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DS 4002

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A Case Study of Image Recognition Models for Nutrition and Agriculture

Global food insecurity is a significant problem that affected over 700 million people globally in the year of 2023 alone.[1] This is a problem that not only creates hunger, but threatens agriculture sustainability as climate change escalates. For these reasons, it is critical to employ technology to assess crop health and nutritional values of meals in real time. Image recognition is a well-known tool that can help us address this need.

However, it is important for image recognition models to be trained to identify different subjects within the same image, as many image recognition models are trained to only identify one subject at a time. For this case study, you will be provided with a dataset containing images of multiple fruits taken from different angles and in different lighting conditions to train a model using the YOLO algorithm to identify multiple subjects within the same image. The You Only Look Once (YOLO) algorithm combines regional algorithms with convolutional neural networks to detect and localize different objects in each image.[2] Essentially, YOLO predicts bounding boxes around each object and then uses class probabilities to identify what each object is in order to perform detection.

The Deliverable: For this assignment, you will use the dataset of 21,122 fruit images of 20 different kinds of fruit in 8 different combinations to create an image recognition model using YOLO in Python.[3,4] This dataset contains a folder to train your model as well as another folder to test your model on. The starter scripts have been provided in a GitHub repository to begin this assignment. You will submit your own GitHub repository containing your final code for the YOLO model, the data and images used, and a summary of your results and takeaways from this project. **GitHub Repository Link:** https://github.com/amirahhoss/DS4002CC3/

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