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# DRIVERLESS TRACTORS IN FARMING

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The use of a driverless tractor or self-operating robots in farming is not just to do sci-fi research. The use of robotics can help provide an efficient usage of our food resources and a higher crop yield. This will improve the profit for the farmer, reduce the price for consumers, and has a potential for making organic/sustainable farming a more tempting alternative for both consumer and farmer.

Today driverless tractors are already a reality, but the farmer is still required inside the tractor to detect and avoid the harming of animals and especially humans in the field. The project Safer Autonomous Farming Equipment (SAFE) aims to develop methods to recognize and avoid animals and humans automatically, thus enabling driverless farming equipment.

As a part of the SAFE project, the purpose of my PhD is to develop a computer program to recognize animals and humans using a normal camera and a heat sensitive camera. The computer program should then be able to

take over the responsibility of the human-driver by detecting animals and humans.

The subject of computer vision is about giving a computer the ability to see in terms of recognizing, interpreting and understanding data from a camera or other sensors. The ability of understand an image and also speech is very basic to humans, but very difficult for a computer. In fact the most unintelligent people are still superior to the highest performing computer, when it comes to recognizing objects in an image; understanding images in general; recognize the sound of a word or the meaning of a sentence.

However, recent methods and especially a new technique from around 2012 - known as deep learning - have shown to be very promising. The method resembles the structure of the human brain and is able to describe data in multiple layers of abstract automatically. Using a lot of data and computer power the



technique has shown human-like abilities in terms of understanding images and speech.

The work of my PhD is to use recent discoveries in computer vision to detect humans and animals with the potential of realizing fully driverless farming equipment.

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