Creating an Image Classifier to Predict Wheat Blast Disease

Introduction and Problem Identification

- Wheat blast-fungal disease-harm wheat yield around the world
- Image classification machine learning (ML) could help diagnose?
- If successful, could replace expense of professional botanist
- Success=model with high predictive power
- Ideally low computational load

Introduction and Problem Identification 2

- Stakeholders-shareholders of a company selling a predictive app
- App could be mobile or online
- Constraint-this dataset contains photographs taken in controlled environment
- Greater number/variation of photos could increase predictive power
- Constraint-not enough time to fully fine tune model

Dataset Description

- Publicly available dataset from Fernandez-Campos et al.
- ~6,000 wheat spike images
- All images are stated to be unique, relevant, and high quality
- Photographed w high quality camera, blank background, standardized distance
- Pre-split into training and test set, test size 0.2.
- Pre-split into categories of blast severity, as marked by plant pathologist.

Data Wrangling

- Data was downloaded from Fernandez-Campos et al website onto hard disk
- Zip file ~3 GB
- Uploaded google drive, drive mounted in google colab
- Data briefly inspected, determined clean
- Data reported clean-Fernandez-Campos et al

Exploratory Data Analysis (EDA)

- Displayed images, inspected
- Plotted image sizes, aspect ratio
- Visualized number images each subset
- Image Feature Analysis
    - Canny edge, fast features, graphical representation

Data Preprocessing

- Resizing-Keras’ Image Data Generator
- Assigned train/test-Keras’ fit_generator()
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Modeling

- 2 models created
- Model 1-pretrained VGG16 model
- Model 2-smaller CNN-from scratch
- Why choose these?
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Results

Conclusions

Recommendations

Future Steps

Acknowledgements

Works Cited

Images Cited:

1. https://www.google.com/search?q=wheat+blast&source=lnms&tbm=isch&sa=X&ved=2ahUKEwiN1dmIx_XyAhXaFVkFHZqOAQEQ_AUoA3oECAEQBQ&biw=1431&bih=727#imgrc=shxXvjkv7TswtM
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