Wheat yield estimation based on analysis of UAV images at low altitude

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In the last years many papers were published in order to automate labor intensive manual wheat heads counting. Recently we proposed a software package WDS (Wheat Detection System) for ears counting in wheat crops based on RGB images obtained from UAVs. WDS creates the flight plan, for the acquired images carries out automatic georeferencing to the appropriate fragment of the field, counts ears using the neural network models, reconstructs the density of ears in the crop and visualizes it as a heat map in the interactive web application. Based on the field experiment the accuracy of ears counting in plots was assessed: Spearman and Pearson correlation coefficients between the ears density counted manually and using WDS were 0.618 and 0.541, respectively (p-value < 0.05). WDS available at https://github.com/Sl07h/wheat_detection. Further accuracy improvement can be achieved with the use of rotated bounding boxes detection models.

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The main publications of authors on the subject of the abstract:

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Take-home message:

With the use of UAV's and object detection models tedious procedure of manual wheat spikes count can be automated. We proposed software package that allows to form a flight mission, detect wheat heads, link them to map, and visualize the result.

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