

Mapping Emojis to Facial Expressions

With facial detection evolving and being integrated into everyday tasks such as unlocking your phone and using digital pay, it is time that facial recognition moves further but now in detecting emotions. Inspired by this, I wanted to replicate emotion detection through facial expressions and map them to Apple emojis as these emojis are a widely used form of communication online. The main dataset for completing this project contained thousands of images all classified by the primary emotion displayed in them. This variety of classified images was the foundation for my work and the initial basis for training my models.

I built 3 convolutional neural networks with a learning rate of 0.001

CNN 1: 4 convolutional layers, 2 fully connected layers and 50 epochs.

CNN2: 2 convolutional layers, 1 fully connected layer and 15 epochs.

CNN3: 2 convolutional layers, 2 fully connected layers, 1 dropout layer and 100 epochs.

Facial Detection

I started by detecting faces in pictures as shown below.



Figure 1: The model detecting a face from a soccer interview

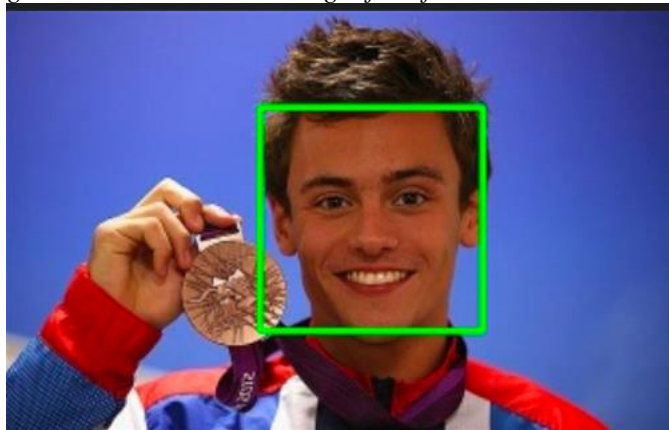


Figure 2: The model detecting a face of a medalist

Results:

Test-set size: 98

Accuracy: 74.48979%

Emotion Recognition:

Model #1, 6 Layers

Accuracy - 66.24%

Loss -1.03

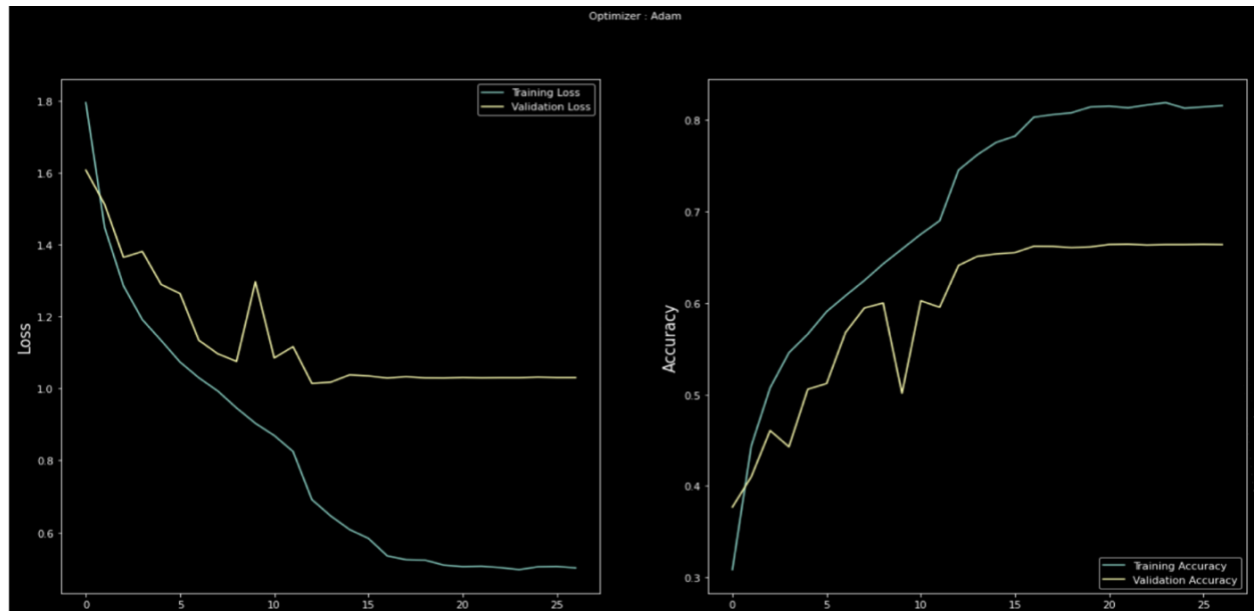


Figure 3: Graphical representation of the loss and accuracy of CNN1 model

Model #2, 3 Layers - 2 convolutional layers and 1 fully connected layer

Accuracy - 33.51%

Loss - 1.81

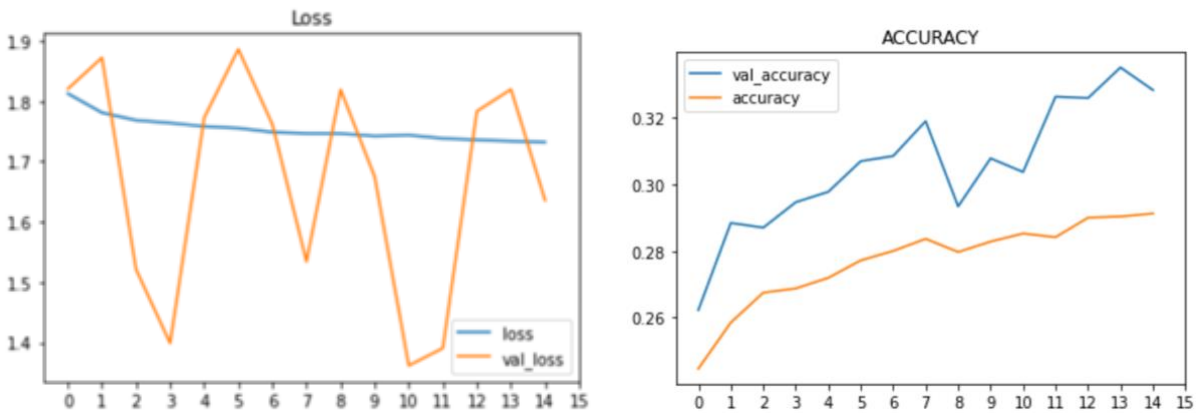


Figure 4: Graphical representation of the loss and accuracy of CNN2 model

Model # 3, 7 layers – 4 convolutional, 2 fully connected and 1 dropout layer

Accuracy – 67.8%

Loss – 0.89

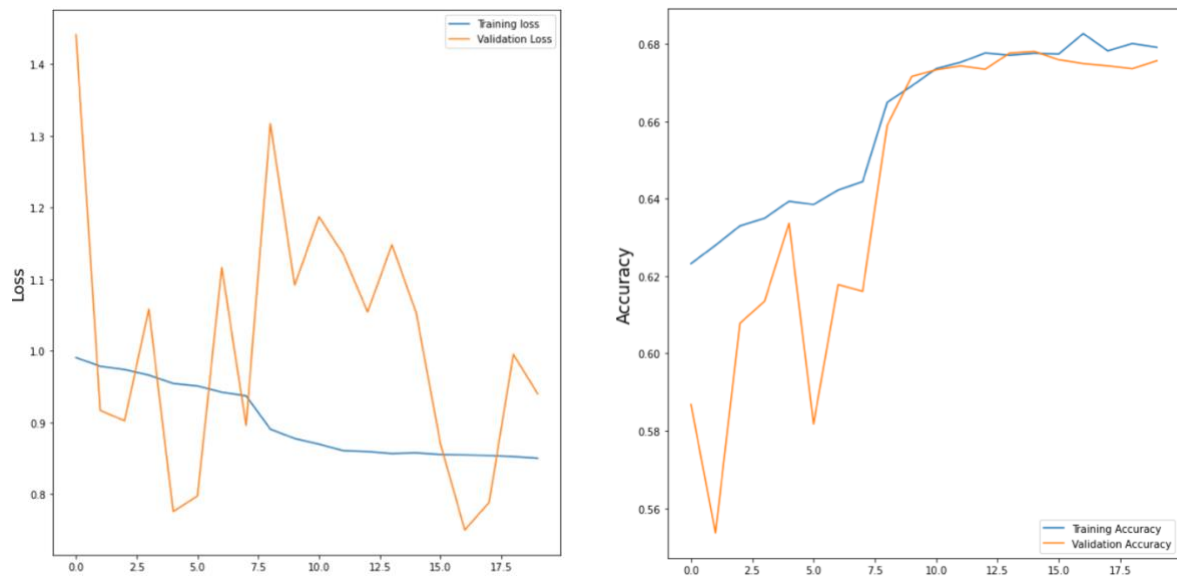


Figure 5: Graphical representation of the loss and accuracy CNN3, the most accurate emotion recognition model

Mapping to Apple Emojis

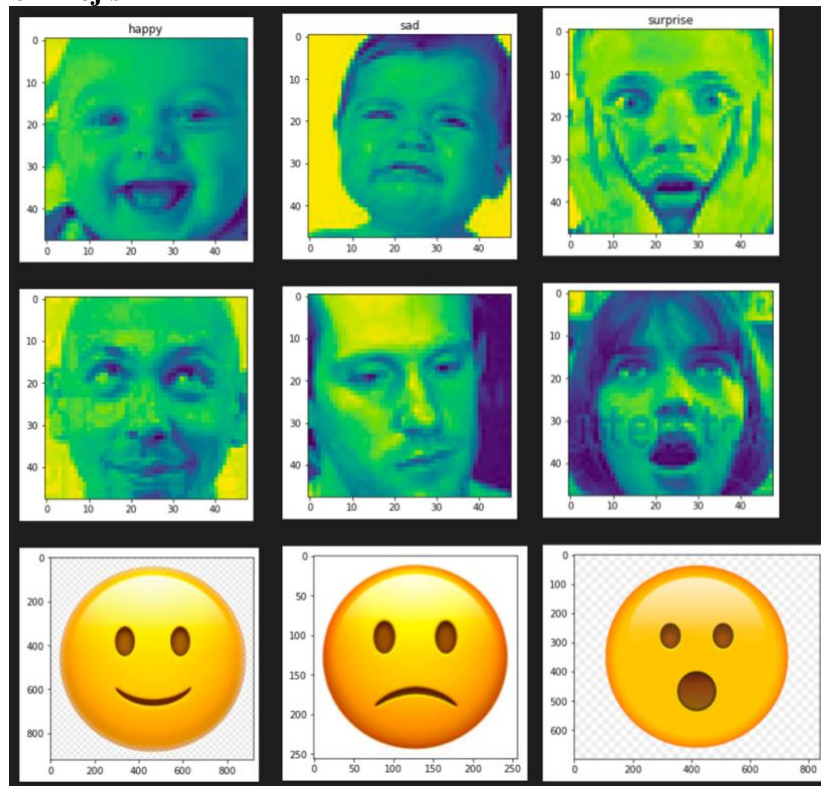


Figure 6: facial expressions being mapped to Apple emojis