

## **Robots as Farmers: Automation in Precision Agriculture**

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The efficiency and productivity of production agriculture has drastically increased over the last 100 years due to mechanization; however, the acquisition of large agricultural machinery is costly, and there remain repetitive and labor-intensive tasks for which no automated solutions exist. Additionally, on-farm labor costs are increasing due to a growing workforce shortage. These economic pressures have ignited efforts towards developing smaller, portable, multi-task robotic systems for agriculture. These agricultural robots, or “agbots”, promise to deliver smart, automated solutions for a variety of on-farm tasks, such as plant phenotyping, sorting, scouting, pruning, thinning, planting, spraying, weeding, and harvesting. Automated solutions are of particular importance to specialty crop industries, which currently rely on the availability of seasonal, manual labor for production.

A significant challenge to automating these tasks, however, is the dynamic, unstructured, and uncertain nature of agricultural environments, but ongoing advancements in artificial intelligence, navigation, and control are enabling systems to overcome these challenges. In light of these recent advancements, this talk will focus on cutting-edge agbot technologies from both industry and academia for automating specialized tasks in agriculture and will include case studies from a variety of cropping systems. The material covered in this talk will illustrate the potential for agbots to further improve efficiency and productivity of production agriculture, while identifying challenges that remain ahead before they become fully adopted and integrated on the farm.