



## Machine Learning Internship

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### Facial Expression Recognition Classifier Model

**Abstract:** I built a Facial Expression Recognition Classifier Model that takes Real-time Video input and predicts the Emotion of users present in front of Webcam. It also gives Graphical Visualization of Expressions when we feed in an Image.

#### Coding Structure:

- Import the required Packages and Libraries.
- Data analysis and Creating Training and Validation Batches.
- Create a CNN using 4 Convolutional Layers including Batch Normalization, Activation, Max Pooling, Dropout Layers followed by Flatten Layer ,2 Fully Connected dense Layers and finally Dense Layer with SoftMax Activation Function.
- Compile the model using Adam Optimizer and categorical cross entropy loss function.
- Training the model for 15 epochs and then Evaluating the model as well as saving the model Weights in .h5 Values

- Saving the model as JSON string.
- Creating a Class in a separate file to reload the model and its weights to make predictions and return the probabilities of each emotion.
- Creating one more class in a Separate file which takes in the Real-time Video input and returns frames of Images with a Circle detecting the face and putting text of its emotion on it.
- Finally creating a file which inherits form all the Classes defined by us and deploys our application using Flask.
- Additionally, a python script is created which upon running yields the Graphical Visualization of Emotions present in the Image provided.

**Note:**

We can further improve the Validation Accuracy of the model by tuning the hyperparameters like:

- ✓ Learning Rate
- ✓ Epochs
- ✓ Batch Size
- ✓ Number of Layers in CNN
- ✓ Number of filters
- ✓ Size of filters
- ✓ Value in Dropout Layers
- ✓ Optimizers