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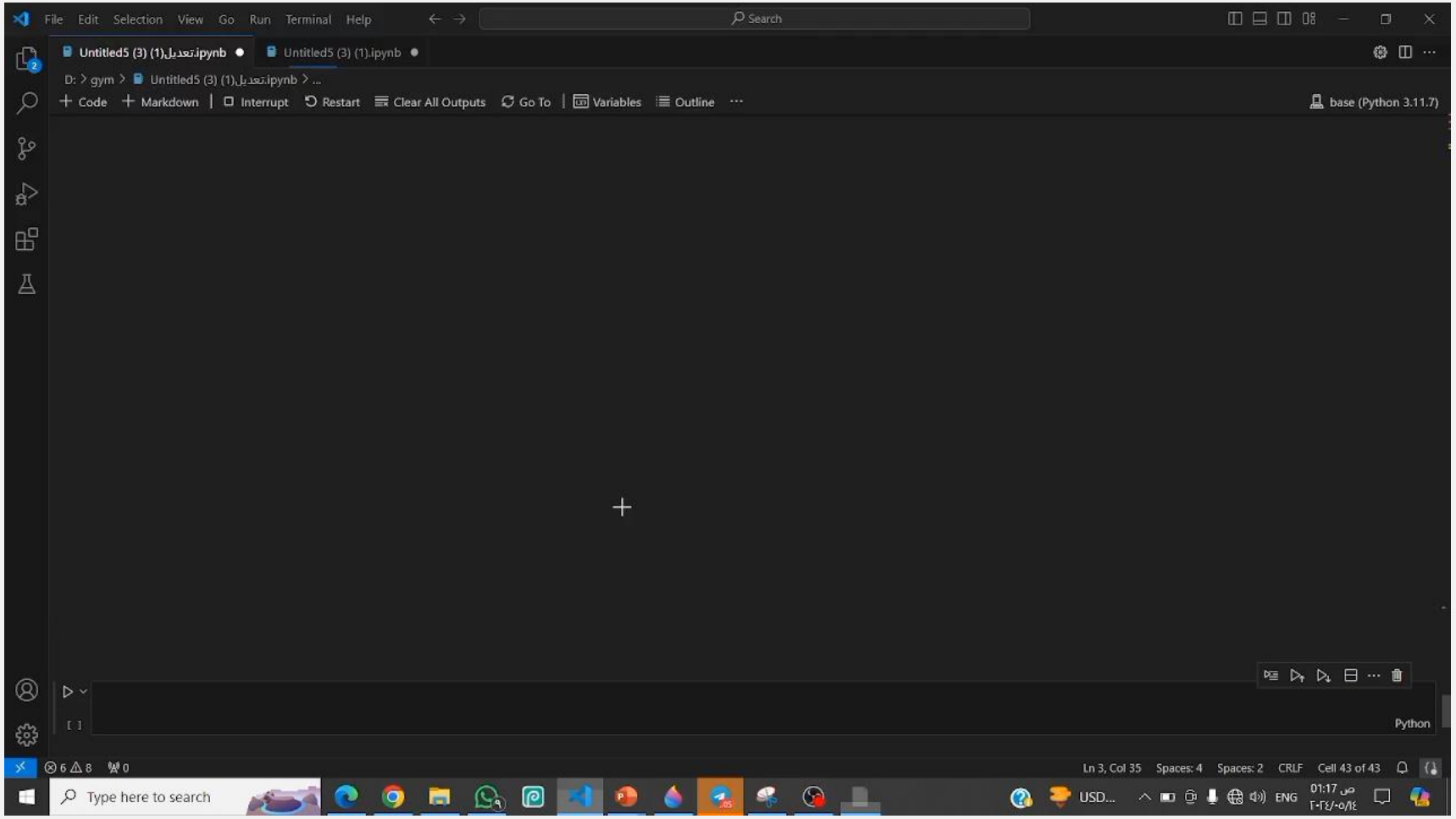
AI COACH APP

The model detects eight exercises and identifies true or false :

(Pull Up , Leg Extension , T Bar Row, Lat Pulldown , Hip Thrust , Hammer Curl , Chest Fly Machine , Bench Press)



https://github.com/Huda-Mawood/AI-Coach.git

CONTRIBUTION

1.Collecting video dataset for correct and wrong exercises

2. After training The model , It was not detect well.

3. Increasing number of epochs from 150 to 500

4. Add three Dense Layer to architecture .

5.Training the model again, it detects well and the accuracy is 99%.

DATASET

We collected videos for

- correct exercises from Kaggle: https://www.kaggle.com/datasets/hasyimabdillah/workoutfitness-video
- wrong exercises from YouTube.

1. Size :

1.1. The dataset is consisting of 920 videos.

1.2. The dataset categorized into 16 classes divided into 8 exercises true and 8 false .

1.3. each correct exercise consists of 103 videos , and each wrong exercise consist of 12 videos.

2. Preprocessing :

2.1. Labeling and Feature Extraction: - Extracting Information from File Names

- Loading Additional Data from Files
- Assigning Labels to Sequences

3. Splitting : The dataset was split into 20% for testing and 80% for training.

SAMPLES FROM DATASET

TRUE LAT PULLDOWN

FALSE LAT PULLDOWN

ARCHITECTURE

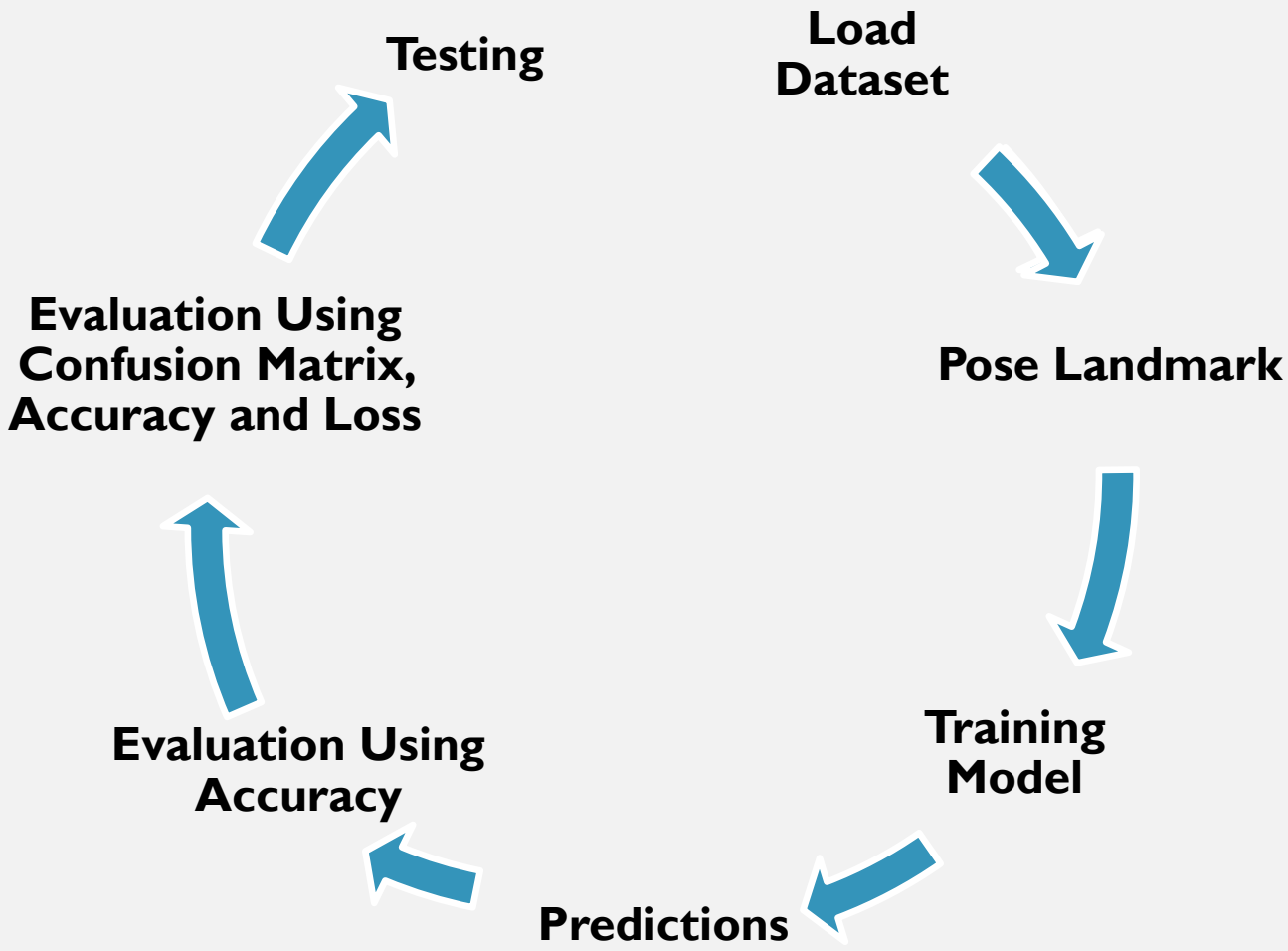


Figure 4. Steps to develop an accurate Ai coach app

METHODS

- A combination of Convolutional, Max-Pooling, Dense layers is used to classify sequence data.
- Number of layers is 2 Convolutional, 2 Max-Pooling,1 Flatten and 3 Dense layers
- Layer Sizes:

Convolutional Layer 1: 64 units and kernel Size equal 3

Convolutional Layer 2: 128 units and kernel Size equal 3

Max-Pooling Layer 1: Pool Size equal 2

Max-Pooling Layer 2: Pool Size equal 2

Flatten Layer

Dense Layer 1: 256 units

Dense Layer 2: 128 units

Dense Layer 3: 200 units

METHODS

- Activation function:

ReLU: is used to facilitates feature learning and gradient propagation within the neural network's hidden layers.

Softmax : is used to produces meaningful class probabilities at the output layer, aiding in accurate classification.

- dropout regularization is implemented to enhance the generalization capabilities of neural network architectures and prevent overfitting to the training data.

- Adam Optimization Algorithm is implemented.

- Number of epochs : 500

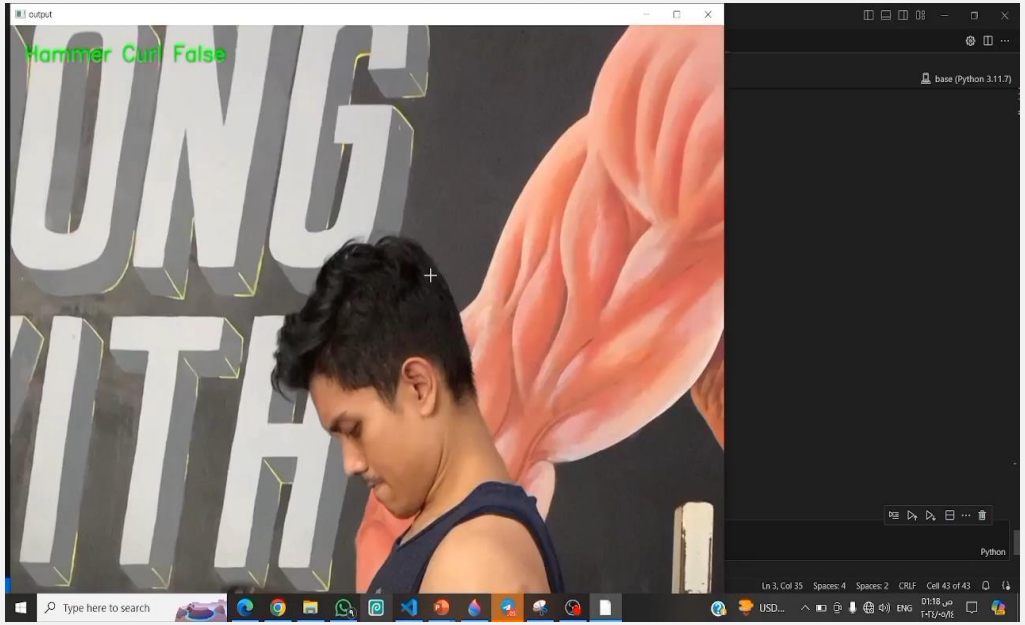
RESULT

Accuracy was used as a measure.

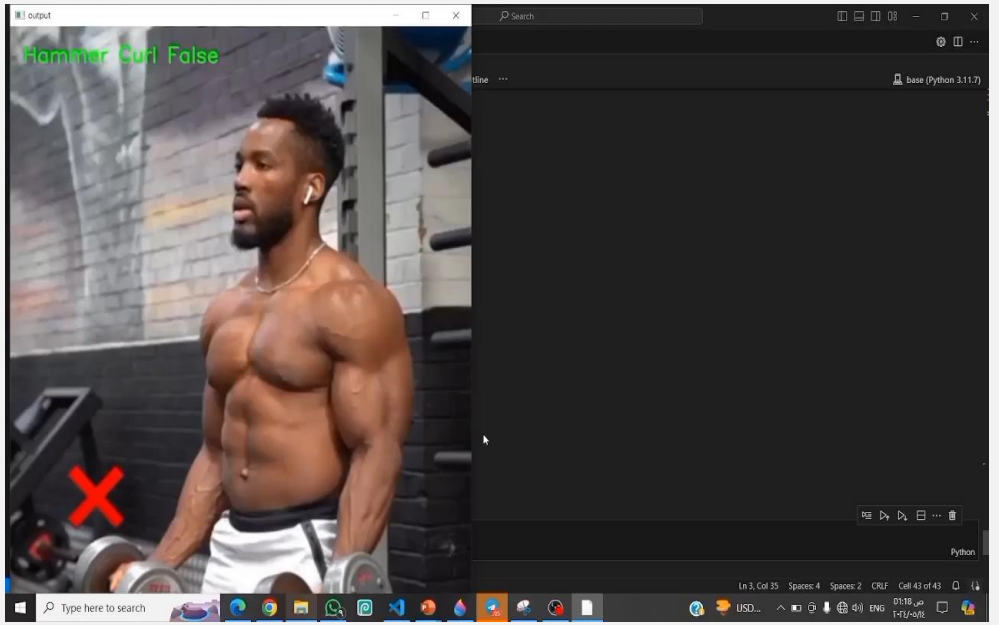
The accuracy for testing yields **99%**
and yields also **99%** for training.

RESULT

The error appears because the pattern when revealing the hammer curl and the lat pull-up cannot be differentiated, because the object is not clear and the two exercises are similar.



True Hammer Curl



False Hammer Curl

RESULT

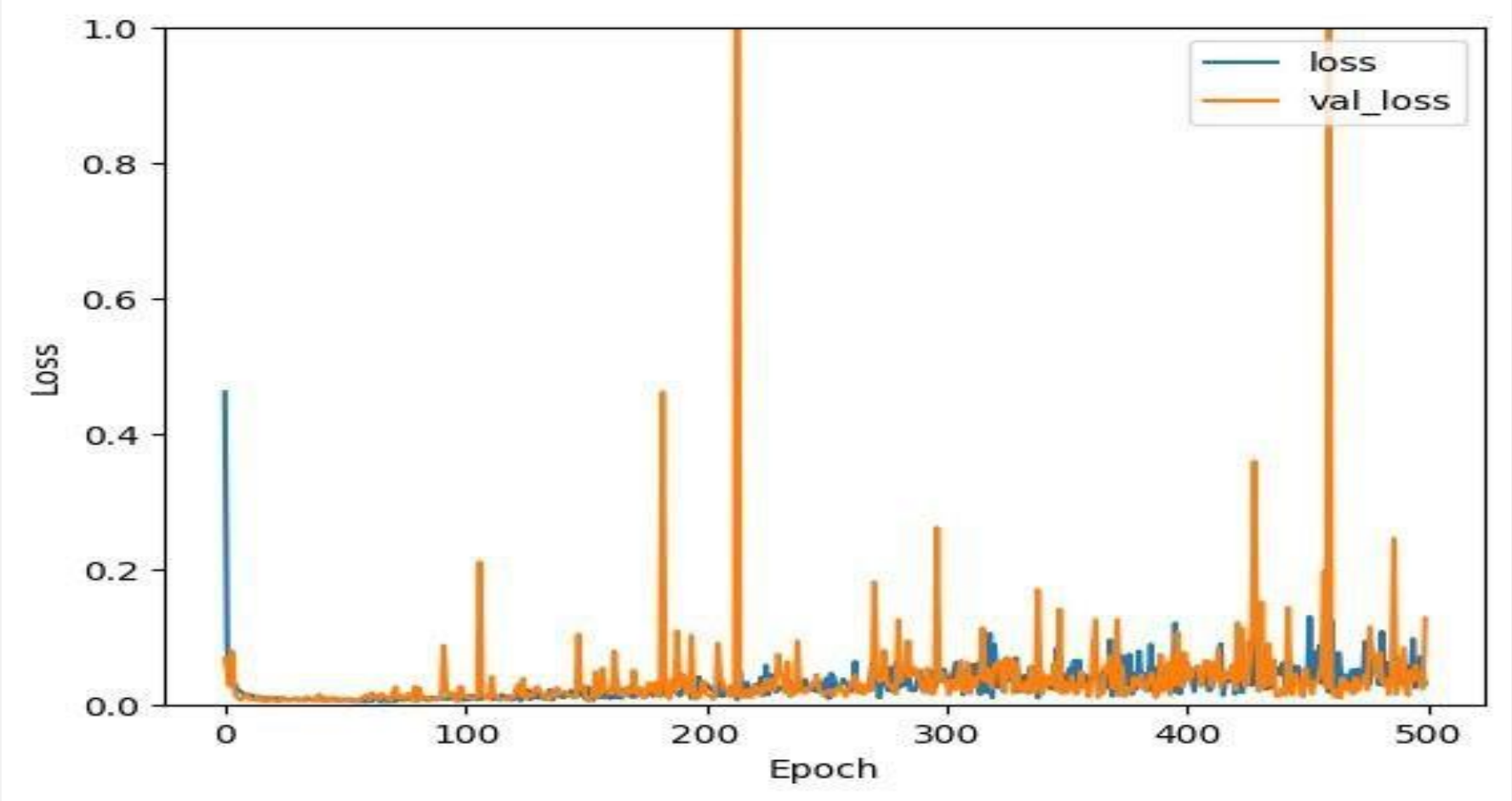


Figure 2. Training and Validation Loss Over Epochs

RESULT

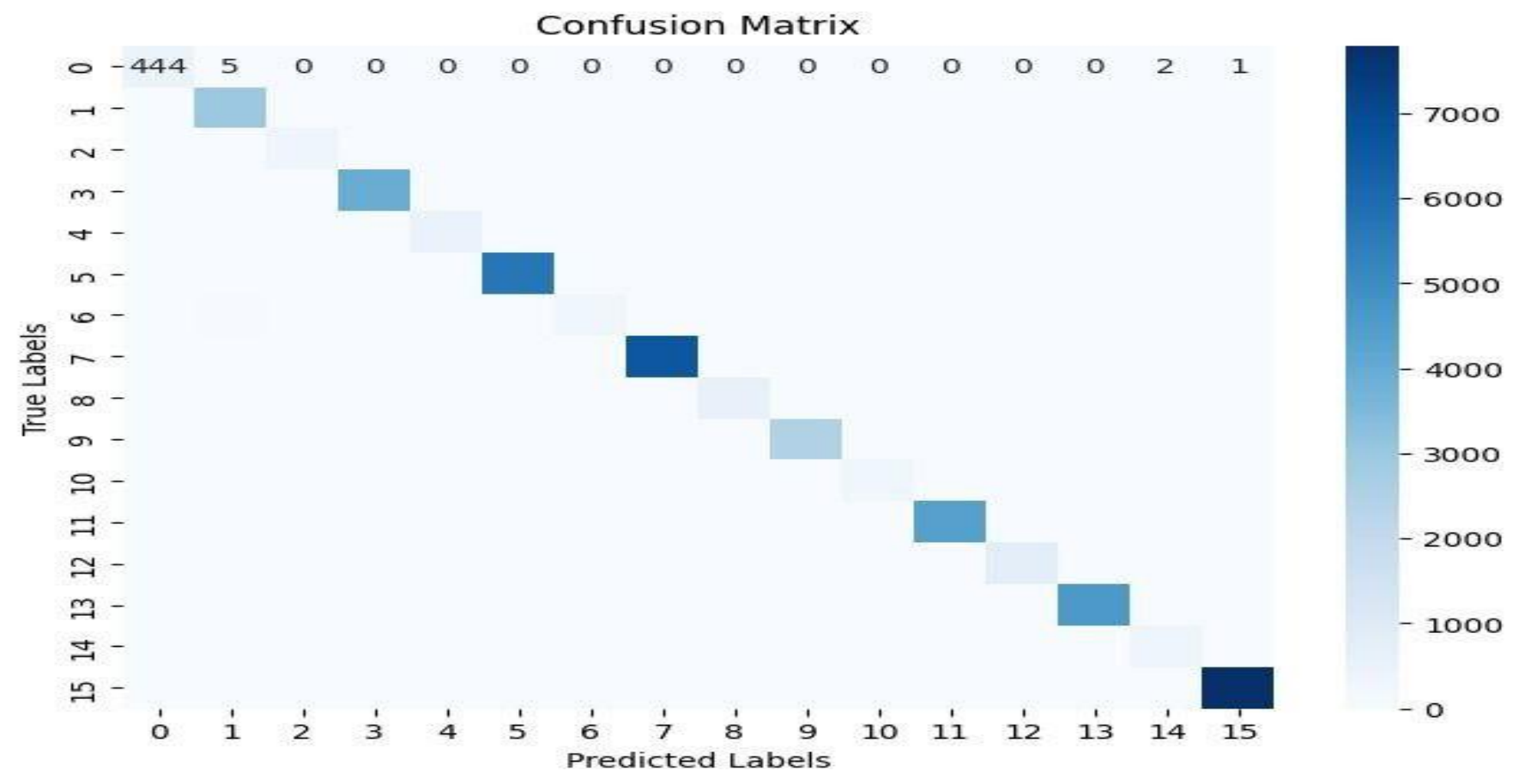


Figure 1. Evaluation using confusion matrix

RESULT

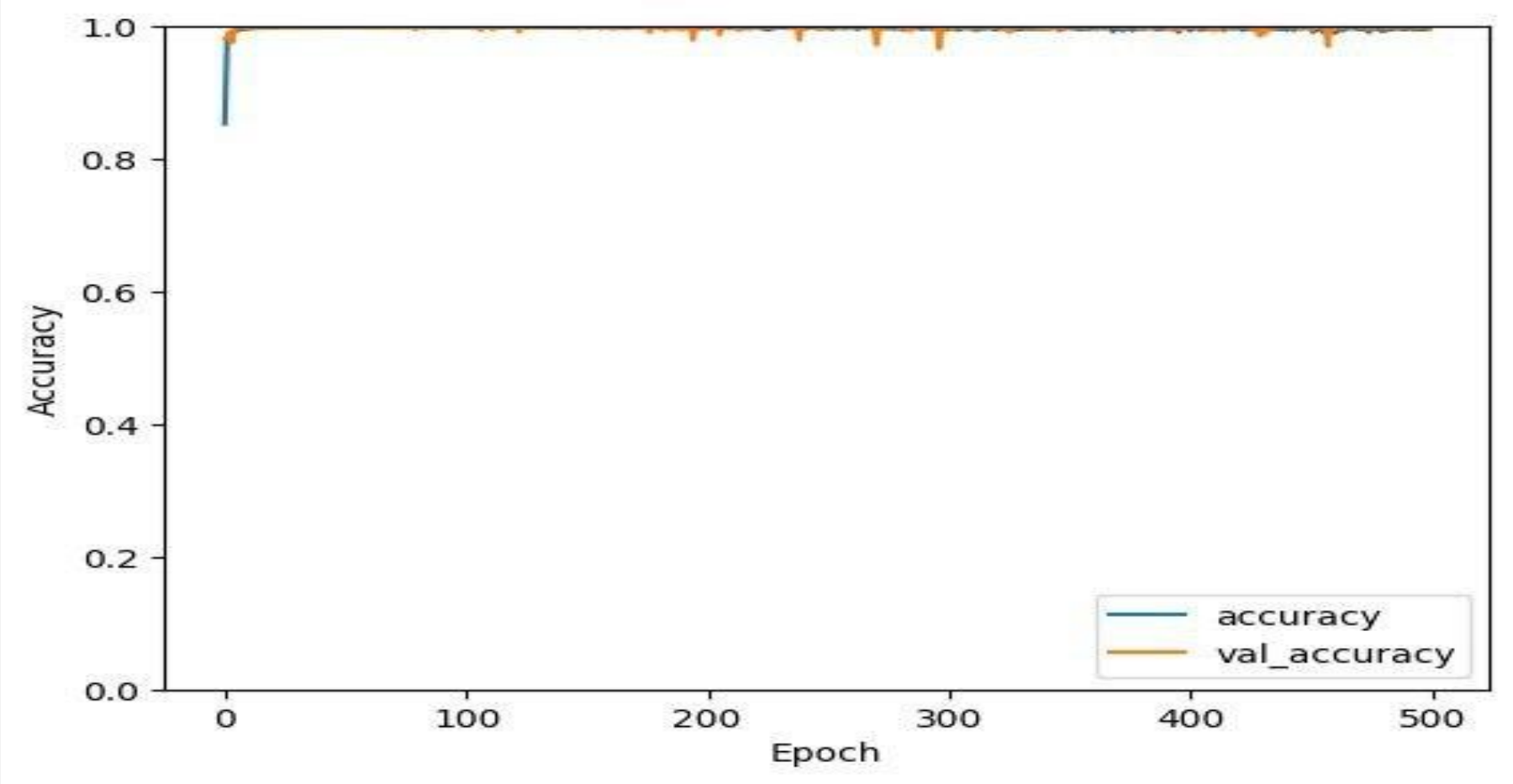


Figure 3. Training and testing accuracy over epochs