Announcing the Final Examination of Xiangling Kong for the degree of Doctor of Philosophy

Time & Location: June 26, 2019 at 10:00 AM in ENG 2 202a
Title: Color-Ratio Based Strawberry Plant Localization and Nutrition Deficiency Detection

In recent years, precision agriculture has become popular anticipating to partially meet the needs of an ever-growing population with limited resources. Plant localization and nutrition deficiency detection are two important tasks in precision agriculture. In this dissertation, these two tasks are studied by using a new color-ratio (C-R) index technique. Firstly, a low cost and light scene invariant approach is proposed to detect green and yellow leaves based on the color-ratio (C-R) indices. A plant localization approach is then developed using the relative pixel relationships of adjacent plants. Secondly, the Sobel operator and morphology techniques are applied to segment the target strawberry leaf from a field image. The characterized color for a specific nutrition deficiency is detected by the C-R indices. The pattern of the detected color on the leaf is then examined to determine the nutrition deficiency. The proposed approaches are validated in a commercial strawberry farm.

Major: Mechanical Engineering

Educational Career:
Bachelor's of Automatic Control, BS, 2007, Beijing Union University, China
Master's of Computer Applications Technology , MS, 2014, Beijing Union University, China

Committee in Charge:
Yunjun Xu, Chair, Department of Mechanical and Aerospace Engineering
Liqiang Wang, Computer Science
Tarek A. Elgohary, Department of Mechanical and Aerospace Engineering
Qiushi Fu, Department of Mechanical and Aerospace Engineering
Dazhong Wu, Department of Mechanical and Aerospace Engineering

Approved for distribution by Yunjun Xu, Committee Chair, on June 11, 2019.

The public is welcome to attend.