to simultaneously process both traditional and non-relational data from databases and sources, providing advanced results. Additionally, the lack of unbiased measures and defined datasets for XAI often makes it difficult to compare models and formally confirm their accuracy. While XAI provides a set of processes that can produce explanations that are understandable to humans, AI is the primary element of the industrial transformation that enables intelligent robots to carry out activities autonomously.

Conflict of Interest

Author has no conflicts.

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