



**ABSTRACT**  
**Licentiate thesis**

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**"Crop and weed discrimination using computer vision"**

**Abstract:**

The thesis is concerned with computer vision in ecological and precision agriculture aiming to identify crops and weeds in images of crop rows. The identification of plants can be done by extracting the plants in the image and classifying them as a crop or weed depending on the shape and color. The extraction of plants can be accomplished in two ways, either by extracting the separate leaves and combining them into plants or by extracting the plants directly. Plants overlapping each other, plants missing parts of leaves or whole leaves, variations in plant appearance, and missing plants in crop rows are the main problems the computer vision-based plant identification needs to tackle.

The main objective in this thesis is to develop and investigate methods for both ways of extracting the plants and classification of extracted plants into crop or weed classes. A new method for extraction of separate leaves, called cutting, is presented and compared to the watershed and erosion followed by dilation methods, which have been used in other applications of leaf extraction. For the direct extraction of plants, the active shape models (ASM) method is adapted and evaluated. The initial position is one of the main parameters affecting the robustness of the result obtained from the ASM. Therefore the robustness regarding different initial positions is studied experimentally.