



## Machine learning for automated metal cutting:

Since 1985 HGG is a world leader in designing and building robotic cutting solutions for the heavy steel industry. Its machines are deployed all over the world and are used to rapidly cut steel profiles into free-form shapes.

Its machines have been used to build iconic landmarks world-wide such as the London Eye, the Amsterdam Arena and huge stadiums



Ever increasing demands however on the machines productivity and difficulties in finding skilled personnel, are driving a demand for more autonomy and self-learning machinery.

### Assignment description



One of the challenges faced when trying to automate steel cutting further is that capturing the craftsmanship associated with metal cutting in code, especially using Oxy-Fuel cutting on very thick steel parts, is hard. Operators generally cut with consistent quality but have a hard time explaining what exactly they are doing and approaches vary greatly between operators. Hence the wish is to design and implement a learning mechanism that can incorporate the following items:

- Learn a model for Oxy-fuel cutting by observing an experienced cutter
- Using audio and visual cues for the learning process
- Incorporate some part quality feedback
- Improve cutting quality and speed by exploration

### Why is this hard!

To achieve good cutting results, skilled operators look at and listen to their machines to detect visual and audio cues and adapt their gas mixture and cutting speed accordingly.

While the number of control variables might be limited, learning to automatically cut steel using oxy-fuel is considered hard because of the little repetition between jobs, the difficulty in objectifying the end result and the large quantity of unknown variables that influence the end-result.



[https://en.wikipedia.org/wiki/Oxy-fuel\\_welding\\_and\\_cutting](https://en.wikipedia.org/wiki/Oxy-fuel_welding_and_cutting)

### Who are we looking for

We are looking for an enthusiastic self-assertive machine learning adept that wants to take novel learning schemes onto the industrial work floor.

- Desire to put advanced learning strategies into real world applications
- Strong background in machine learning or AI.
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### Company supervision

HGG will provide a challenging assignment and the support needed to make it a success. The daily supervision will fall under Matthijs Jansen, graduated at Systems and Control student (Delft University of Technology) and R&D engineer at HGG.

### Contact

Want to know more? Send your CV and questions to Matthijs Jansen at [maj@hgg.nl](mailto:maj@hgg.nl).

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