ADVERSARIAL AUTOENCODERS FOR AGRICULTURE YIELD FORECASTING

Yueyang Symus Say[1], Mark Wong Kei-Fong[1], Eddie Ng Yin-Kwee [1]

School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore 639798, Singapore
MYKNG@ntu.edu.sg

ABSTRACT

For sustainable food production. In agriculture, crop yields are increasingly affected by warmer temperatures, and pest infestations caused by climate change have increased agricultural losses. Increasing local production is important to reduce our dependence on imported food and provide a buffer in case of supply disruptions such as those caused by the COVID-19 pandemic. To increase food security, it is important to optimize agricultural yields, despite the high costs associated with factors such as supplemental feeding, pest control measures, or operating costs.

We present a Machine Vision method (MV) with Adversarial Autoencoder (AAE) as an approach to crop yield optimization. Predicted leaf area is projected from initial germination to early vegetative stages. Generative machine learning models are analyzed to determine a suitable architecture for crop yield prediction. Images of romaine lettuce grown over time under different conditions (e.g., light intensity) are used as the data set. Preliminary results show that the model created is able to predict an image with sufficient accuracy based on a single condition. With our method, corrective actions can be taken early, and yields recover from initial below-average values. Further work can be done to extend the model to other conditions such as moisture, strength of available sunlight, or soil nutrient content.