

# Master's Thesis Proposal

## Seed surface measurements from multiple views

### *Company*

MAXX Automation AB specialises in sorting seeds using digital image processing. Many years' experience combined with knowledge of the field has resulted in the Seedscanner. The Seedscanner is operating as a tool for the determination of other seeds by number in cereal species at the Norwegian Agricultural Inspection Service Seeds Department, the Swedish Seed Testing and Certification Institute, Eurofins and SASA Scotland. Based on modern image-processing technology and advanced machinery, the Seedscanner can separate 90-95% of the kernels in a standard sample, leaving only about 5-10% for human inspection. The species included in the program are wheat, barley, oats, rye and triticale.

### *Background*

The different seed types can show various forms of damage. Estimating the extent of the damage on a sample of several hundred seeds is the common way of determining product quality (and thus price). This is currently done manually. MAXX Automation, in collaboration with Lantmännen, is developing a machine, based on their Seedscanner, to automate this procedure. With the use of mirrors, the machine is now able to acquire three views of each seed. New image analysis methods need to be developed to make best use of these new type of data.

### *Goals*

This thesis proposal has various related goals:

- Determine the extent of the total seed surface area seen by the three views, and the areas seen in multiple views.
- Develop a method to quantify the physical surface area of a small patch as seen in one of the three views.
- Develop methods to consistently characterize seed properties, independently of the orientation of the seed.
- Derive new measures that can be used to refine the detection of specific forms of damage, taking into account the increased field of view of the new camera system.
- Determine the robustness of existing and new methods with respect to the orientation of the seed in the imaging system.

### *Supervision*

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