Image Classification: Plant Diseases

Business Understanding

- Identify common diseases that manifest on the leaves of cotton plants by comparing images of infected plants with images of diagnosed plants to efficiently identify diseases and lead to faster application of correct treatment
- What industry/realm/domain does this apply to?
  - Agriculture
- What is the motivation behind your project? (Saying you needed to do a capstone project for flatiron is not an appropriate motivation)
  - Strong interest in the potential of image classification models
  - A hobbyist gardener that would benefit from a similar model at home and interest in its application to automate plant health processes in industrial agriculture.
  - Intrigued in combining this with drone technologies used for surveying in the agricultural industry

Data Understanding

- Direct download of labeled images of cotton plant leaves
- 6 classes of visible leaf conditions

Data Preparation

- Rescale pixel values using MobileNetV2 as an application of Keras
- Format labels
- EarlyStopping to regularize

- What are some of the cleaning/pre-processing challenges for this data?
  - Would prefer larger set of labeled images
  - Issues introducing diversity by applying random transformations, needs more work

Modeling

- What modeling techniques are most appropriate for your problem?
  - Convolutional Neural Network
  - Pixel features that indicate specified classes of Cotton Plant diseases based on images of the leaves to distinguish healthy leaves from unhealthy leaves and identify the disease
- Is this a regression or classification problem?
  - Classification

Evaluation

- What metrics will you use to determine success (MAE, RMSE, etc.)?
- Plot inverse accuracy and loss
- `Tqdm visualization to show confidence based on loss`

- Manual check of predicted label

Tools/Methodologies

- What modeling algorithms are you planning to use (i.e., decision trees, random forests, etc.)?
    - MobileNetV2 architecture for convolutional neural network