# Active learning using deep learning for damage detection

## Job Description

Mainblades Inspections is on a mission to change the way inspections are performed for large commercial aircraft. Our company develops data-driven technology, focused on automation of the complete inspection process: from autonomous drone flight, to damage detection and assessment of visual data, all the way to automated reporting. Our automated drone inspections for aircraft allows for a more rapid and effective inspection on any location, enabling our customers to *keep their aircraft off the ground*.

## Research scope and objectives

A key aspect of the automated inspection is the ability to detect damage from the images the drone is capturing of an aircraft, making use of computer vision techniques and algorithms. For computer vision applications, deep convolutional neural networks (CNN) gained a lot of momentum due to their empirical success on visual recognition tasks.

This research assignment focuses on active learning. Instead of just relearning from scratch with new additional data, disagreements between the model and human feedback can be used to identify "hard" examples (i.e. edge cases, previously unseen scenarios, etc.) and optimize for performance on those by modifying the training algorithm. It also promises to make the labelling process more efficient by only letting humans label the hard examples. Example literature for inspiration:

- https://arxiv.org/abs/1703.06971
- https://arxiv.org/abs/1901.10609
- https://arxiv.org/abs/1702.06559

## Requirements

**What you bring to the table**

We are looking for a talented and enthusiastic MSc student, preferably with some programming experience and a background in computer vision and deep learning. Furthermore, we are looking for people who like to be seriously challenged and easily adapt to change. You contribute with innovative ideas to the company and have a shared responsibility to make our vision a reality. Above all, we are looking for someone with a dedication for mastering new topics and a willingness to learn.

**What we bring to the table**

*A comfortable and fun working environment:*

- Collaborating with a young, dynamic and multidisciplinary team in an innovative start-up.
- Testing of your research on an available drone inspection platform in a real-world application.
- Computational resources to conduct your research
- Unique chance to be part of a high-growth, successful start-up.

If you think you got what it takes, and you are up for the challenge, take the first step and apply now! If we're interested, we'll reach out and take you through our recruitment process.

**MainBlades Inspections B.V.**

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