CLOUDY THE SCIENTIST

ZERO WASTE

ITCS227 Introduction to Data Science

PROJECT GOAL

Misclassification of waste leads to poor recycling and environmental issues.

This project aims to build an image classification model that identifies garbage types and suggests the correct waste bin color.

ZERO WASTE PRACTICE

The principles of zero-waste are straightforward actions to minimize waste, conserve resources, and safeguard the environment. By embracing these practices, we can make zero-waste living both simpler and more effective

REDUCE

RECYCLE

REUSE

DATA SOURCE

- The data that we are using in this project is Garbage & Recyclable Image Dataset.

- The source that we use is from "**Recyclable and Household Waste Classification"** which is from the website "https://www.kaggle.com"

- The size of the data that we use is "19577" photo"
Train: 16427 images
Validate: 3150 images

- We get the data by searching for Public Datasets.

CLASSIFY CLASS

CARDBOARD

CLOTHING

PLASTIC

FOOD WASTE

GLASS

PAPER

METAL

STYROFOAM

PROPOSED METHODOLOGY

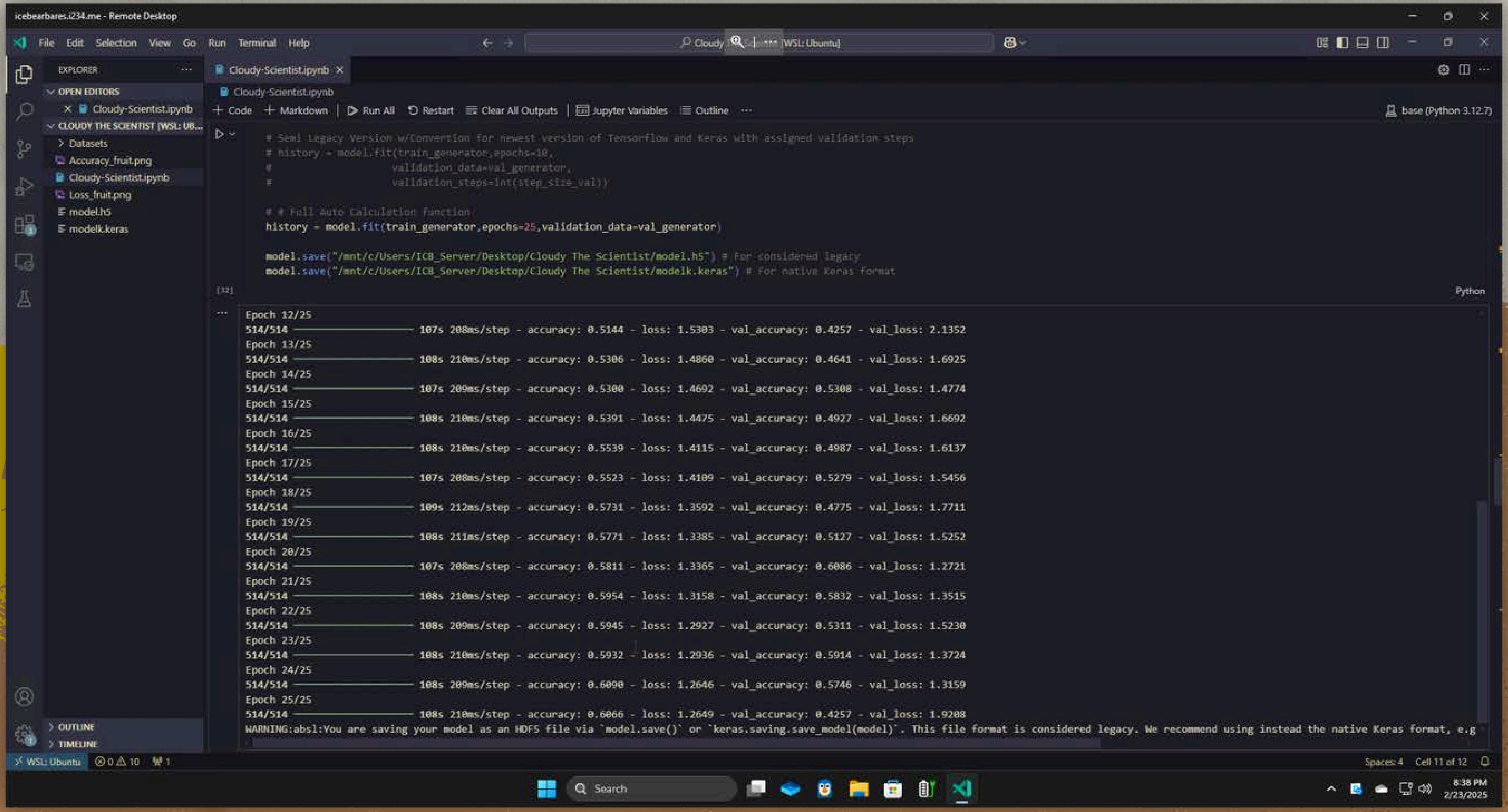
Tensordlow: Sequential model

TensorFlow

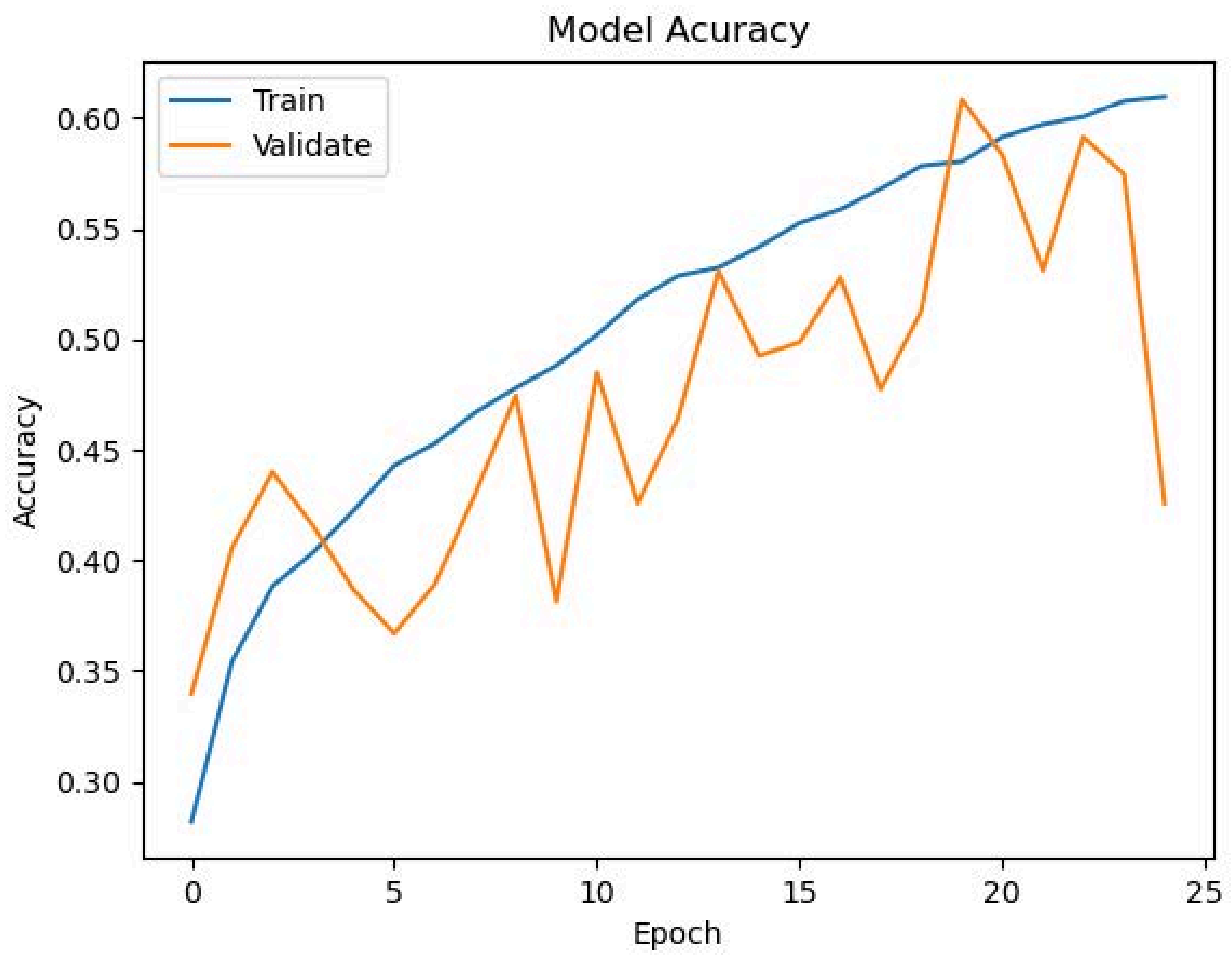
A Sequential model is appropriate for a plain stack of layers where each layer has exactly one input tensor and one output tensor.

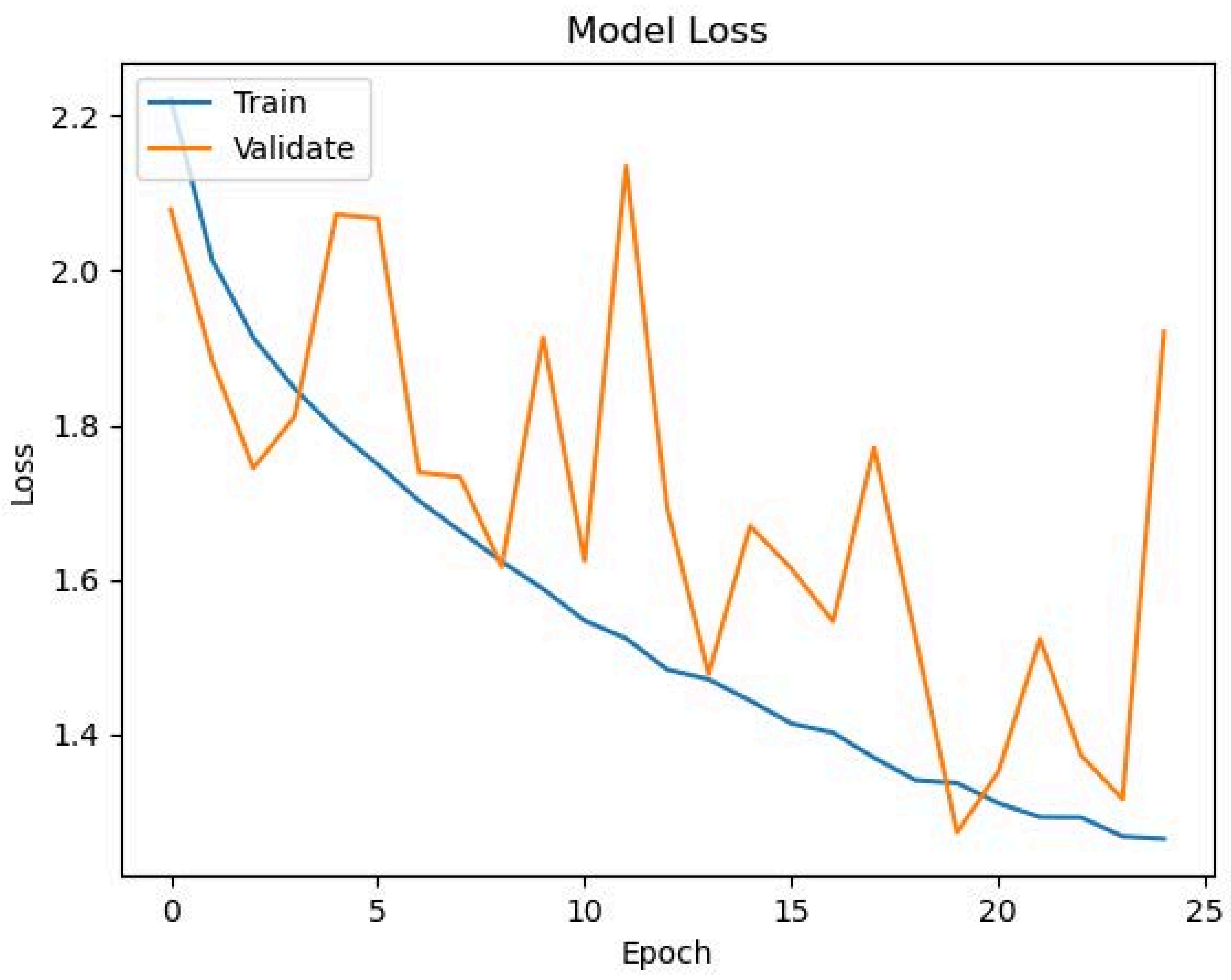
PROPOSED METHODOLOGY

Tensordlow: Sequential model



```
514/514 ━━━━━━━━━━━━━━━━━━━━ 107s 208ms/step - accuracy: 0.5811 - loss: 1.3365 - val_accuracy: 0.6086 - val_loss: 1.2721
Epoch 21/25
514/514 ━━━━━━━━━━━━━━━━━━━━ 108s 210ms/step - accuracy: 0.5954 - loss: 1.3158 - val_accuracy: 0.5832 - val_loss: 1.3515
Epoch 22/25
514/514 ━━━━━━━━━━━━━━━━━━━━ 108s 209ms/step - accuracy: 0.5945 - loss: 1.2927 - val_accuracy: 0.5311 - val_loss: 1.5230
Epoch 23/25
514/514 ━━━━━━━━━━━━━━━━━━━━ 108s 210ms/step - accuracy: 0.5932 - loss: 1.2936 - val_accuracy: 0.5914 - val_loss: 1.3724
Epoch 24/25
514/514 ━━━━━━━━━━━━━━━━━━━━ 108s 209ms/step - accuracy: 0.6090 - loss: 1.2646 - val_accuracy: 0.5746 - val_loss: 1.3159
Epoch 25/25
514/514 ━━━━━━━━━━━━━━━━━━━━ 108s 210ms/step - accuracy: 0.6066 - loss: 1.2649 - val_accuracy: 0.4257 - val_loss: 1.9208
WARNING:absl:You are saving your model as an HDF5 file via `model.save()` or `keras.saving.save_model(model)`. This file
```





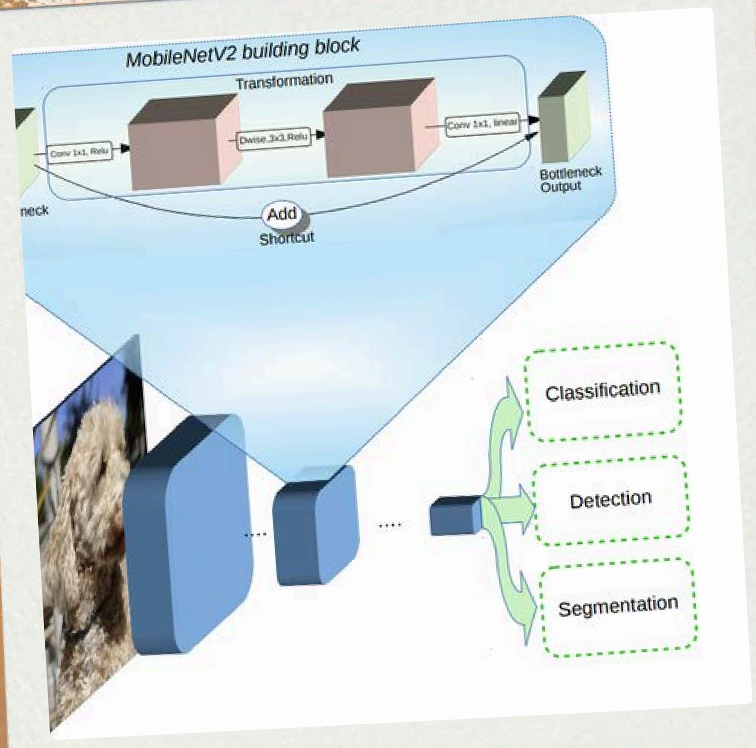
PROPOSED METHODOLOGY (PLAN B)

- USE EARLY STOPPING
- ADD MORE DATA AUGMENTATION
- LEARNING RATE ADJUSTMENT

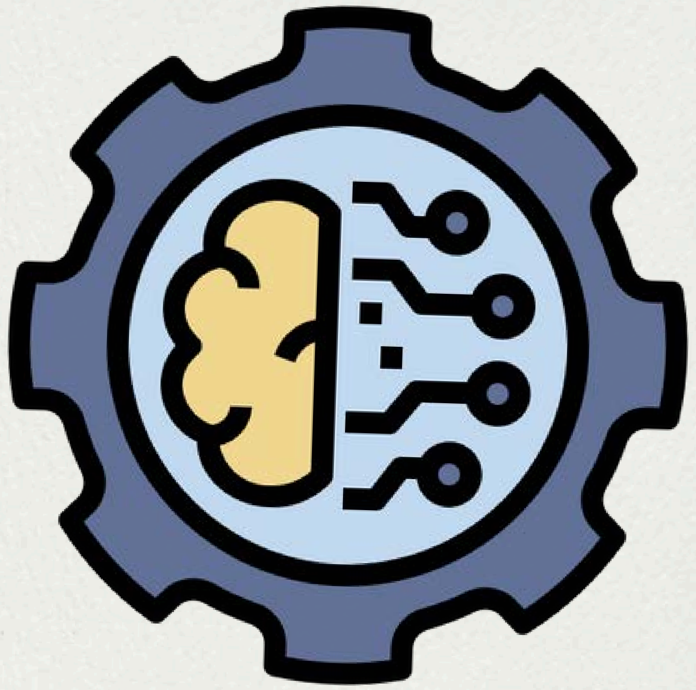
PROPOSED METHODOLOGY (PLAN B)

Tensordlow: Sequential model

Enhance with pre-trained MobileNet-V2



Very accurate model



TIMELINE

Collect the data → Model Training → Model Testing/Optimization

↓

Monitoring the result ← Deployment

EXPECTED OUTCOME

- **Effective waste categorization**

  Efficient waste categorization results in the waste separation being as we want and it is in the correct categories.

- **Save budget on waste categorization**

  Categorization with Machine Learning, we can save the budget on people to separate the waste manually.

- **Convenience for users**

  A good and fast waste categorization system makes it more convenient for people to separate their waste.

THE IMPACT WE CAN MADE

- Reduce waste and pollution
- Reuse and recycle to save energy
- Protect ecosystems from harmful waste

THANK YOU!

FOR YOUR ATTENTION!