Chef Robotics
Perception Engineer Exercise

CHEF

We want to see how you handle and prepare datasets for a machine learning task and train a model. Your submission will be evaluated on your level of understanding, communication, and results.

Here is a dataset consisting of 25 training images and 5 testing images. Your task is to train (or fine-tune) a Machine Learning model that runs on device and will be used to detect bowls (the trays where food is deposited). You are allowed to use whatever libraries you want.

Instructions

1. **Data Analysis**
    a. Inspect the dataset for quality and consistency. Document any issues you find and how you would address them.
    b. How would you collect and annotate a larger dataset of images?

2. **Model Training**
    a. Choose a suitable deep learning model architecture for object detection. Justify your choice.
    b. Train the model using the images. Feel free to alter the dataset if needed.

3. **Evaluation**
    a. Evaluate the model performance using appropriate metrics for object detection. Discuss the results.
    b. Identify any potential limitations of the data and your model and suggest improvements.

4. **Documentation**
    a. Provide a brief report documenting your methodology, code, results, and any insights or challenges you encountered during the task.

5. **Extension**
    a. Discuss different alternatives to predict the bowl orientation.
    b. Discuss different alternatives to also output the ingredients in the bowl.

Deliverables

1. Source code for preprocessing, training, and evaluation.
2. Trained model artifacts.
3. A concise and detailed report (half a page to one page) covering methodology, results, and discussions.