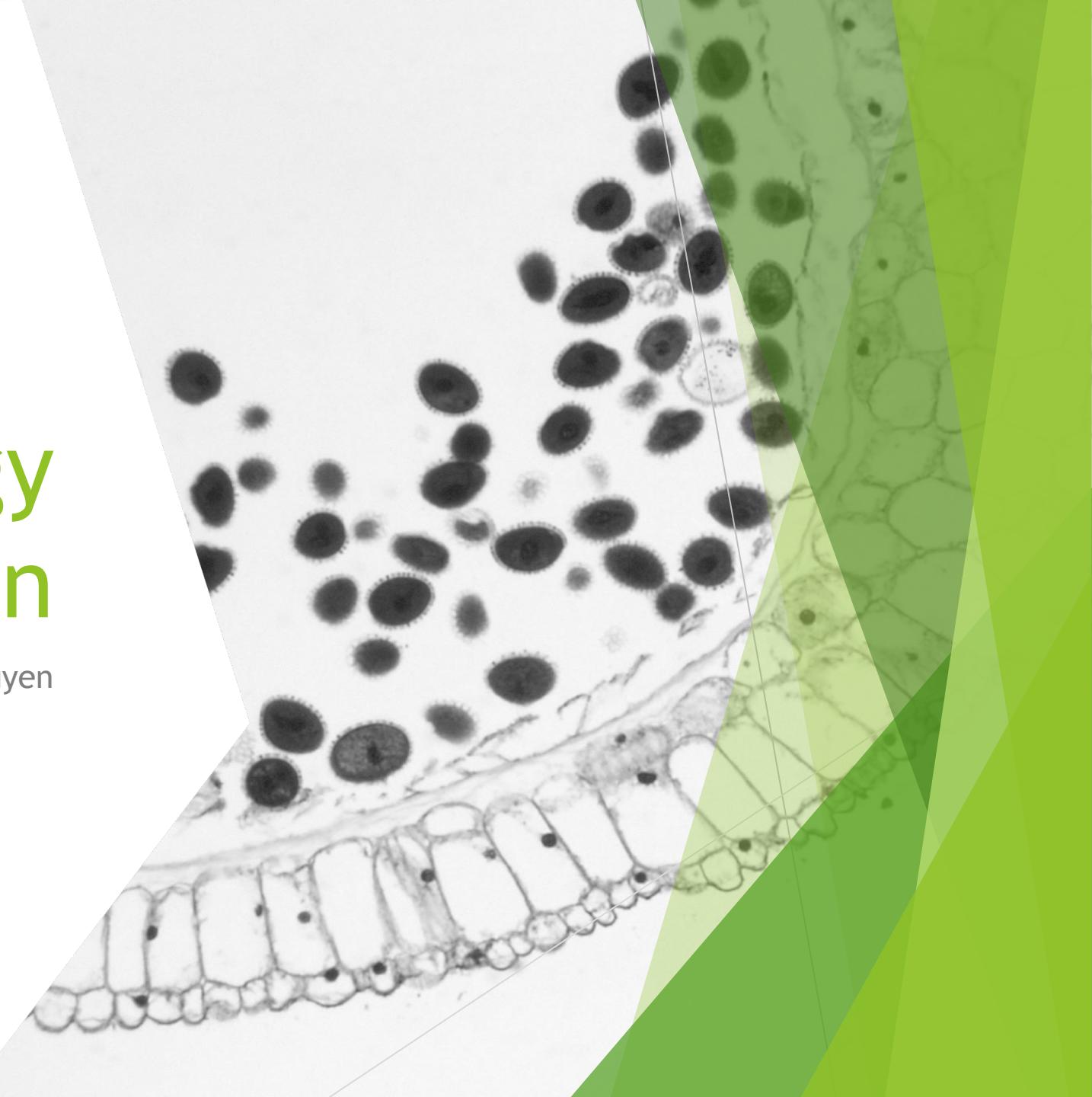


# Plant Pathology Classification

Bi Nguyen



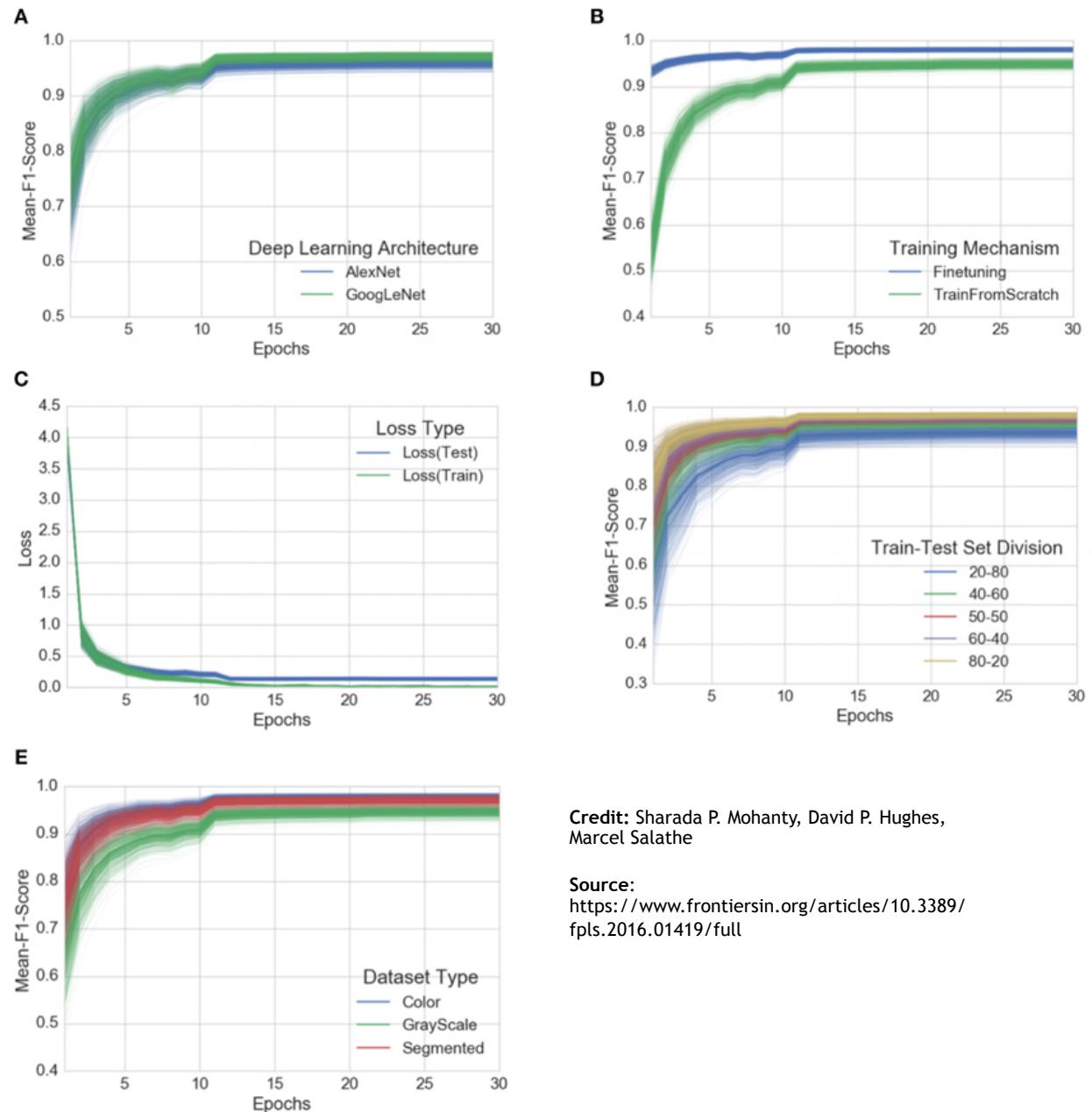


## About the project

- ▶ Crop diseases are a major threat to food security
- ▶ Manually identifying these diseases can be time consuming
- ▶ Help agricultural farmers properly diagnose the underline diseases to prevent misuse of chemicals
- ▶ Improper usage of the wrong chemicals can lead to emergence of resistant pathogen strains, more outbreaks at the expense of the farmers.

# Related Work

- ▶ In 2016, a group of researchers in Switzerland did a study on the effectiveness of Computer Vision on Plant Disease Detection
- ▶ They were able to achieve a 99% accuracy rate across 14 species of crops and 26 diseases
- ▶ By using pre-trained models (or transfer learning from GoogleNet models and AlexNet) on large scale data set of over 50,000 images.

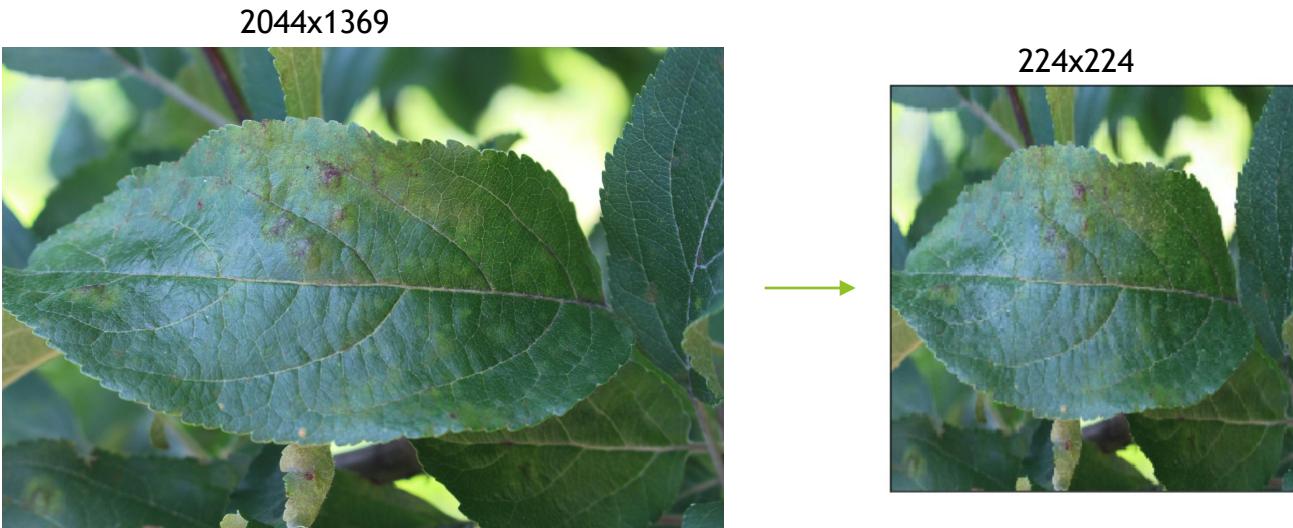


Credit: Sharada P. Mohanty, David P. Hughes, Marcel Salathe

Source:  
<https://www.frontiersin.org/articles/10.3389/fpls.2016.01419/full>

# Description

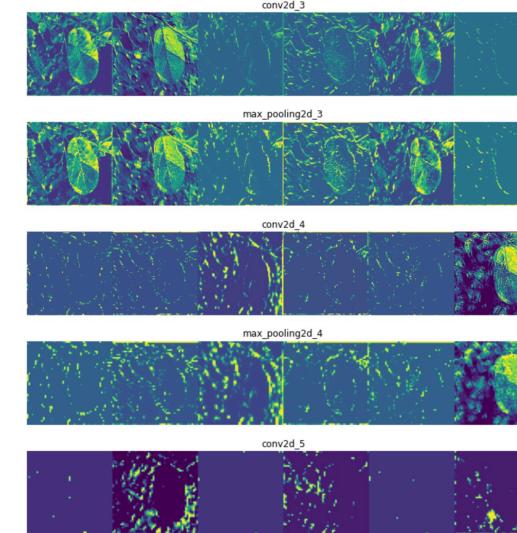
- ▶ The dataset contains only 1821 images.
- ▶ Most of the images came at high resolution so I had to scale it down in order to improve computation efficiency but at the cost of performance.



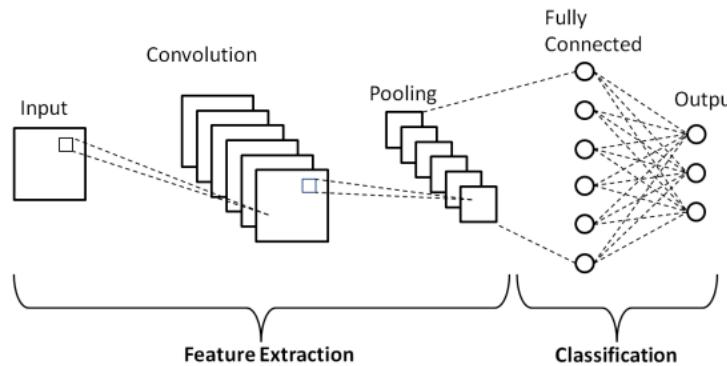
- ▶ 5 possible resolutions: 150, 198, 224, 256, and 384. After trial and error, I think 224 pixels provides the optimal input size. We can see this still keep the important trait of the leaves for classification

# Methodology

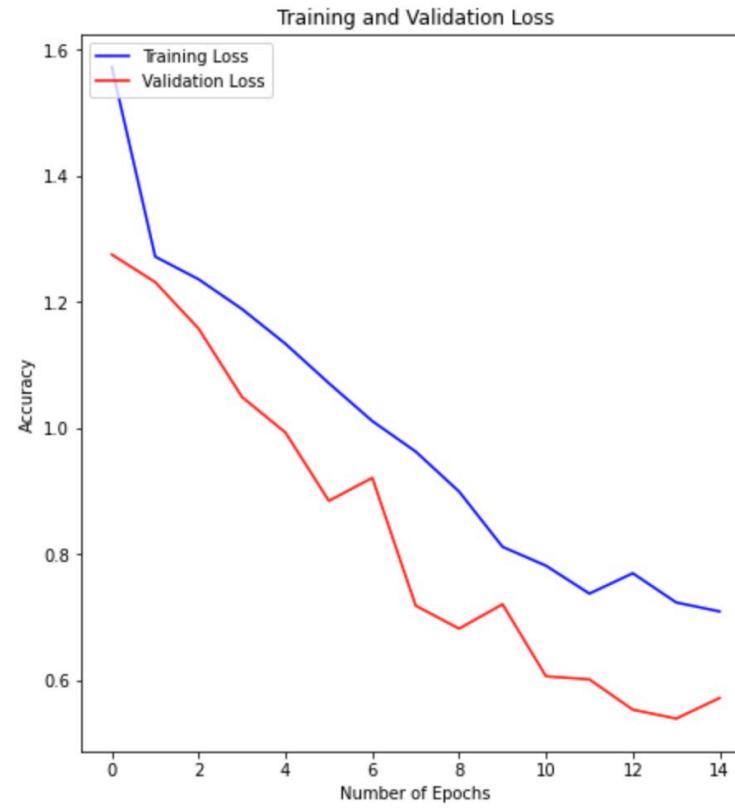
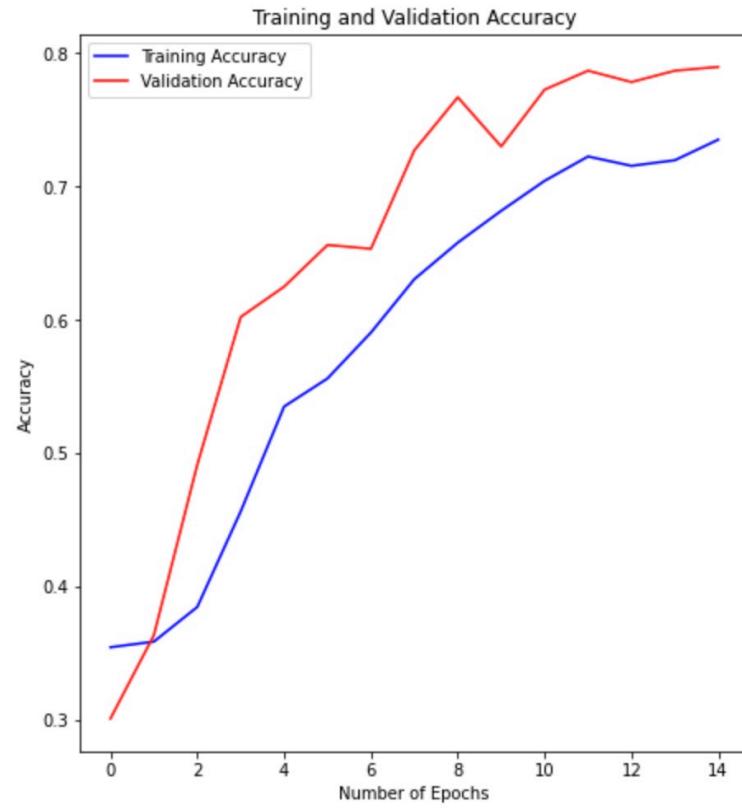
- ▶ Small samples leads to overfitting
- ▶ Augmented the pictures in order to allow the model to generalize.



- ▶ Convolutional Neural Network



# Results



# Possible Next Step

- ▶ Train the model for more epochs
- ▶ Tune Hyperparameters
- ▶ Use pre-trained models like AlexNet or GoogleNet for transfer learning to improve accuracy
- ▶ Create a Generative Adversarial Network to generate more images so the model can train better