

# IT1244 PROJECT

TEAM 40: Vu Minh Duc, Nguyen Tuan Dung, Do Trong Phuoc Nguyen, Le Ha Dang

## How to run the project

The notebook has already been executed beforehand and thus all the evaluation results saved for convenience's sake, as it takes about 2 hours to fully run the code. If you wish to rerun it for testing purpose, please follow these steps.

### Step 1: Install the project's required packages.

```
pip install numpy
pip install tensorflow
pip install keras
pip install matplotlib
pip install keras-tuner
pip install ultralytics
```

### Step 2: Open the notebook and import the required packages.

```
import os
import shutil
import random
import numpy as np
import matplotlib.pyplot as plt
import tensorflow as tf

np.random.seed(42)
```

[1] Python

... WARNING:tensorflow:From <c:\Users\Admin\anaconda3\Lib\site-packages\keras\src\losses.py:2976>: The name tf.losses.sparse\_so

```
> tensorflow.keras.preprocessing.image import ImageDataGenerator, img_to_array, load_img
> tensorflow.keras.models import Sequential
> tensorflow.keras.layers import Conv2D, MaxPooling2D, Dropout, Flatten, Dense, GlobalAveragePooling2D, BatchNormaliz
> tensorflow.keras.metrics import Precision, Recall, AUC
> tensorflow.keras.callbacks import EarlyStopping
```

[2] Python

### Step 3: Import the datasets.

If you do not wish to partition the input data into training and validation sets again, please only run the the block of code above

```
batch_size = 16
train_datagen = ImageDataGenerator(
    rescale=1./255,
    rotation_range=40,
    shear_range=0.2,
    zoom_range=0.2,
    horizontal_flip=True)

test_datagen = ImageDataGenerator(rescale=1./255)

train_generator = train_datagen.flow_from_directory(
    'Rice Disease/Datasets/train',
    target_size=(224, 224),
    batch_size=batch_size,
    class_mode='categorical')

validation_generator = test_datagen.flow_from_directory(
    'Rice Disease/Datasets/val',
    target_size=(224, 224),
    batch_size=batch_size,
    class_mode='categorical')
```

[6] Python

... Found 459 images belonging to 4 classes.  
Found 117 images belonging to 4 classes.

Otherwise, if you want to test the training/validation split function, please delete the folder “Rice Disease/Datasets” first and proceed to run all block in this section, or there will be duplicate images in the “Datasets” folder.

### Step 4: Train and evaluate the models.

1. Run the code blocks in the “Self-defined metrics” section before executing the models.
2. Depending on which model you wish to test, run the code blocks in that model’s subsection. All model subsections can be run independently, except for those of model 2B, 2C which require running model 2A beforehand.

Notes:

- In subsection 2: CNN, we used “kerastuner” to perform hyperparameter tuning. This process requires approximately 1 hour to run so all the results have been saved in the folder “keras\_tuner\_dir”.
- For the Finetuning YOLOv8 model, the training results have been saved in the folder “runs/classify/train to save time. Here, you can find the training results, pre-training schemes, and the final model.