**Capstone Report 4**

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**Project Title: - Video Deep-Fake**

**Detection**

* Till Report 3 we had documented the pre-processing and various feature extraction methods that would be efficient in deepfake detection especially for face orientation related datasets.We had also implemented a few of the feature extraction methods.
* In this report we have documented the test set accuracy that we have got from all of the filtered, feature extraction methods. To get a consistent accuracy analysis we have used images from the same distribution that is the Celeb-DF dataset, and also we have used the same classifier for all the methods so that we can compare the accuracies and select the best out of the list.
* First testing on the SVM Classifier:

| **Feature Extractor** | **Accuracy** |
| --- | --- |
| Local Binary Patterns | 0.574 |
| HOG | 0.906 |
| Face Pose Estimator | 0.738 |
| Gabor Filter | 0.705 |

* HOG was tested on RFC and MLP too which gave an accuracy rate of 0.885 and 0.889 respectively.
* LBP was also tested on RFC which gave an accuracy rate of 0.7275

A neural network architecture for binary classification using Keras was used. It includes several dense layers with decreasing neuron counts, ReLU activations, batch normalization, and dropout to prevent overfitting, followed by a sigmoid output layer.

* Second Testing on the Neural Net Classifier(MLP):

| **Feature Extractor** | **Accuracy** |
| --- | --- |
| Local Binary Patterns | 0.8828 |
| HOG | 0.9042 |
| Face Pose Estimator | 0.5358 |
| SIFT | 0.8827 |

* Conclusion :- So based on the accuracy analysis we find HOG, SIFT and face pose estimator(in that order of ranking) to be the top 3 and we have planned to use only these in our actual deep learning model (as of now)which we have already started implementing.