UTILIZATION OF RADAR AND LIDAR SENSORS FOR DETECTING AND CLASSIFYING HUMANS AND ANIMALS IN AUTONOMOUS AGRICULTURE

Safe self-driving farming vehicles

Autonomous farming is the concept of automatic agricultural vehicles operating safely and efficiently without human intervention. Today, technology is available to automatically navigate and operate agricultural machinery, such as tractors and harvesters, more efficiently and more precisely than by manual human operation. However, a crucial deficiency in this technology concerns the safety aspects. In order for an autonomous vehicle to be certified for unsupervised operation, it must perform automatic risk detection and obstacle avoidance in the field with high reliability.

Increasing safety

In my PhD project, I am working with two different sensor technologies, radar and lidar. By incorporating these technologies into the area of autonomous farming, I hope to ensure efficient and reliable operation of self-driving agricultural vehicles. I want to maximize safety by providing obstacle detection capabilities possibly exceeding human abilities.

Radar technology can be used to detect obstacles located in front of the vehicle, and due to the application of radio waves, I envision that radar may even enable detection of humans and animals that lie hidden within vegetation.

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A lidar uses laser light to build very accurate 3D maps of the terrain around the vehicle. It is the de facto standard for self-driving vehicles for navigation and obstacle avoidance in urban environments. Using a lidar sensor in an agricultural setting, I want to optimize the detection performance of humans and animals in rough and vegetated terrain.

Partners

The PhD project is part of a larger project, "SAFE – Safer Autonomous Farming Equipment", sponsored by the Innovation Fund Denmark (Højteknologifonden). The SAFE project is a joint research collaboration between the two major agricultural machine manufacturers, Kongskilde and CLAAS, and the two research institutions, Aarhus University and University of Southern Denmark.

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