

Facial Expression Recogniser



TECHNOLOGY PRESENTATIONS



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Building Process

- Dealing with the Image datasets
- Performing Data Processing and Augmentation as and when required
- Creating and training a Convolutional Neural Network using Tensorflow 2.0
- Dataset is collected from kaggle to train and test the model.
The link for the dataset is given below –
<https://www.kaggle.com/datasets/msambare/fer2013>



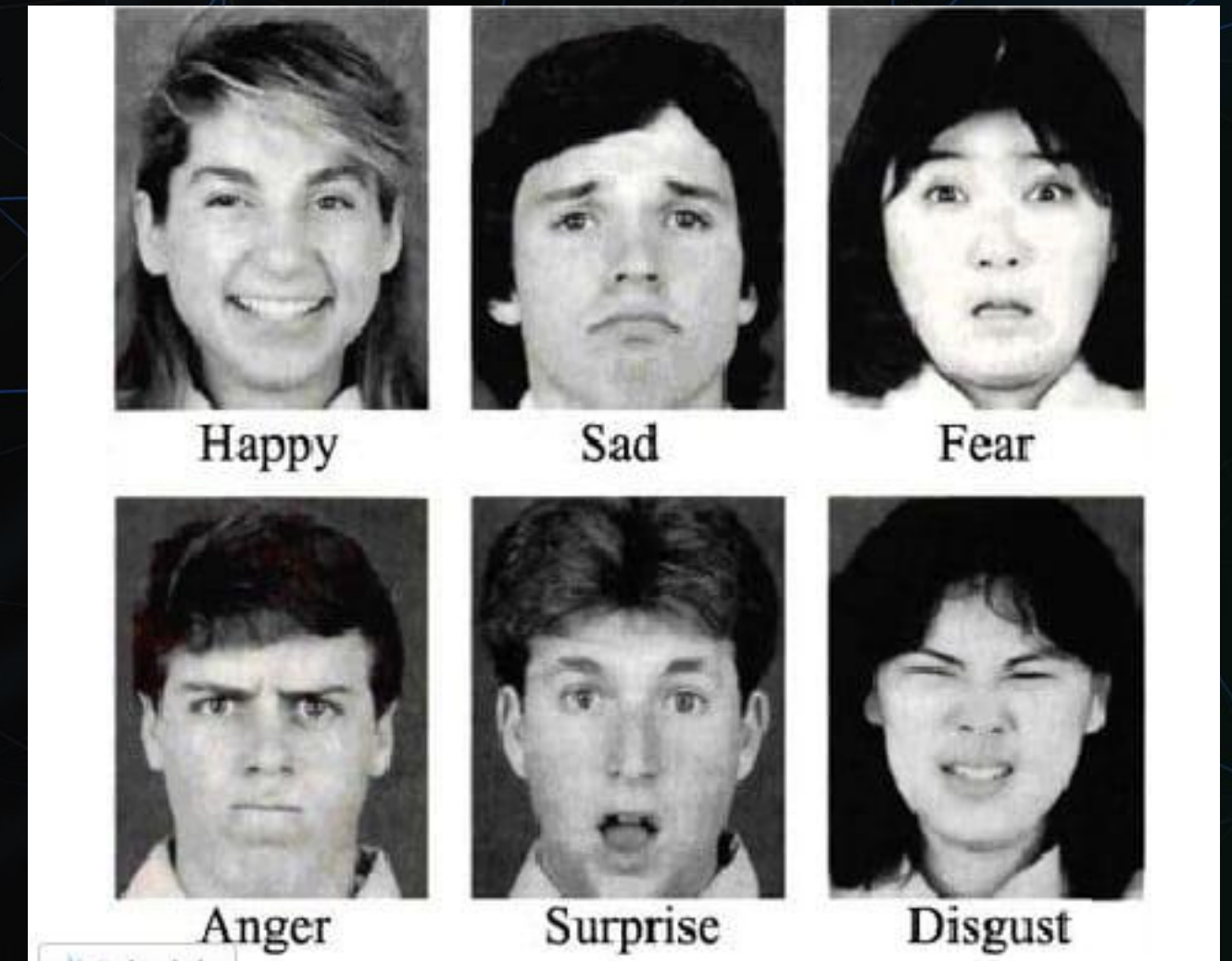
This Project Depicts



- Advanced level application of python programming language, as the whole code is written in python
- Depth Knowledge over Linear and Logistic regression as these are the bricks of neural networks
- Basic image processing understanding
- Basic understanding of artificial neural networks and convolutional neural networks working and implementation.

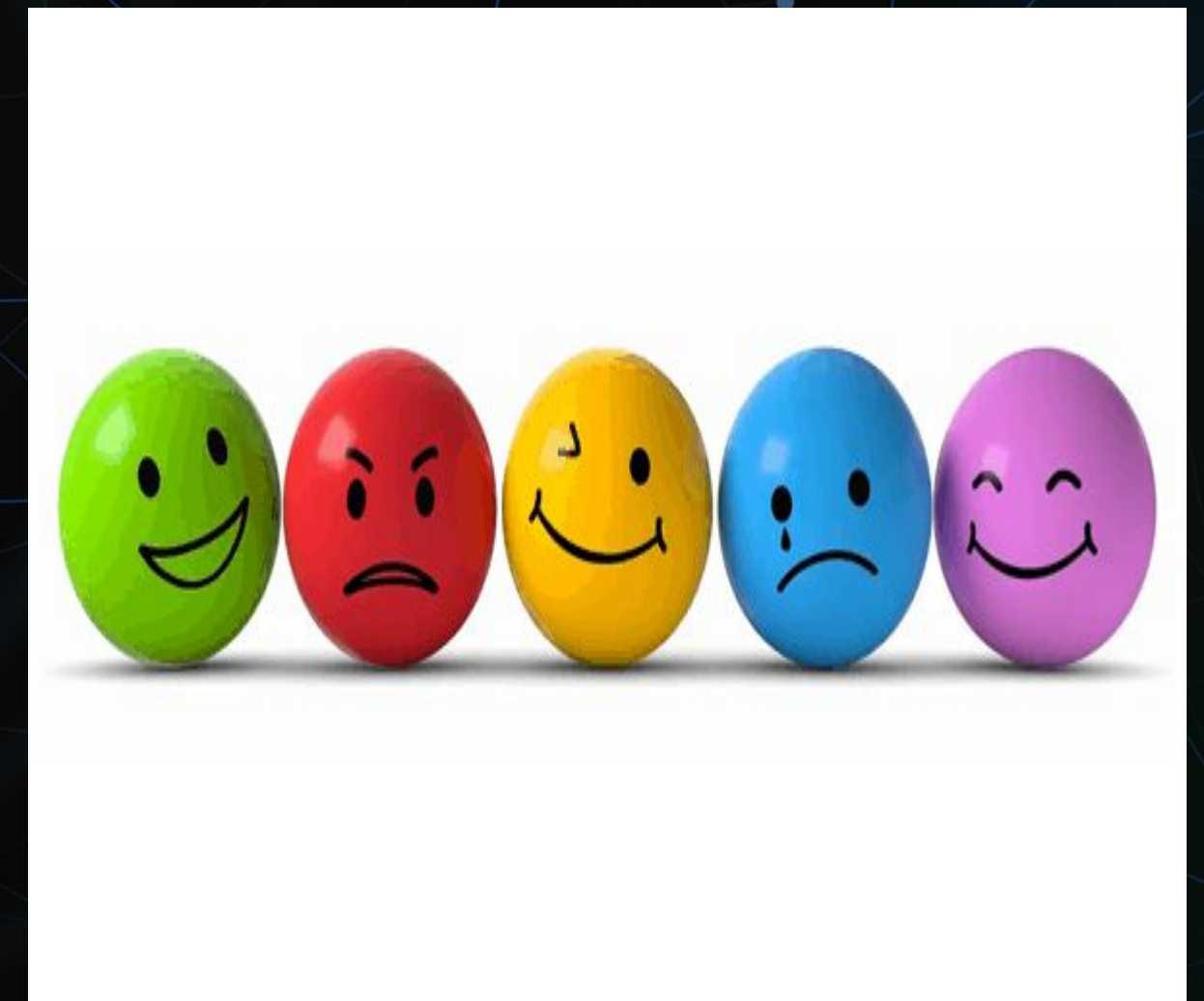
Facial Expressions Recognition System

- Facial expression recognition is technique which uses biometric markers to detect emotions in human faces
- The six basic universal expressions: happiness, sadness, anger, surprise, fear and disgust



○○○ Understanding Facial Expressions ○○○

- Because facial expressions convey nonverbal communication cues that play an important role in interpersonal relations
- These cues complement speech by helping the listener to interpret the intending meaning of spoken words.



○○○ Use Cases - Market Research ○○○

- Traditionally, market research was done by conducting surveys to find out what consumers want and need, the methods involving employing people to observe reactions of customers while interacting with a brand or product
- Facial expression recognition can save the day by allowing companies to conduct market research and measure moment-by-moment facial expressions automatically, making it easy to aggregate the result

○○○ Use Cases - Gaming Industry ○○○

- Facial expression recognition can also be used in the video game testing phase
- A focused group of users are asked to play a game for a given amount of time and their behaviour and emotions are monitored.
- By using a facial expression recognition, game developers can gain insight and draw conclusions about the emotions experienced during the game play and incorporate the feedback in the making of the final product

○○○ Use Cases - Behavioural Testing ○○○

- Suppose you have built some product and want to understand the genuine feedback of your customer on it, then you can incorporate facial expression recogniser on your product which keeps tracking customer's emotions
- It makes it easy to capture a few expressions like sadness, happiness, or surprise while they walk through your product

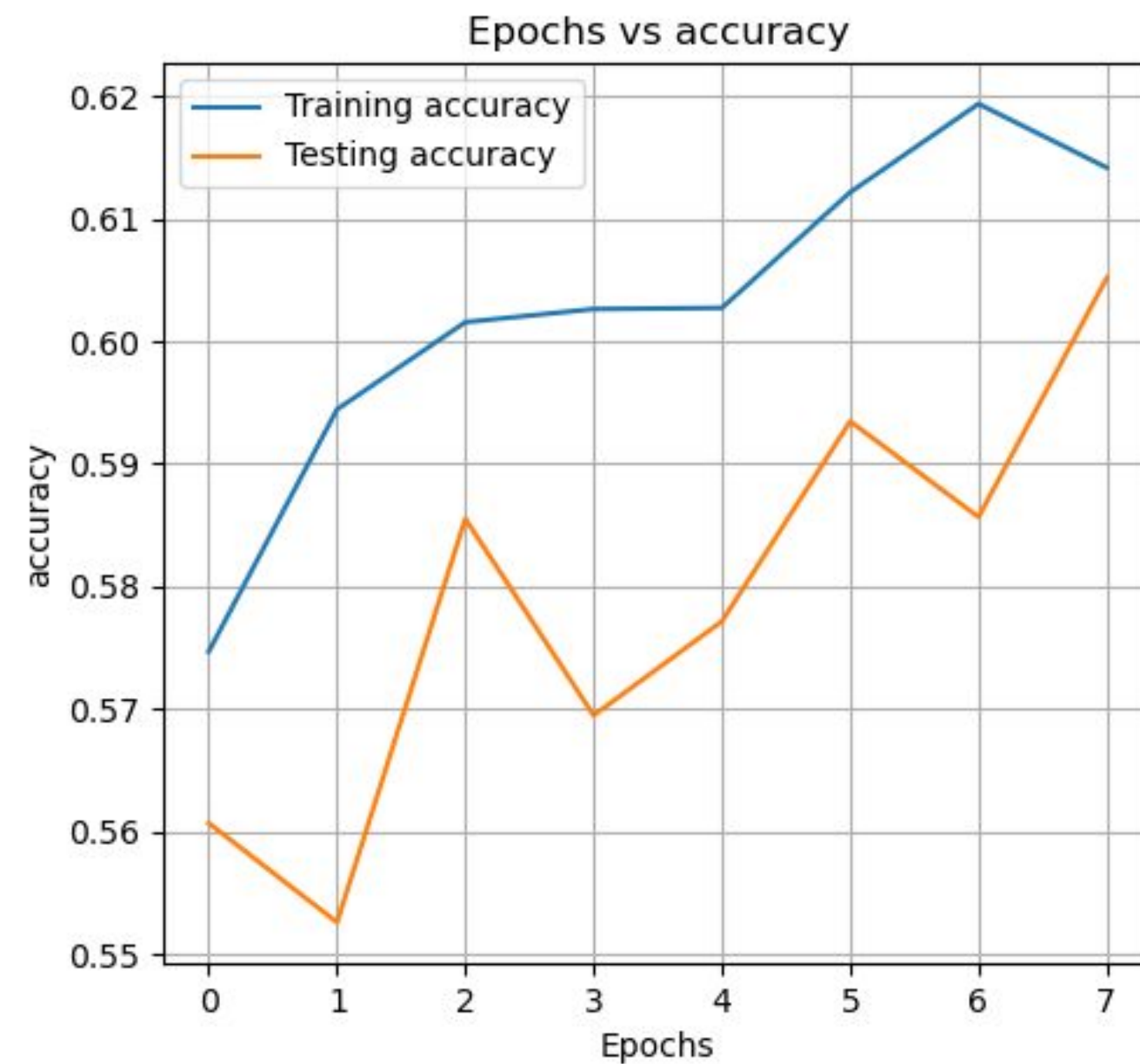
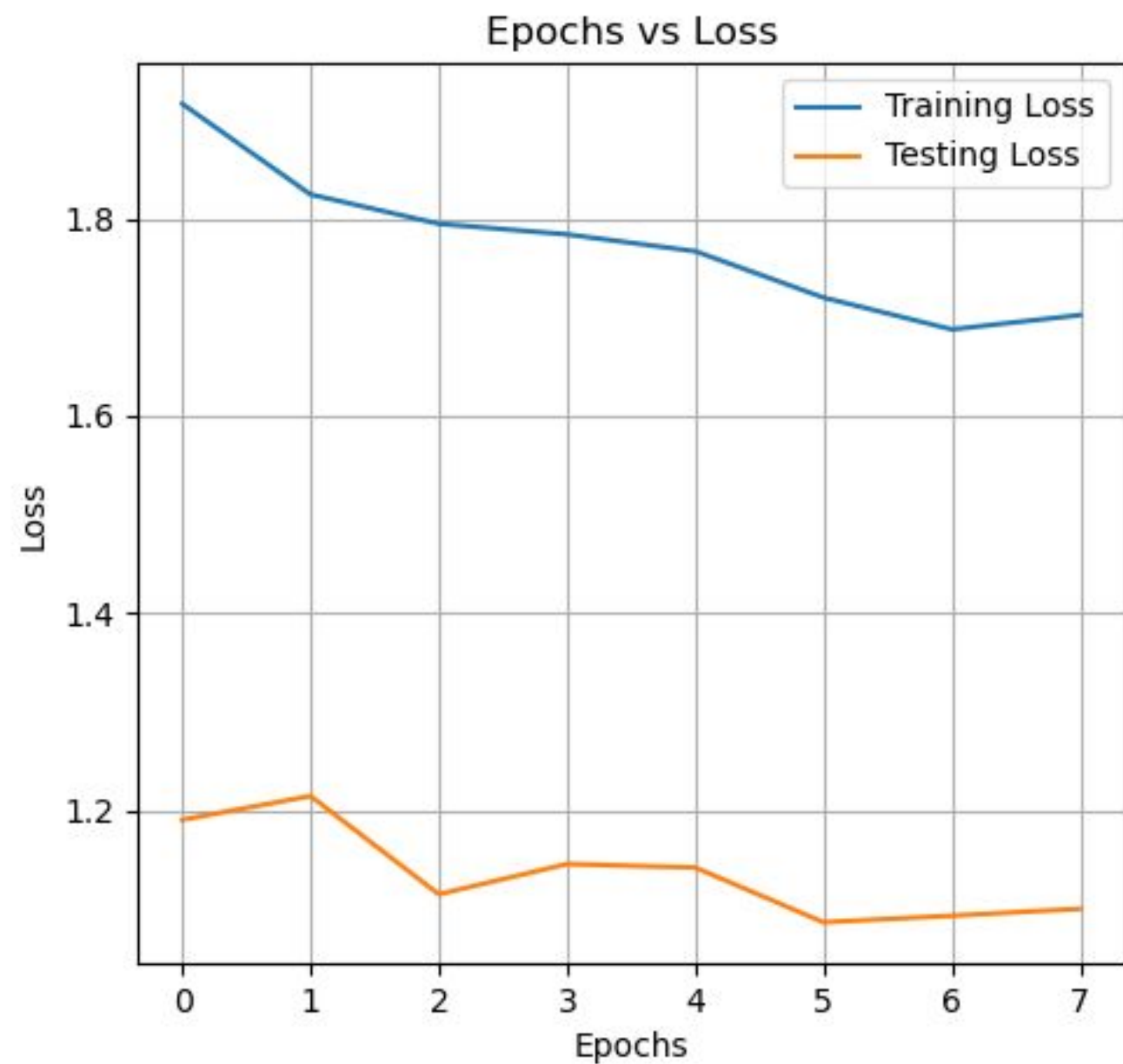
Environment Setup

- To run a normal CPU, having a 'CUDA' enabled GPU helps models get trained quicker
- 'Google Colaboratory' is the best developer's best friend when it comes to deep learning
- Colaboratory is a google research project created to help machine learning education and research
- Hosted on Google cloud instances which we can use for free

○○○ About This Project ○○○

- EfficientNetB2 Model is used to create the facial expression recogniser
- Dataset on which the model is trained and tested was obtained from kaggle.
- The model may not perform in some circumstances as the images on which model is trained are very small in size.

Comparison between Training and Testing Scores for both Loss and Accuracy



Summary



- Google Colab and GPUs
- Utilized the resources for solving high level computational problems where datasets consists of images, text, videos
- Set up the environment for solving deep learning problems
- Used tensorflow to build Convolutional Neural Networks
- Created a model that can detect basic facial expressions

Summary



- Used OpenCV and dlib
- Used two phase training to freeze the training before our model starts overfitting
- Evaluated our model on test set and applied real time prediction
- Performed data augmentation to improve model's prediction



THANK YOU!