CSCE636 Project Part IV

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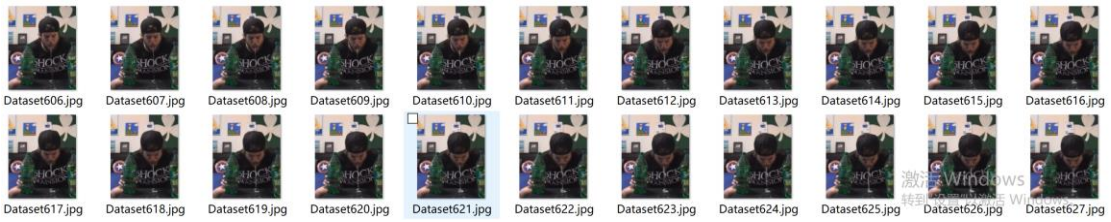
PART I TOPIC

The purpose of the project is to train a neural network so it could be applied to video detection in the future smart home environment. The topic assigned to me is “detecting vomit”. To achieve the purpose, I will find proper videos and transfer it into a dataset. Then I will build a network and train it over the dataset. The target is that the trained network could identify whether the person in the video is vomiting or not.

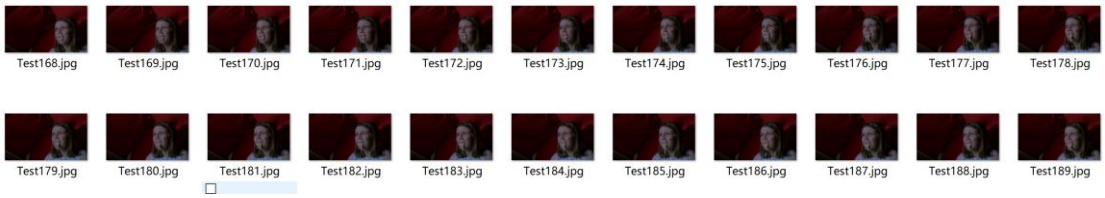
PART II DATASET

Since the topic is a little weird, I looked through the training dataset and I couldn’t find related videos/images which I could make use of. I searched Youtube and most of the uploaded videos don’t have any actual vomit scene. I managed to find several videos and transfer them into images. By sorting and labeling the images I get a preliminary dataset which could be used for training the network.

Shown below are parts of the images used for training.



Shown below are parts of the images used for testing:



	Training Dataset	Testing Dataset
# of Vomit Images	805	168
# of Non-vomit Images	199	48
# of All Images	1004	216

Although the dataset is not ideal, the number of the videos and images could be enlarged for the future submissions.

PART III ARCHITECTURE

The layers I use in this attempt are all dense layers. But in some cases, the model will over fit.

In the future improvements I will attempt using different layers and adding more training data to avoid over fitting.

Input shape of tensor:

X_train shape is (1004,32,32)

Y_train shape is (216,32,32)

Output shape of tensor:

x_train shape is (1004,32,32)

y_train shape is (216,32,32)

The parameters I attempted to tune include epochs and batch size. The epoch I am using for optimization is 30. The batch size I am using is 256.

Testing performance is shown below:

```
Train on 404 samples, validate on 600 samples
Epoch 1/30
404/404 [==============================] - 0s 447us/step - loss: 0.6919 - accuracy: 0.5025 - val_loss: 0.6856 - val_accuracy: 0.7150
Epoch 2/30
404/404 [==============================] - 0s 49us/step - loss: 0.6910 - accuracy: 0.5495 - val_loss: 0.6662 - val_accuracy: 0.8517
Epoch 3/30
404/404 [==============================] - 0s 49us/step - loss: 0.6854 - accuracy: 0.5990 - val_loss: 0.7584 - val_accuracy: 0.0000e+
Epoch 4/30
404/404 [==============================] - 0s 54us/step - loss: 0.6875 - accuracy: 0.5272 - val_loss: 0.7036 - val_accuracy: 0.4333
Epoch 5/30
404/404 [==============================] - 0s 44us/step - loss: 0.6838 - accuracy: 0.5866 - val_loss: 0.7165 - val_accuracy: 0.1883
Epoch 6/30
404/404 [==============================] - 0s 71us/step - loss: 0.6834 - accuracy: 0.6238 - val_loss: 0.7268 - val_accuracy: 0.0617
Epoch 7/30
404/404 [==============================] - 0s 47us/step - loss: 0.6821 - accuracy: 0.6015 - val_loss: 0.7043 - val_accuracy: 0.4967
Epoch 8/30
404/404 [==============================] - 0s 47us/step - loss: 0.6815 - accuracy: 0.6015 - val_loss: 0.6536 - val_accuracy: 0.8433
Epoch 9/30
404/404 [==============================] - 0s 47us/step - loss: 0.6812 - accuracy: 0.6064 - val_loss: 0.6751 - val_accuracy: 0.7667
Epoch 10/30
404/404 [==============================] - 0s 42us/step - loss: 0.6794 - accuracy: 0.6287 - val_loss: 0.6691 - val_accuracy: 0.7750
Epoch 11/30
404/404 [==============================] - 0s 47us/step - loss: 0.6803 - accuracy: 0.6139 - val_loss: 0.7427 - val_accuracy: 0.0250
Epoch 12/30
404/404 [==============================] - 0s 47us/step - loss: 0.6776 - accuracy: 0.5718 - val_loss: 0.6666 - val_accuracy: 0.7833
Epoch 13/30
404/404 [==============================] - 0s 42us/step - loss: 0.6785 - accuracy: 0.6485 - val_loss: 0.6598 - val_accuracy: 0.7750
Epoch 14/30
404/404 [==============================] - 0s 47us/step - loss: 0.6757 - accuracy: 0.6510 - val_loss: 0.6644 - val_accuracy: 0.7567
Epoch 15/30
404/404 [==============================] - 0s 47us/step - loss: 0.6739 - accuracy: 0.6634 - val_loss: 0.7104 - val_accuracy: 0.5650
Epoch 16/30
404/404 [==============================] - 0s 52us/step - loss: 0.6726 - accuracy: 0.6510 - val_loss: 0.7009 - val_accuracy: 0.6450
Epoch 17/30
404/404 [==============================] - 0s 54us/step - loss: 0.6726 - accuracy: 0.6361 - val_loss: 0.6390 - val_accuracy: 0.7933
Epoch 18/30
404/404 [==============================] - 0s 52us/step - loss: 0.6710 - accuracy: 0.6510 - val_loss: 0.7522 - val_accuracy: 0.0633
Epoch 19/30
404/404 [==============================] - 0s 49us/step - loss: 0.6708 - accuracy: 0.6361 - val_loss: 0.7124 - val_accuracy: 0.6017
Epoch 20/30
404/404 [==============================] - 0s 52us/step - loss: 0.6682 - accuracy: 0.6658 - val_loss: 0.7228 - val_accuracy: 0.5350
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Epoch 21/30
404/404 [==============================] - 0s 52us/step - loss: 0.6682 - accuracy: 0.6337 - val_loss: 0.7390 - val_accuracy: 0.3333
Epoch 22/30
404/404 [==============================] - 0s 59us/step - loss: 0.6665 - accuracy: 0.6807 - val_loss: 0.7189 - val_accuracy: 0.5933
Epoch 23/30
404/404 [==============================] - 0s 44us/step - loss: 0.6646 - accuracy: 0.6881 - val_loss: 0.7123 - val_accuracy: 0.6533
Epoch 24/30
404/404 [==============================] - 0s 54us/step - loss: 0.6635 - accuracy: 0.6658 - val_loss: 0.7351 - val_accuracy: 0.4950
Epoch 25/30
404/404 [==============================] - 0s 49us/step - loss: 0.6619 - accuracy: 0.6733 - val_loss: 0.6661 - val_accuracy: 0.7317
Epoch 26/30
404/404 [==============================] - 0s 54us/step - loss: 0.6650 - accuracy: 0.6634 - val_loss: 0.6360 - val_accuracy: 0.7467
Epoch 27/30
404/404 [==============================] - 0s 49us/step - loss: 0.6670 - accuracy: 0.6535 - val_loss: 0.6404 - val_accuracy: 0.7467
Epoch 28/30
404/404 [==============================] - 0s 52us/step - loss: 0.6630 - accuracy: 0.6832 - val_loss: 0.6523 - val_accuracy: 0.7367
Epoch 29/30
404/404 [==============================] - 0s 47us/step - loss: 0.6597 - accuracy: 0.6708 - val_loss: 0.7625 - val_accuracy: 0.2250
Epoch 30/30
404/404 [==============================] - 0s 42us/step - loss: 0.6584 - accuracy: 0.6683 - val_loss: 0.6733 - val_accuracy: 0.7233
```

The loss is 0.6733 and the accuracy is 72.33%.