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Computer vision quality assessment of barley kernels

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Abstract: Due to the increased requirements concerning the quality of the produced cereal grain, there is a need for an objective, reproducible, rapid and low-cost quality assessment methods. Particularly in the brewing industry, kernel uniformity, existence of germ in every kernel, lack of mechanical defects and lack of fungal infections in grains (Ruan et al., 2001 and Ridgway et al., 2002) is crucial for the production of high quality malt.

As the quality of thousands of tons of grain has to be inspected upon purchase, which involves visual inspection of selected samples, the development of automatic computer vision methods could have positive impact on the industry. Herein, we present results of image based texture, color and geometry analysis for quality assessment of barley kernels. The method for identification of defected kernels is evaluated. The approach is based on image derived attributes of individual kernels; discriminant analysis and involves linear classifier ensembles (Szczypiński et al. 2015).

This study shows the defected kernels can be recognized with acceptable sensitivity and specificity ratios, reaching respectively 92% and 94% for fusarium detection, and 97% and 99% for missing germ detection.

Barley kernel examples: healthy, with missing germ and fusarium infected

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