

Unit 12: Industry 4.0 and Machine Learning

Unit 12 Artefact

Thoughts on the Future of Machine Learning from the modules reading

I read the article by Diez-Olivan et al (2019) and related literature with great interest. I applied some of the learnings from this reading to the industrial area of healthcare because of my background as an NHS Doctor.

The type of ML model I selected for my thinking/discussion was predictive, because these are ideal for making future predictions based on past or real-time data. In healthcare, this could be predicting the risk of adverse outcome from a disease in a specific patient based on population level data (Stiglic et al, 2020). In the context of industry 4.0, these kinds of models are essential for optimising processes and providing powerful new insights for a range of use cases. The rationale for my selection is because the ultimate benefit of these technologies in my view is to provide predictive insights that benefit humanity.

Industry 4.0 and 5.0 are characterised by increasing integration of powerful digital technologies into various industries, and more recently, with a focus on increasing the depth of collaboration between humans and machines (Diez-Olivan et al, 2019). Advances in robotics, AI, internet of things (IOT), combine advanced software (AI/ML) with hardware to produce practical actions in the real-world. Examples of how this may affect the healthcare industry could be in surgical robotics where the robot powered by AI works in collaboration with the human surgeon to increase the accuracy and efficiency of surgery (Andras et al, 2020; O'Sullivan et al, 2020).

It is not just healthcare where AI-empowered robotics will have the greatest impact on humanity in the coming decade. For example, Tesla is building a bot known as Optimus to become the general-purpose humanoid robot (Klingler). The vision for this technology is to provide robotic assistants in homes and factories, and this combination of AI technologies with hardware that allows real-world physical actions is a mega-trend that is a defining characteristic of the Industry 5.0.

Part of this mega-trend in industries as far-ranging as from space, manufacturing, to defence and healthcare is this concept of hard tech (Alamalhodaie, 2024). Hard tech is often defined as a combination of advanced software and hardware where significant scientific or engineering challenges still need to be overcome (Mintz, 2024). Hard Tech may have some of the biggest impact in my chosen sector of healthcare, by combining advanced AI technologies with new and existing hardware/software in medicine, the potential to enhance diagnostic capabilities, personalise treatments and accelerate healthcare access remains significant. I am excited to take forward my new understanding from the future of ML obtained throughout this module and apply this to the development of AI-powered Hard Tech for unmet needs in healthcare.

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