

Scaling WeldCorp: Leveraging AI for Quality Assurance in Welding

Introduction

While many firms are struggling with overcoming the challenges associated with scaling, other firms are rapidly moving toward creating value from digital technology and consequently scaling in a massive way. Successful examples of scaling demonstrate that a mindful strategy may not only enable improved preventive and proactive maintenance of key processes, but also more effective and efficient value creation and capture. But these examples also demonstrate that increased use of digital technology in scaling efforts also adds complexity and creates challenges for the involved firms. In this project, your assignment is to help WeldCorp, a firm providing welding services to navigate away from these challenges by articulating a strategy for quality assurance by leveraging AI. In particular, you will use insights gained from this course to discuss how WeldCorp can articulate a strategy helping them to leverage AI and, as a consequence, continue to scale.

The case of WeldCorp

WeldCorp was launched in Gothenburg back in 1994 by Kaj Kindvall, who is also the CEO of the firm. The firm has grown to have offices in Stockholm and Malmö since the early 2000s. In 2025, WeldCorp opened offices in Västerås, Skellefteå and Luleå. As often is the case for growing firms, Kaj's passion is the key driver for growth. Despite the early success, Kaj is looking to take the next step to scale WeldCorp beyond their current state. He has recently turned his attention to machine learning to help WeldCorp with quality assurance of their services. As WeldCorp has grown, it has at times been difficult to sustain the quality of the services they provide. With offices all over Sweden, Kaj's hands-on quality assurance does not work anymore. It is against this backdrop that WeldCorp is now turning to you for help. How can they sustain their growth by leveraging AI?

Your assignment

Your assignment for this seminar is to help WeldCorp sustain their growth by leveraging AI. Specifically, your task is to analyze welding images (images of good and bad welding points) to develop a model – using the Orange Data Mining software – that can be useful for WeldCorp in a quality assurance context. The assignment is divided into two parts:

Part 1:

Your *first* task is to:

- 1.1 Describe and motivate your choices regarding data collection and labeling in the Orange Data Mining platform.
- 1.2 Describe how you evaluated the predictions of your model. Are they good enough to use live for WeldCorp? Why / why not?

Part 2:

The CEO also recognizes that a new breed of AI systems capable of analyzing multi-modal data (e.g., text and images) has emerged: large language models (LLMs). These systems could complement or even replace the model trained during step 1.

Your *second* task is to:

2.1 Formulate a basis - a prompt – for a LLM of your choice, to make it able to classify bad and good welds damage. To do this, you need to engage with the art of “prompting” to the LLM instructions on how to react when it receives an image of a welding joint.

2.2 Describe how you evaluated the LLMs performance. What are the differences in evaluating the LLM and the model from Task 1?

2.3 WeldCorp now faces a situation where they have two types of AI systems. Discuss how they would implement these types of solutions in their business by formulating an AI strategy for WeldCorp.

Instructions:

You will be presenting your results both in the form of a short paper, max ten pages, and orally at the final seminar.

During the seminar each group will get 30 minutes to present their results. You are encouraged to show examples from Orange and the LLM. You must also participate actively by answering questions and comments to the presentation.

Your short paper should begin with a cover page on which you state the names of the group participants, the name of the course and the semester. Submit it in Canvas before the final seminar.

The group assignment will be graded with pass or fail. To get the grade pass you need to fulfil the following criteria, you must have:

- Presented a logically coherent suggestion for WeldCorp, both in writing and orally during the seminar,
- Formulated your results and associated discussion in a grammatically correct way and with consistent use of concepts and terms.

Common questions / detailed instructions:

- Format: Use a common font such as Times New Roman, 12pt, single spacing.
- Use of figures, images, screenshots etc is encouraged.
- If you run out of space, move things to Appendices.
- During the presentation, feel free to demonstrate the performance of the LLM in Step 2 live.