FSM Mid-Internship Review

INTP23-ML-9:

Piston Defect Detection using Computer Vision

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IITD-AIA FOUNDATION FOR SMART MANUFACTURING

Objectives

Objective 1: Performing Explanatory Data Analysis
Achieved: Conducted a thorough exploratory analysis of the collected piston image dataset. Examined the distribution of defect types, analyzed image quality, and identified any data inconsistencies.
Planned Deliverables: Perform statistical analysis on the dataset, such as mean, standard deviation, and image resolution. Visualize the data distribution and correlations between features.
Target completion: 100%

Objective 2: Data Collection and Preparation
Achieved: Collected a dataset of AC piston images with a diverse range of defect types. Preprocessed the images to ensure consistency and Complete data augmentation techniques. Completed data augmentation techniques to increase the dataset size and diversity.
Planned Deliverables: Complete data augmentation techniques to increase the dataset size and diversity.
Target completion: 100%

Objectives

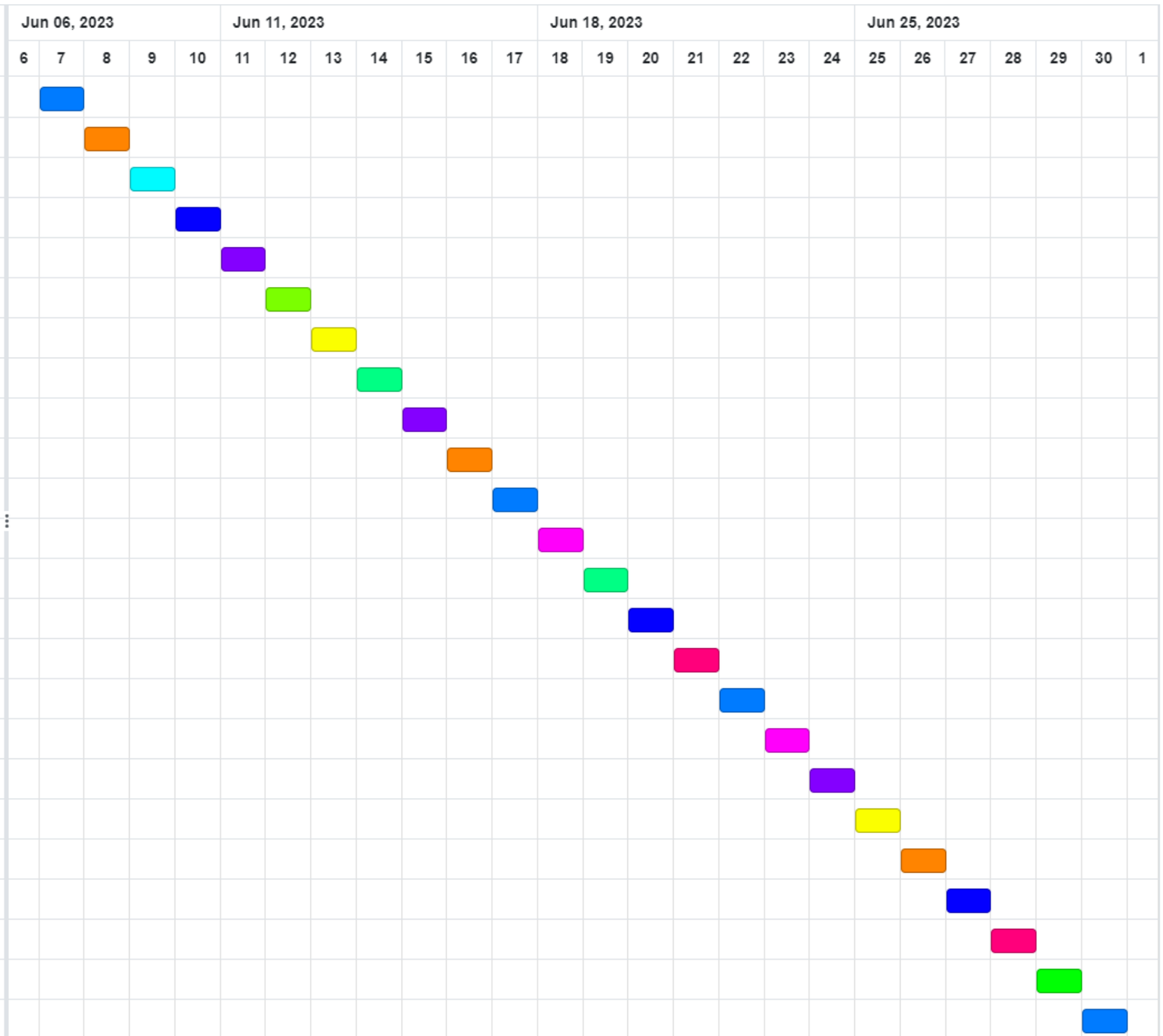
Objective 3: Model Development and Training

Achieved: Developed a Convolutional Neural Network (CNN) architecture for piston defect detection. Trained the model using the piston dataset to learn the features and patterns of different defects.

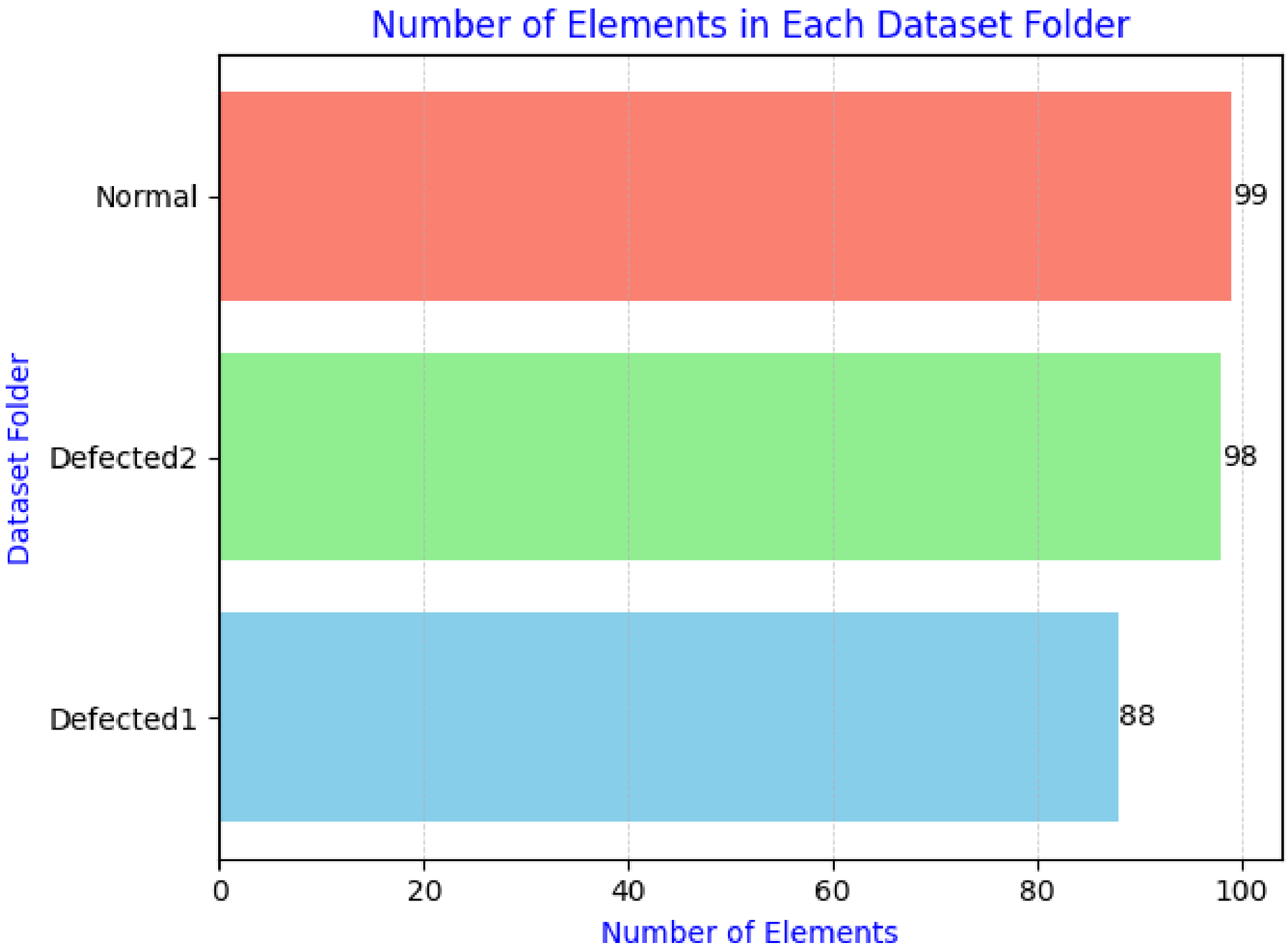
Planned Deliverables: Fine-tune the CNN model using transfer learning to enhance its performance. Experiment with various hyperparameters and architectures to optimize accuracy.
Target completion: 80%

Timeline - Gantt chart

ID	Name
1	Numpy/Pandas
2	Basics of CNN |Convoution Operation|Padding
3	PIL Library | OpenCV
4	Image Manipulation with PIL
5	Tensorflow Data Input Pipeline|CNN
6	Model Building using CNN
7	CNN Classifiers
8	KNN for Object Detection
9	Fundamental Concepts DL
10	Implementation DL Concepts
11	Build a Model Using CNN
12	Image Manipulation with OpenCV
13	Implemented various functionalities of OpenCV
14	Exploratory Data Analysis (EDA)
15	Tensorflow framework for deep learning.
16	YOLO algorithm for object detection.
17	Semantic segmentation|U-Net architecture
18	Model Building
19	Model Training using AC piston Dataset
20	Checked the accuracy and loss of the model.
21	Completed the abstract writing
22	ResNet,AlexNet,MobileNet.
23	created model by using Resnet Pretrained mo…
24	object detection algorithms.



Screenshots of development



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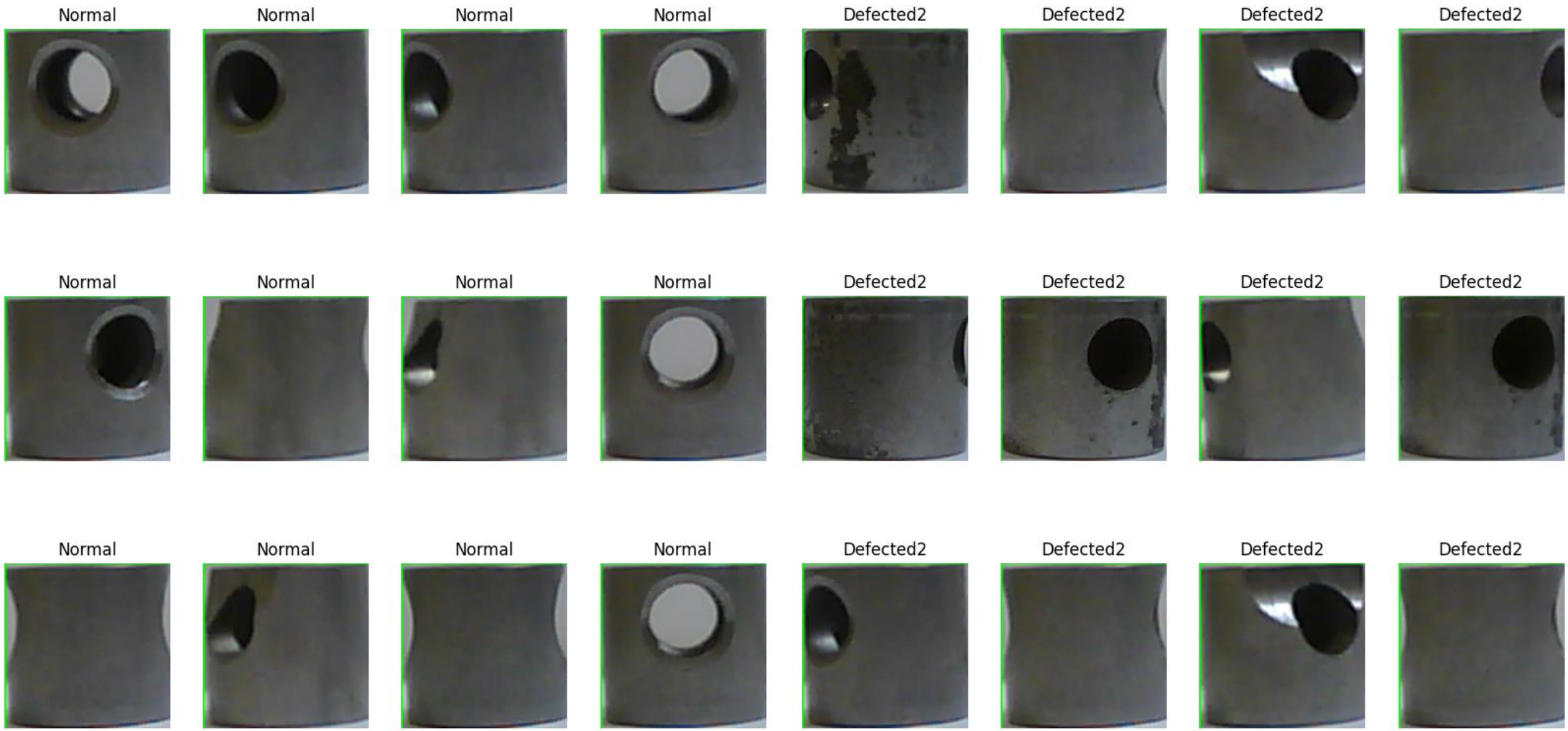

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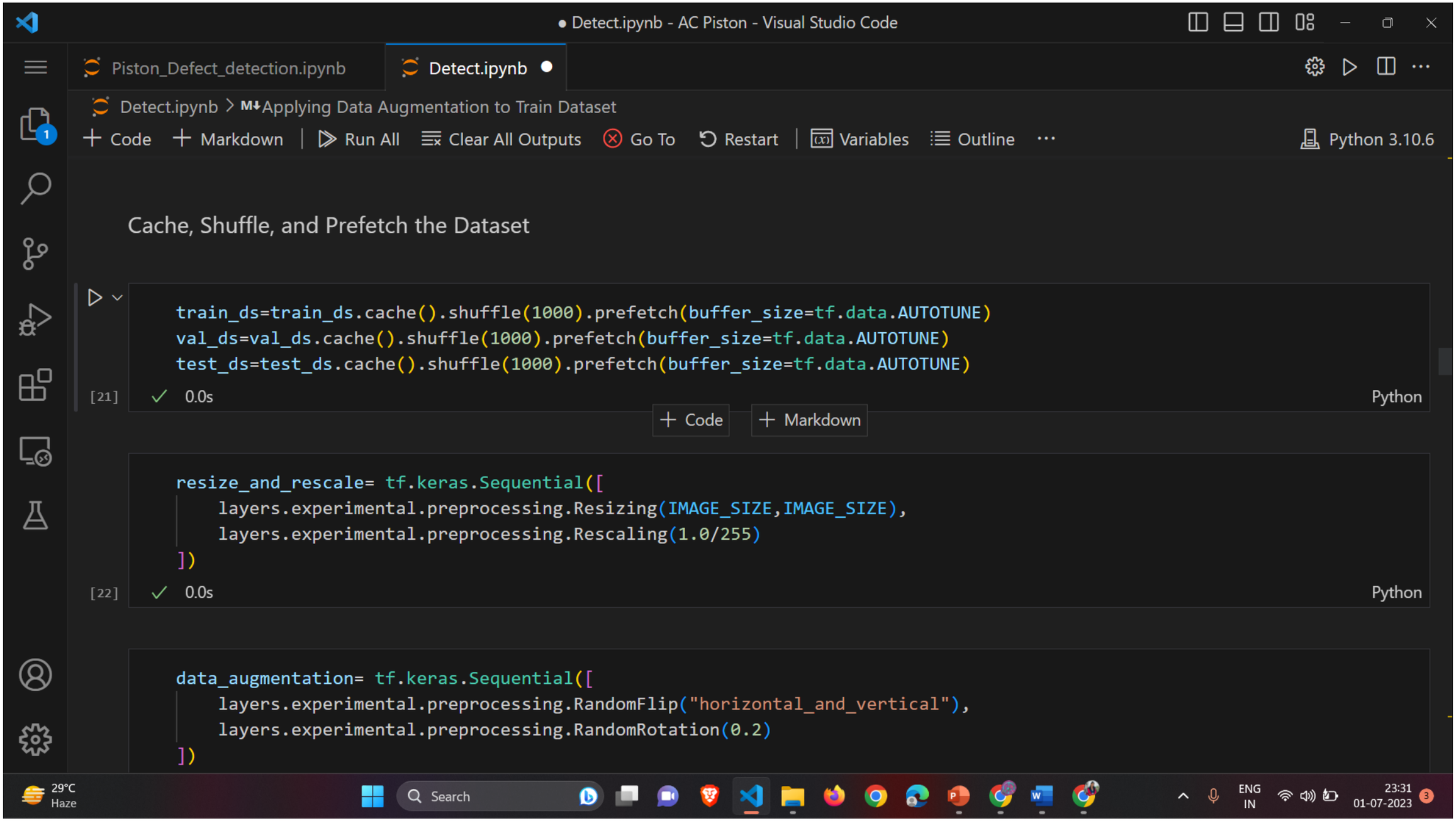

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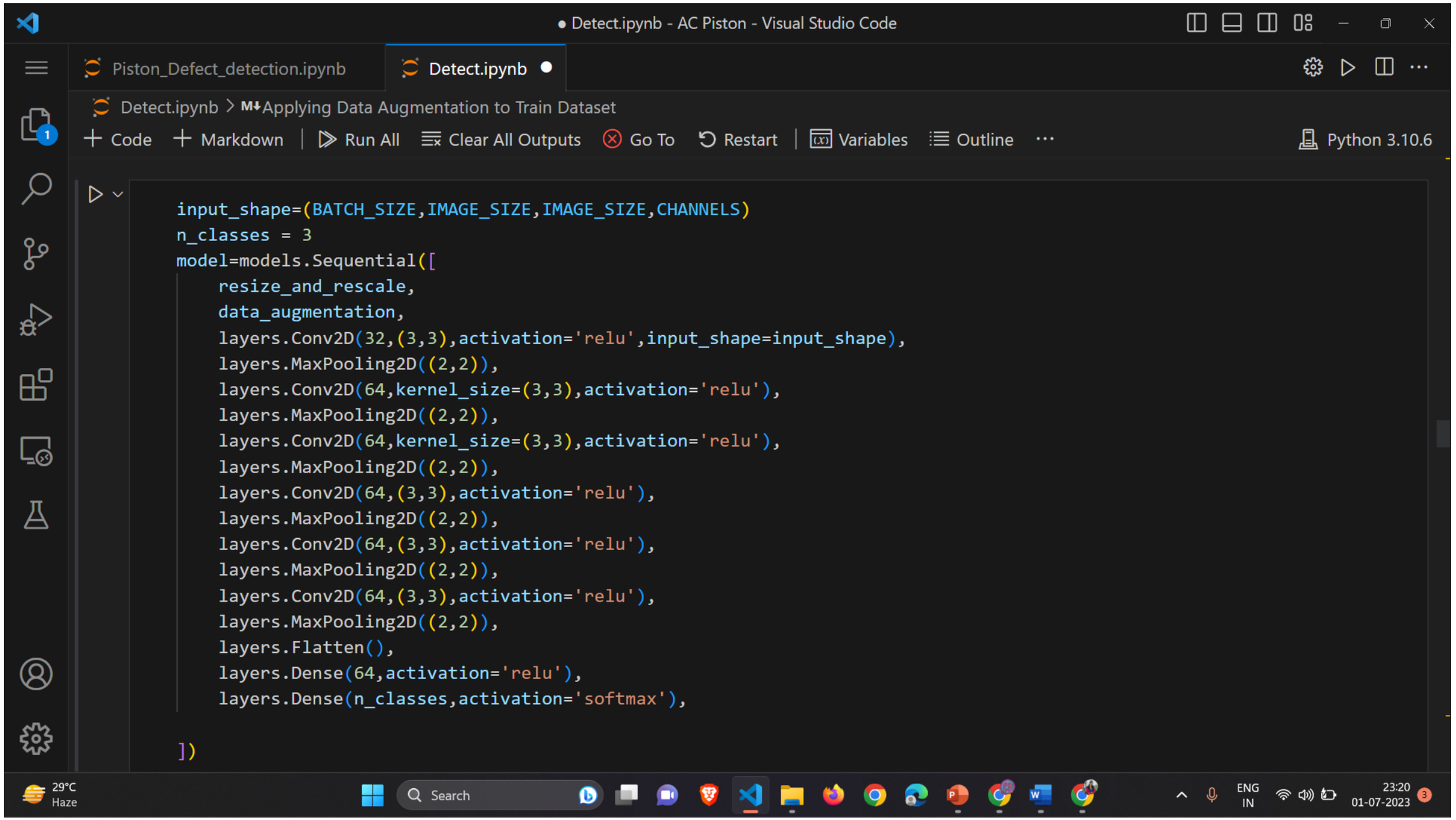

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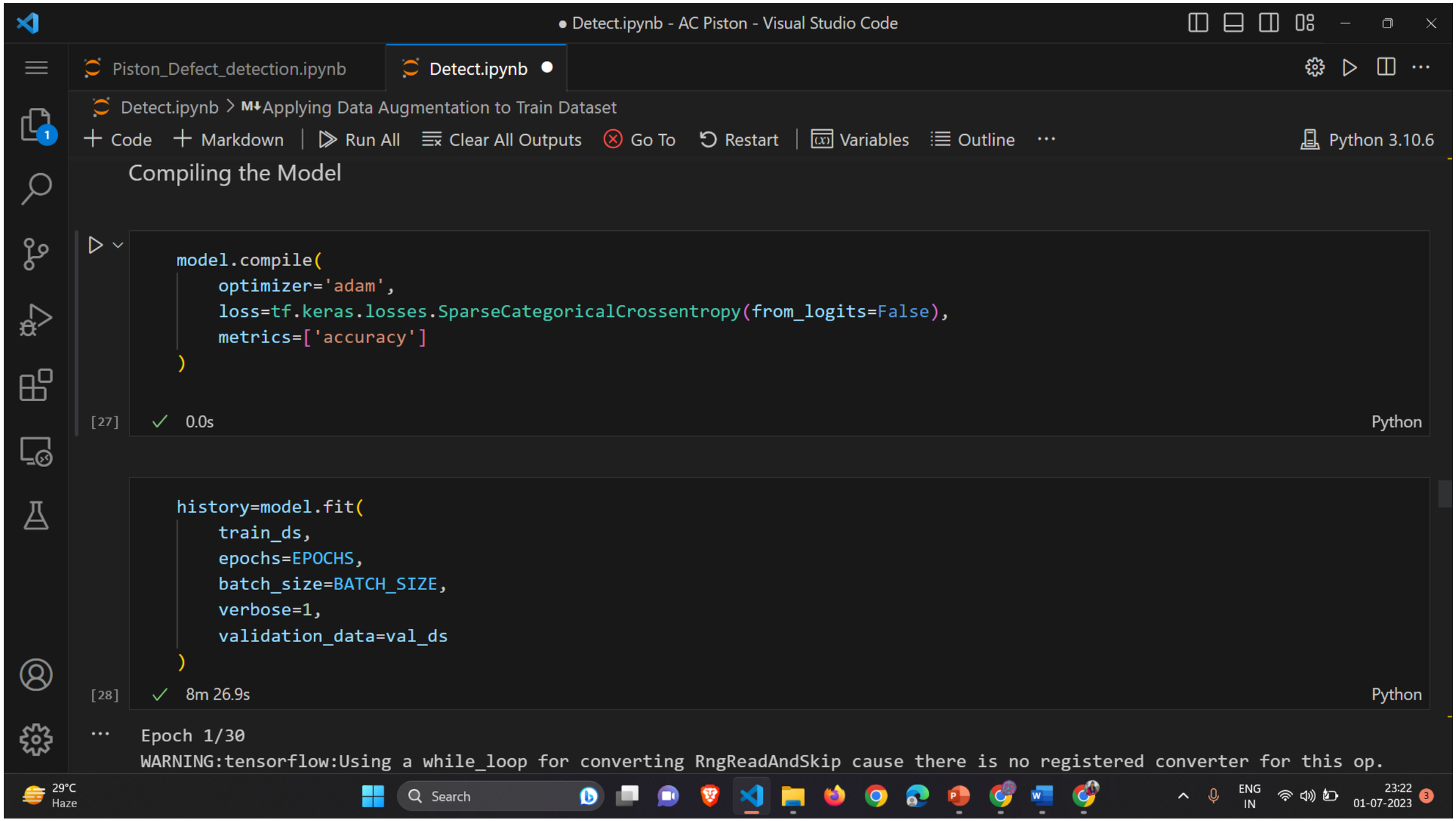

Thank You

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