Recognition of Animated Sitcom Characters Using Computer Vision and Deep Neural Networks

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Problem Statement

- Recognizing the faces of animated sitcom characters present in a video.

Motivation

- Face recognition is one of the important aspects of computer vision applications. A lot of research has been done on the recognition of human faces but there are only a few studies related to the recognition of animated faces.
- Animated sitcoms generate a huge amount of revenue and it will be substantial if we could come up with a model that can recognize animated faces in real time and give relevant information about the character to the user.
- There are two main differences between natural and animated faces: Firstly, there is a lot of variation in the faces of different animated characters and secondly, animated faces are not the same as human faces as they have unusual and distinct facial characteristics. But, as they have simple and well-defined facial features, any NN model should be able to detect them more efficiently than normal faces.
- We will aim to use the baseline architecture of face recognition, which is FaceNet and simplify and modify it to be used for animated face recognition.
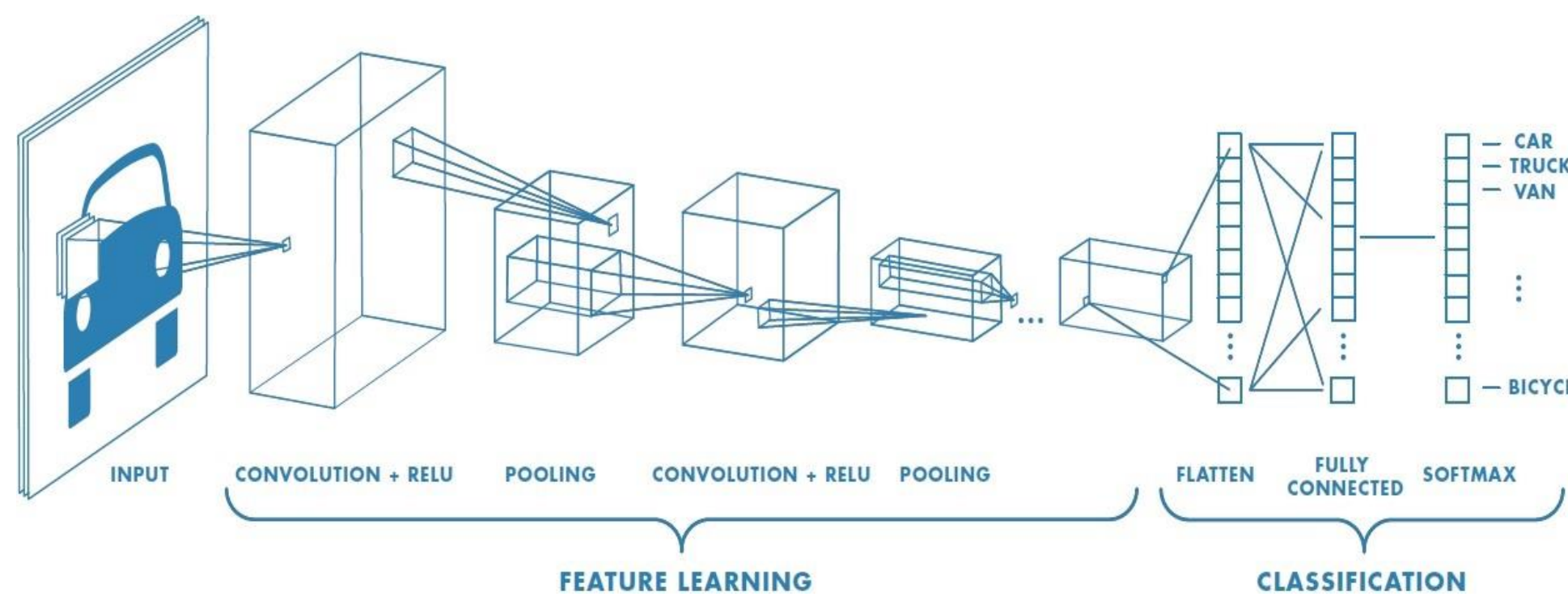
Dataset Description

- The training dataset features 20 classes/characters from the Simpsons animated series. (Source: Kaggle)
- The training set includes about 400 to 2000 images per character.
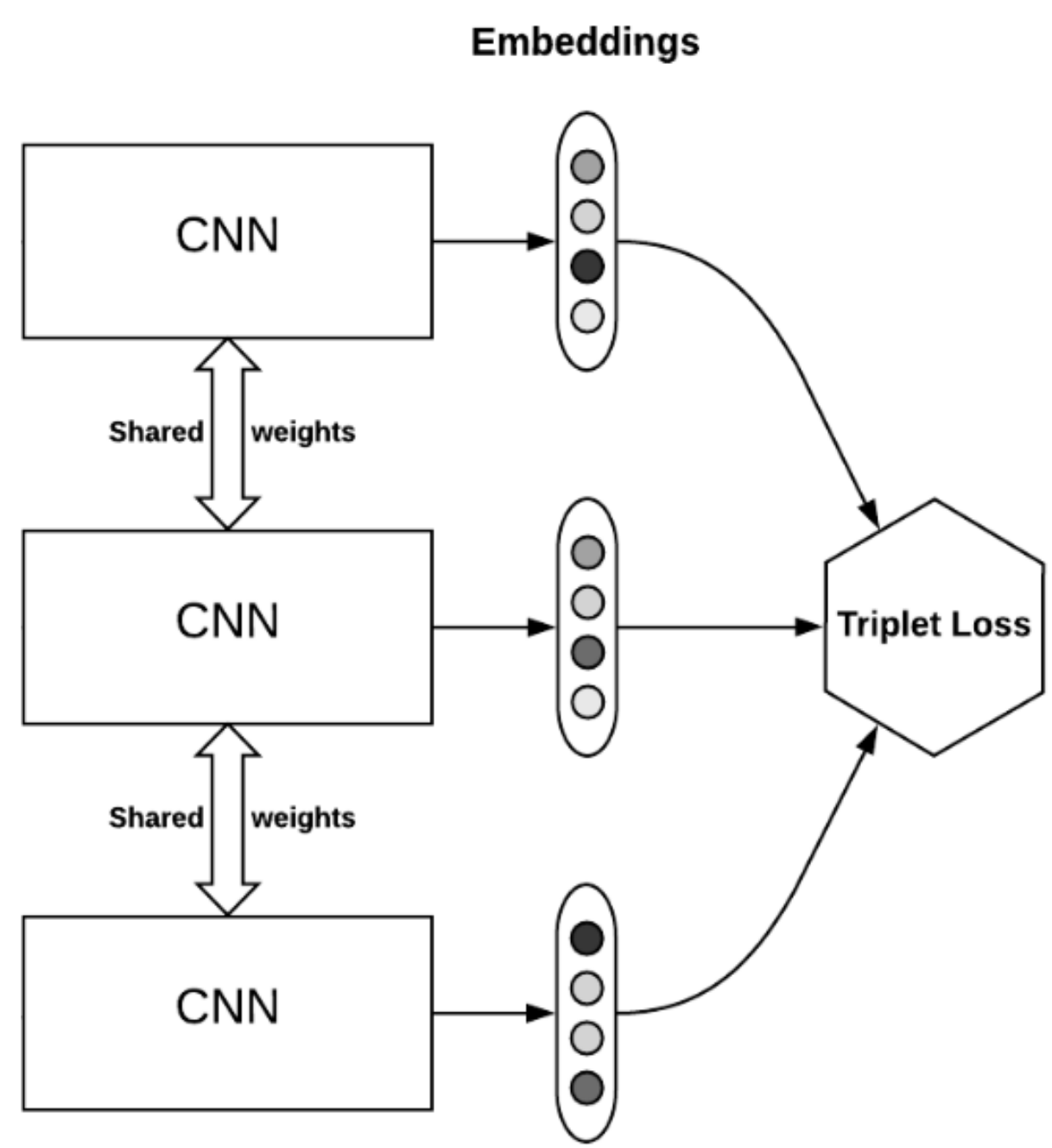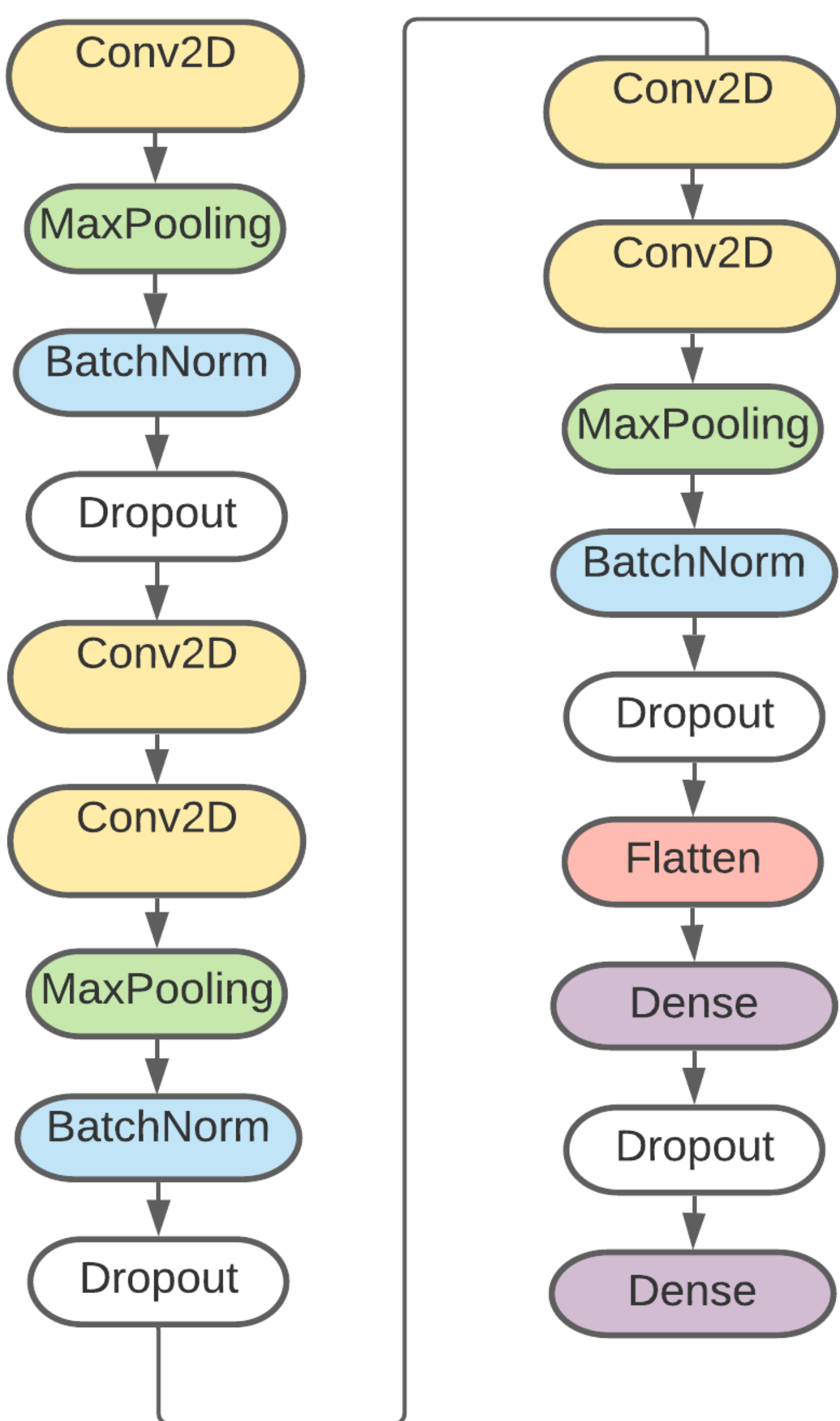- The test set consists of 990 images.

https://www.kaggle.com/alexattia/the-simpsons-characters-dataset

Model Description

CNN Architecture:

FaceNet Architecture:
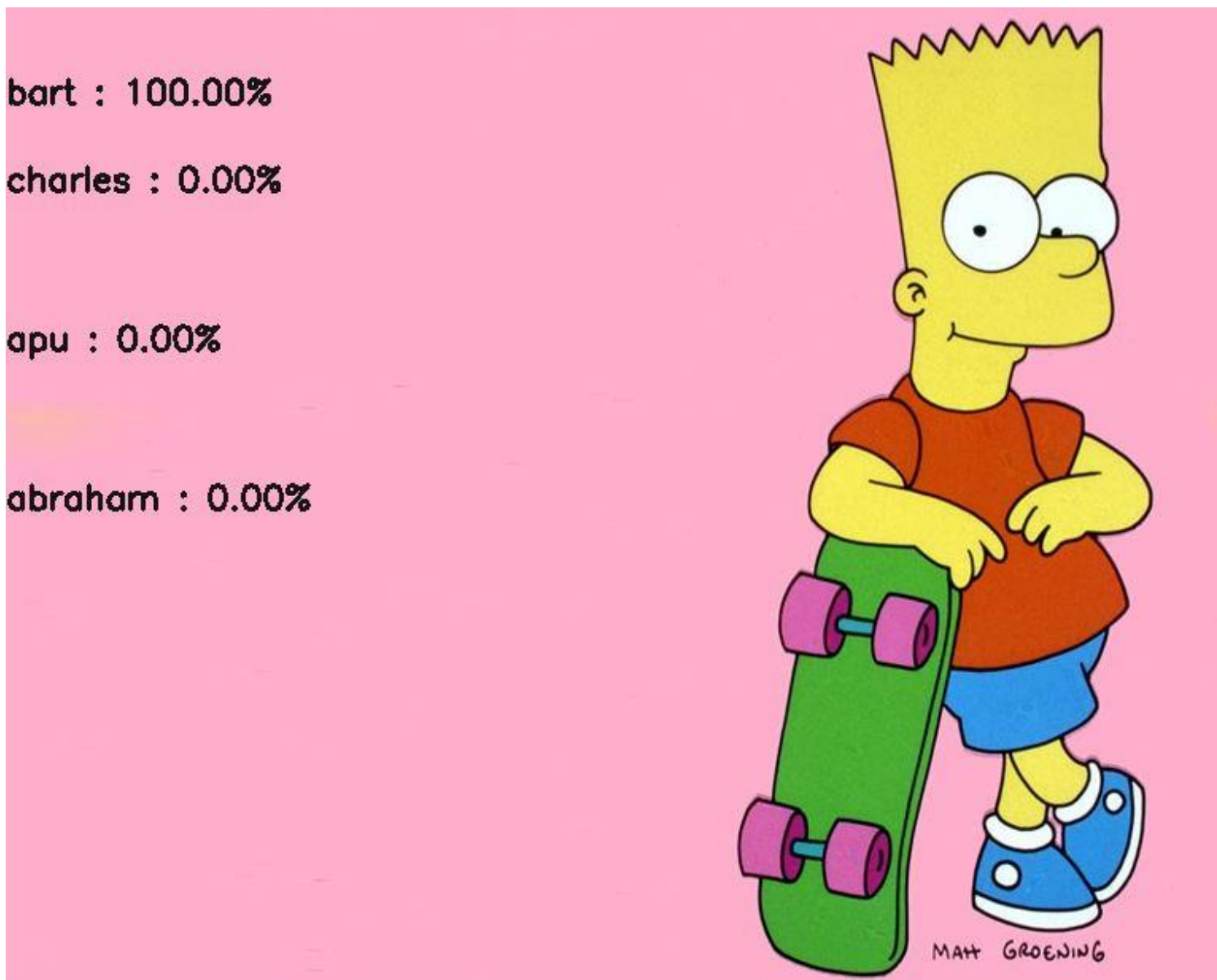

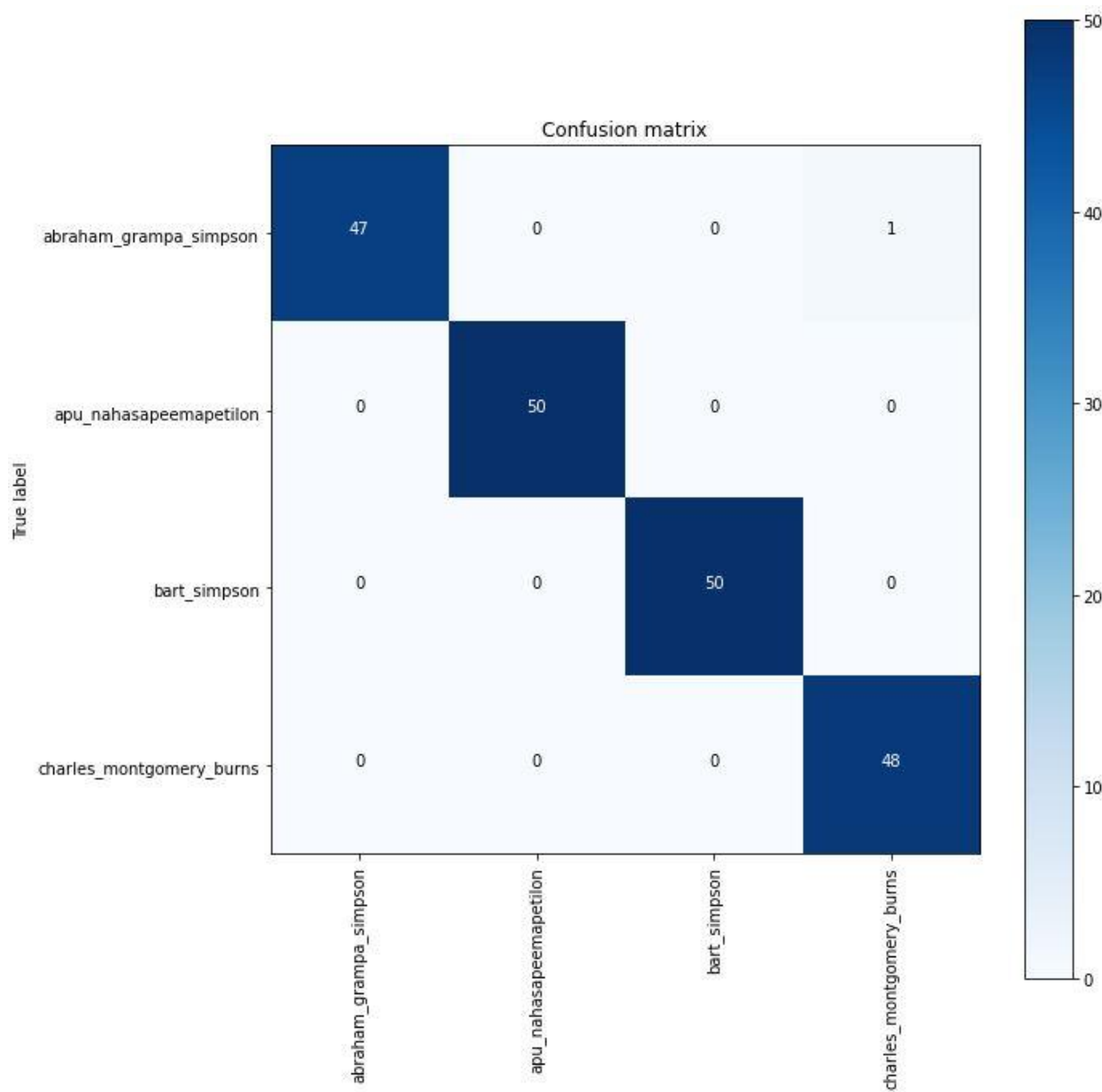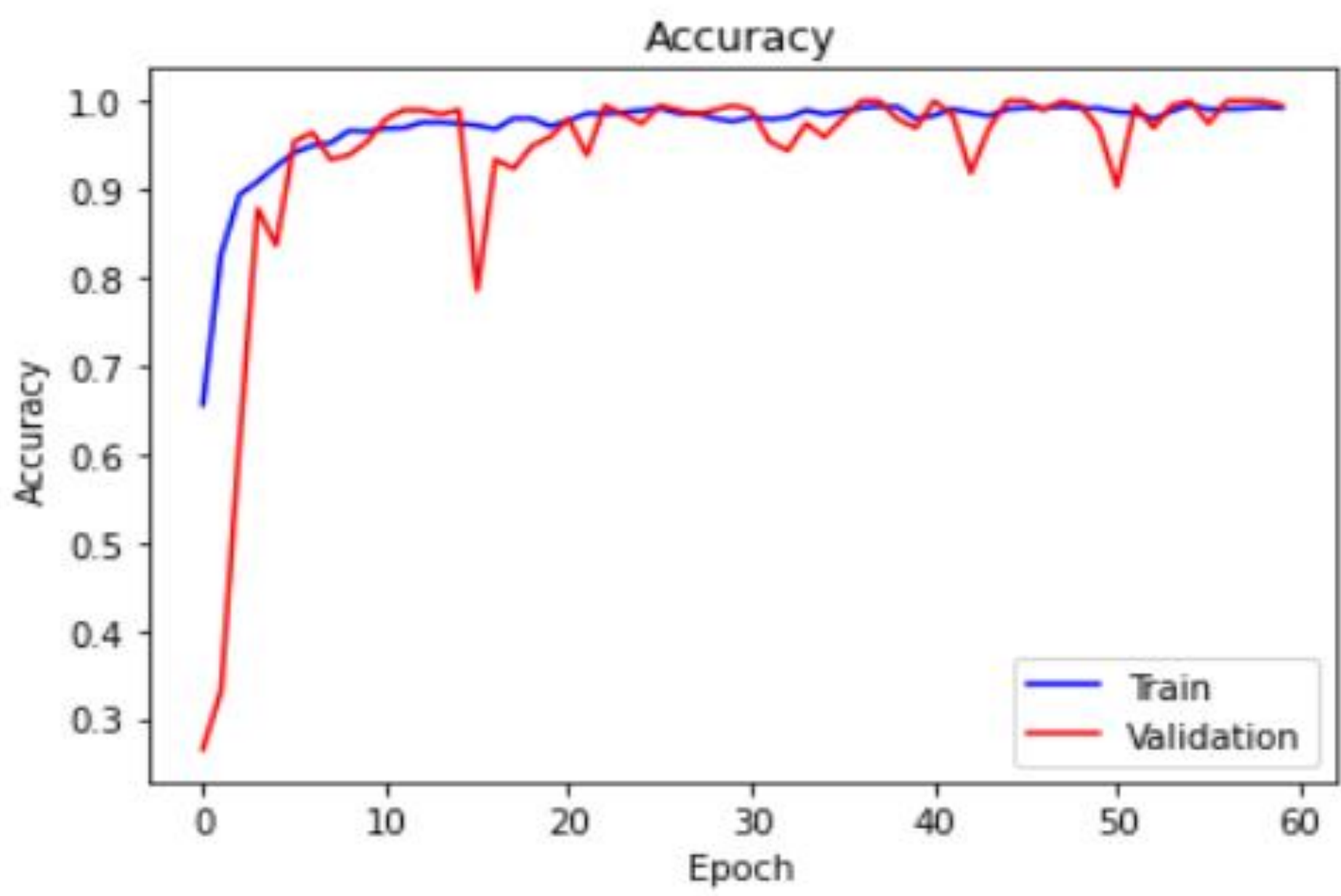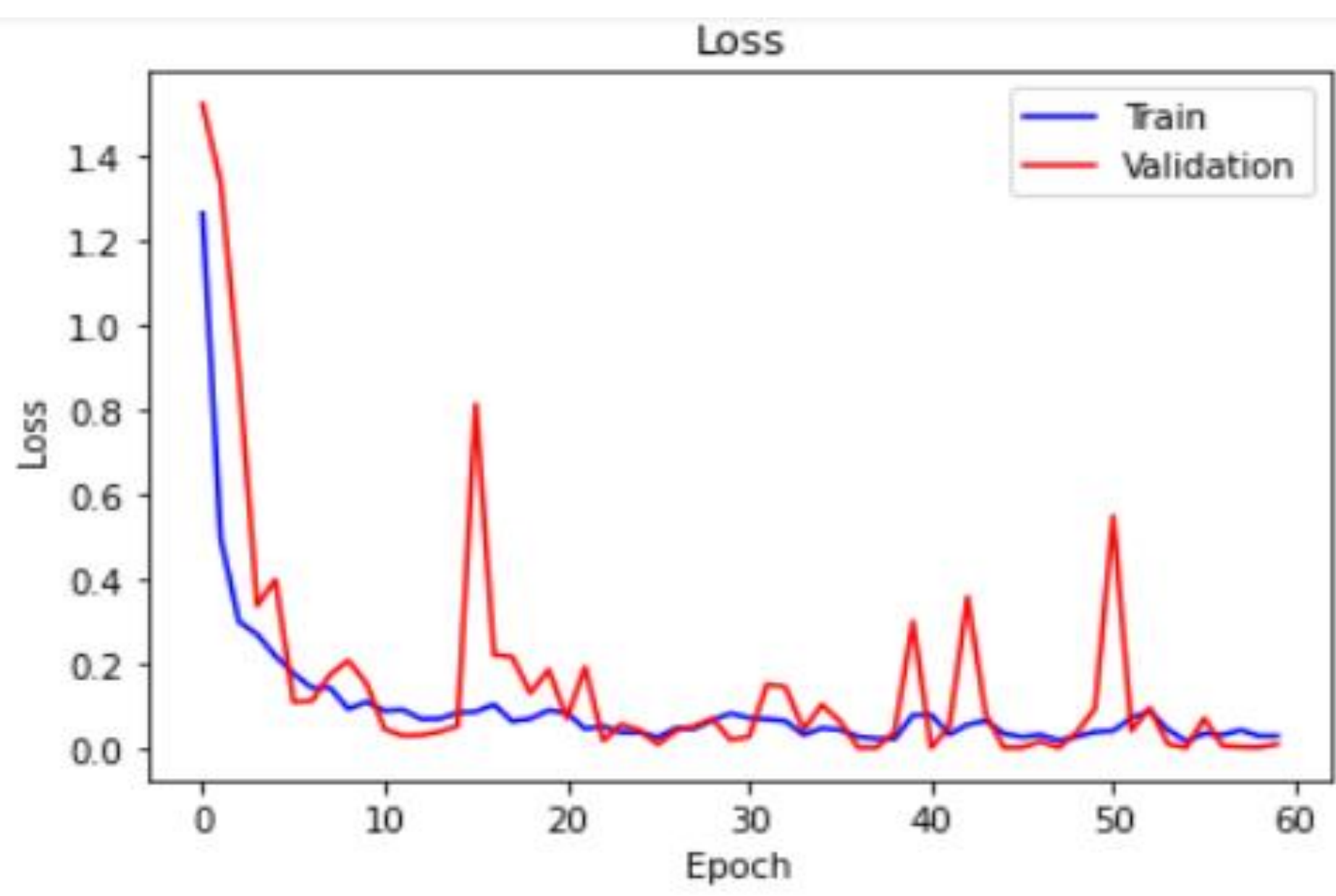**Animated Face Architecture:**

Results
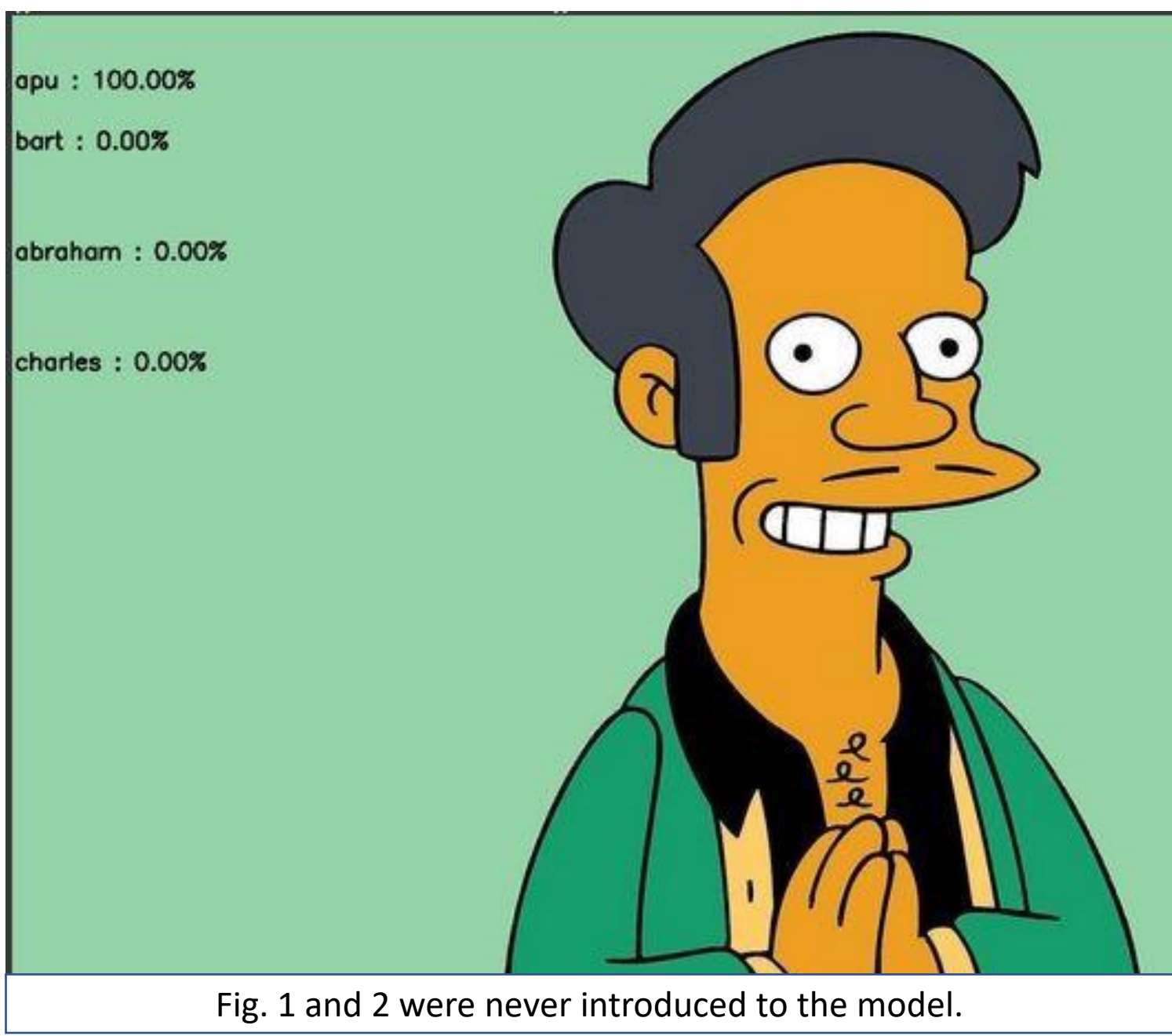
Fig. 1 and 2 were never introduced to the model.

Confusion Matrix and Accuracy

Simpson characters were predicted with a loss of 0.00879 and an accuracy of 99.49%

Evaluation

There was no separate validation dataset as we followed convention and used our test data set as our validation set.
We later tested the model on single images in real time. This data was never introduced to the model to validate the performance.

References

[1] Wei-Ta Chu,Wei-Wei Li, "Manga FaceNet: Face Detection in Manga based on Deep Neural Network", National Chung Cheng University Chiayi, Taiwan
[2] P. Viola and M.J. Jones, "Robust real-time face detection", International journal of computer vision, vol. 57, no.2, pp. 137-154, 2004.

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