

AI/ML based predictive analysis for smart industry

Client name Dr. D.R. (Deepak) Tunuguntla, S. (Sjoerd) Zagema
Client contact d.r.tunuguntla@saxion.nl, s.g.c.zagema@saxion.nl
Client website <https://www.saxion.edu/business-and-research/research/smart-industry/ambient-intelligence>

Client Information

(100 words)

Modern day industrial and societal challenges demand a multi-disciplinary approach. As a cross-disciplinary research group, Saxion Ambient Intelligence groups's passion lies in acting as a potent bridge between highly impactful technologies and society. Given their desire and rich experience in data science/machine learning, data engineering and IT, they envision themselves realising effective real-life smart digital solutions.

Project Background

(200 words)

As is with any service industry, which is continuously working on the latest innovations, *Voortman Steel* needs to remain innovative and continue to expand knowledge. This ensures that the high-tech machines they develop and manufacture, meets the needs of their customers. This is where your project will come into play.

When dealing with machines, one of the key requirements is achieving and maintaining high performance. A very common feature between us humans and machines, is the decreasing ability to perform due to wear and tear. Just like how we humans require some maintenance checks and fixes every now and then, manufacturers also need to make sure that their machines are performing as expected every year. In recent years, the availability of manufacturing-related data has expanded significantly due to advancements in sensor integration and connectivity technologies. These developments, driven by the rise of Industry 4.0, Industrial Internet of Things (IIoT), and Cyber-Physical Production Systems (CPPS), have enhanced monitoring and networking capabilities across products, enabling the collection of vast amounts of real-time data from machines. However, despite this surge in data, its full potential is often underutilised, particularly for tasks like condition monitoring of individual machine components or process optimisation.

Project

(150 words)

As a step to ensure high machine performance, *Voortman Steel* carries out regular maintenance checks on their machines. However, they are curious if predictive maintenance could be performed by continuously monitoring their machines remotely. Engineers at Voortman Steel can gather the data; however, they are unsure if the data that they currently have is utilisable for predictive maintenance. Hence, forming the research question: "Can predictive maintenance be performed on Voortman Steel machines?"

To help you find the answers, you will be applying Data Mining Methodology (CRISP-DM). According to CRISP-DM, you are expected to follow the below listed phases, each crucial for ensuring the successful application of machine learning (ML) techniques for predictive analysis in industrial settings. The phases are

- Business/Data Understanding
- Data preparation
- Model Training and Evaluation
- Deployment

Together with domain experts, the main aim is to investigate and possibly develop a prototype ML-based detection system that utilises the available data from a steel drilling machine. To realise this detection system, in your graduation project, you will analyse the data and research contemporary predictive analysis technologies, which could really help in understanding and predicting device related anomalies.

Predictive Maintenance Project proposal

Constraints & Practical Aspects

(100 words)

This is a golden opportunity for you to enter in the world of data science especially in the field of predictive maintenance for smart industry. It is your chance to learn a variety of AI/ML modelling techniques for predictive analysis for service data.

You will be provided with all the required support and information to successfully realise this project.