Emotion Classifier

By Daniel Zhou

Problem

Objective - given an image of a person's face, classify as 1 of 7 emotions

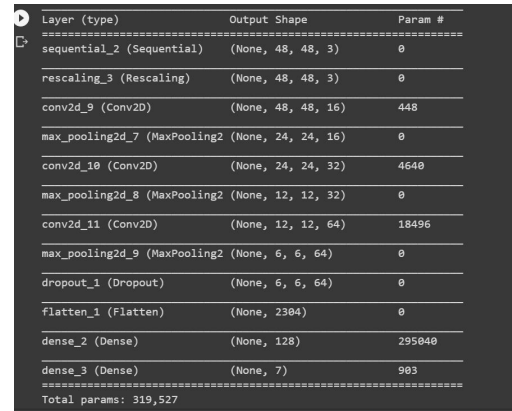`'angry', 'disgust', 'fear', 'happy', 'neutral', 'sad', 'surprise'`

Dataset

-using fer2013 dataset (facial expression recognition) from kaggle competition

-contains 28709 48 x 48 pixel gray images across the 7 classes

-using 80-20 training validation split (22968 training, 5741 validation)

Model

-used keras.sequential and Adam optimizer to create a model

-utilize data augmentation and dropout to prevent overfitting

-trained the model with 25 epochs

-used ModelCheckpoint to save best model to drive to hook up to cascade

| Layer (type)	Output Shape	Param #
sequential_2 (Sequential)	(None, 48, 48, 3)	0
rescaling_3 (Rescaling)	(None, 48, 48, 3)	0
conv2d_9 (Conv2D)	(None, 48, 48, 16)	448
max_pooling2d_7 (MaxPooling2	(None, 24, 24, 16)	0
conv2d_10 (Conv2D)	(None, 24, 24, 32)	4640
max_pooling2d_8 (MaxPooling2	(None, 12, 12, 32)	0
conv2d_11 (Conv2D)	(None, 12, 12, 64)	18496
max_pooling2d_9 (MaxPooling2	(None, 6, 6, 64)	0
dropout_1 (Dropout)	(None, 6, 6, 64)	0
flatten_1 (Flatten)	(None, 2304)	0
dense_2 (Dense)	(None, 128)	295040
dense_3 (Dense)	(None, 7)	903

Total params: 319,527

Results

-kaggle competition winner was 75%

-currently approaching 60%

Training and Validation Accuracy
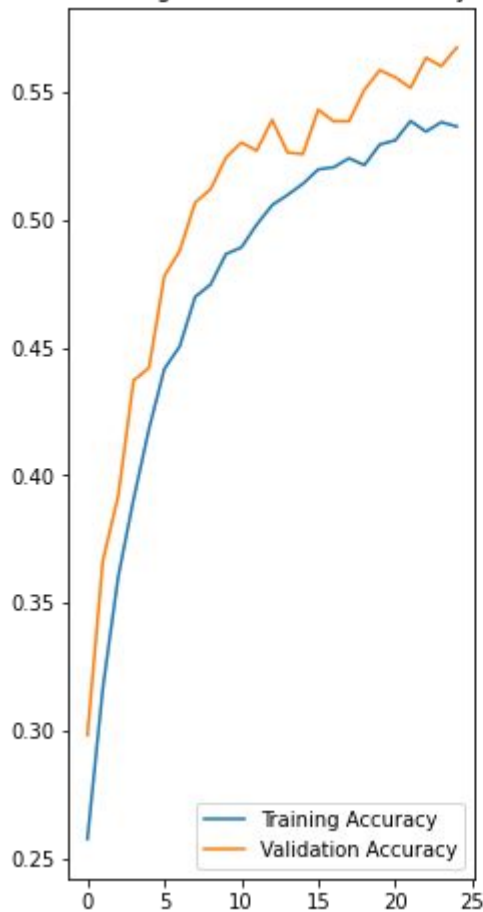
Training and Validation Loss
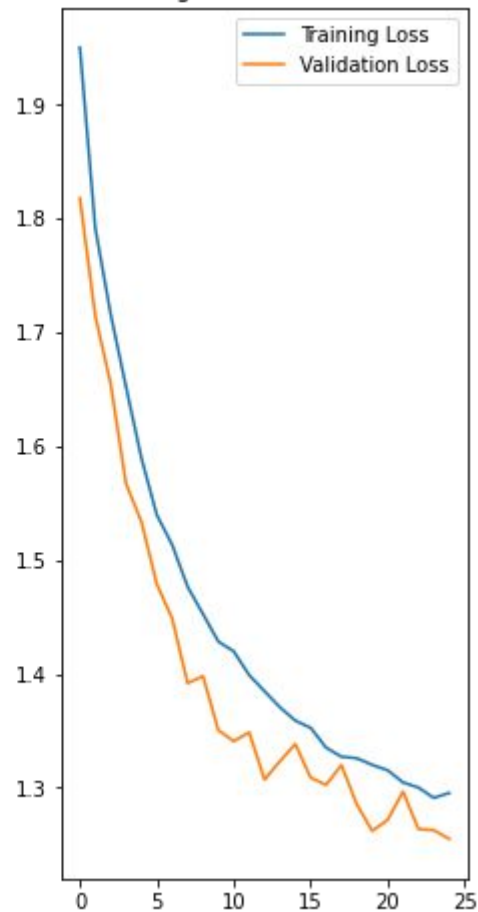
Cascade

-can detect the face and draw bounding box

-still some issues with classifying the face that haven't been figured out

Lessons Learned and Plans for the Future

Lessons:

-python and google collab (I am now a lot more familiar with python than before the project)

-process of machine learning

Plans for Future:

-get the current model to work with cascade

-improve model accuracy

References

https://www.tensorflow.org/tutorials/images/classification

https://karmatnspyphuntsho-tijtech.medium.com/face-classification-by-python-using-cnn-in-google-colab-deed1b43e0fd