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EMOTION DETECTOR

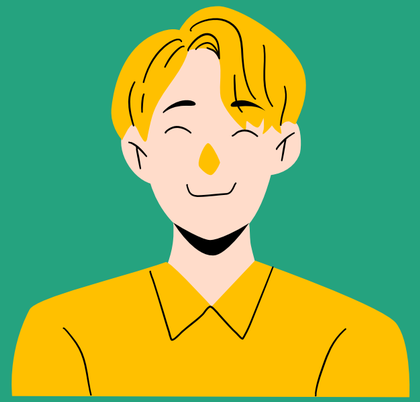
Amanda Darwisyah Binti Muhammad
FCS13625

Problem Statement

Emotion recognition is often **inaccurate** and **easy to misunderstand**, especially when relying on manual interpretation or facial expressions alone.

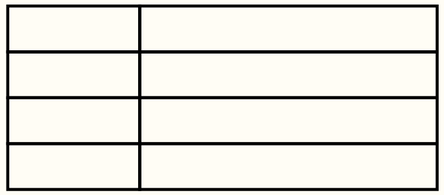
This problem affects users, developers, and organizations that depend on emotion-aware applications.

Without a solution, emotional cues may be misunderstood, which could lead to **poor communication, misunderstandings, and unnecessary disagreements.**

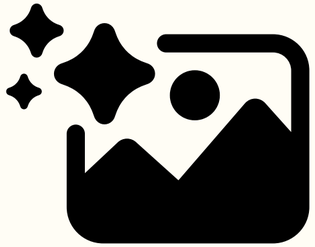


Data Overview

Source: Kaggle
https://www.kaggle.com/datasets/jonathanoheix/face-expression-recognition-dataset/data



Each row represents an **image of a facial expression.**



Training: 28K Images

Validation: 7K Images

Total: 35K Images

Target Variable is **Emotion**, with classes such as **Happy, Angry, Sad, Fear, Surprise, Disgust,** and **Neutral.**

Objectives & Key Questions

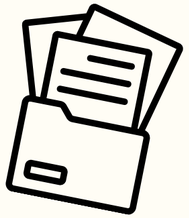
To develop a machine learning model that can accurately **detect human emotions** from facial images.

To build an interactive web application using Streamlit that allows users to upload images and receive real-time **emotion predictions.**

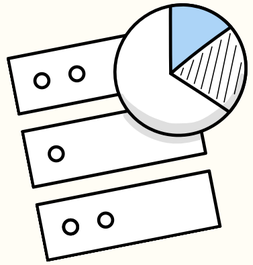
How accurately can the model **classify each image into different expressions/emotions?**

Methodology

- Data Collection



- Understanding Data
  (Visualizations, EDA Analysis)



- Preprocessing and Augmentation

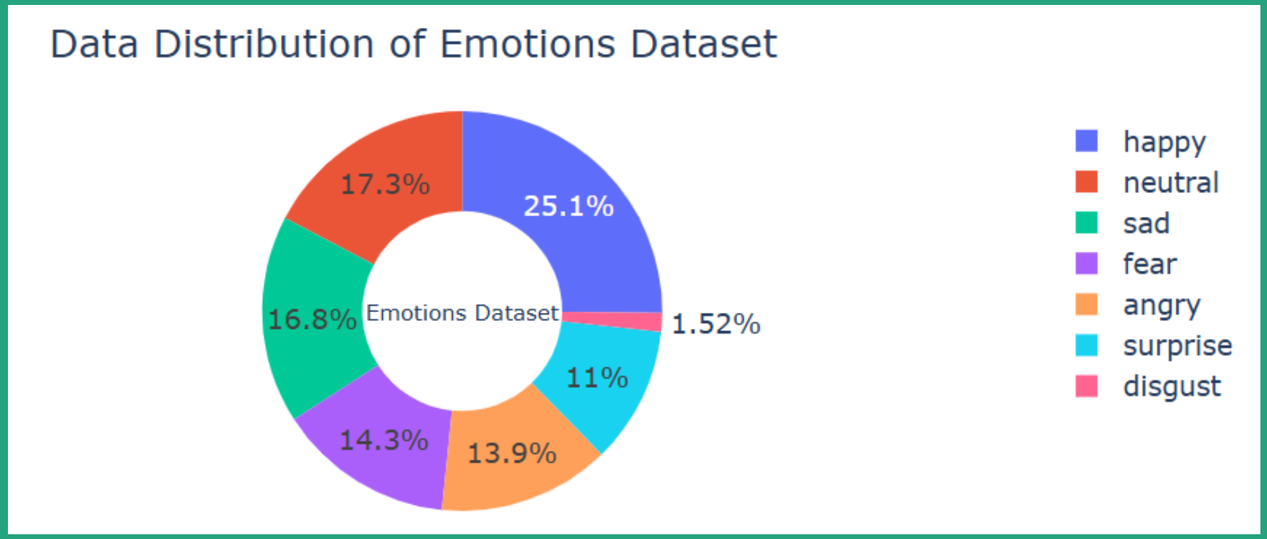
- Model Building & Training

- Results and Model Evaluation

EDA Key Findings

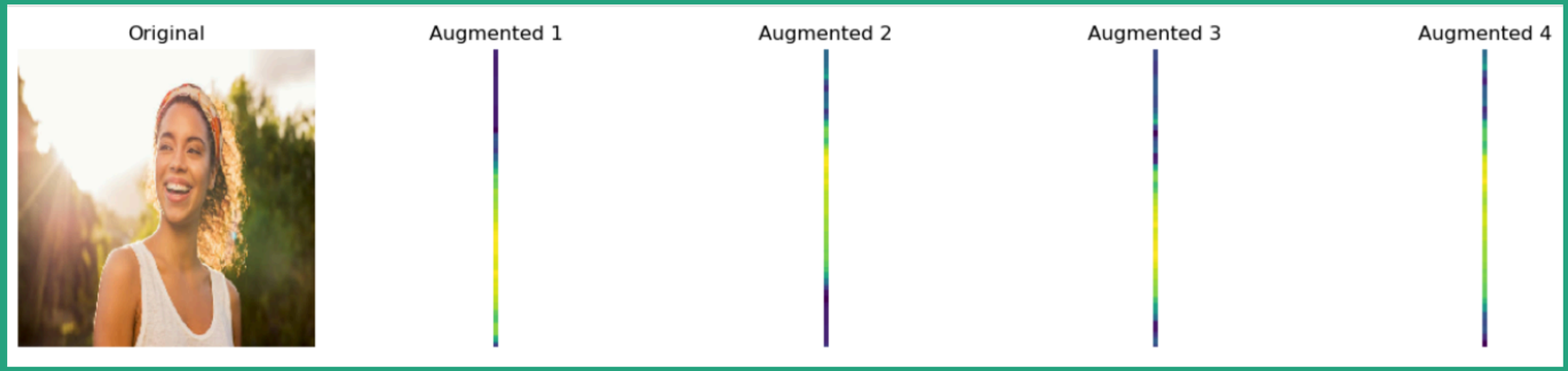
Bar Chart

Pie Chart



Sample Image Visualisations

Resizing



Data Augmentation

Modeling Approach

Algorithms

- Convolutional Neural Network (CNN)
- MobileNetV2

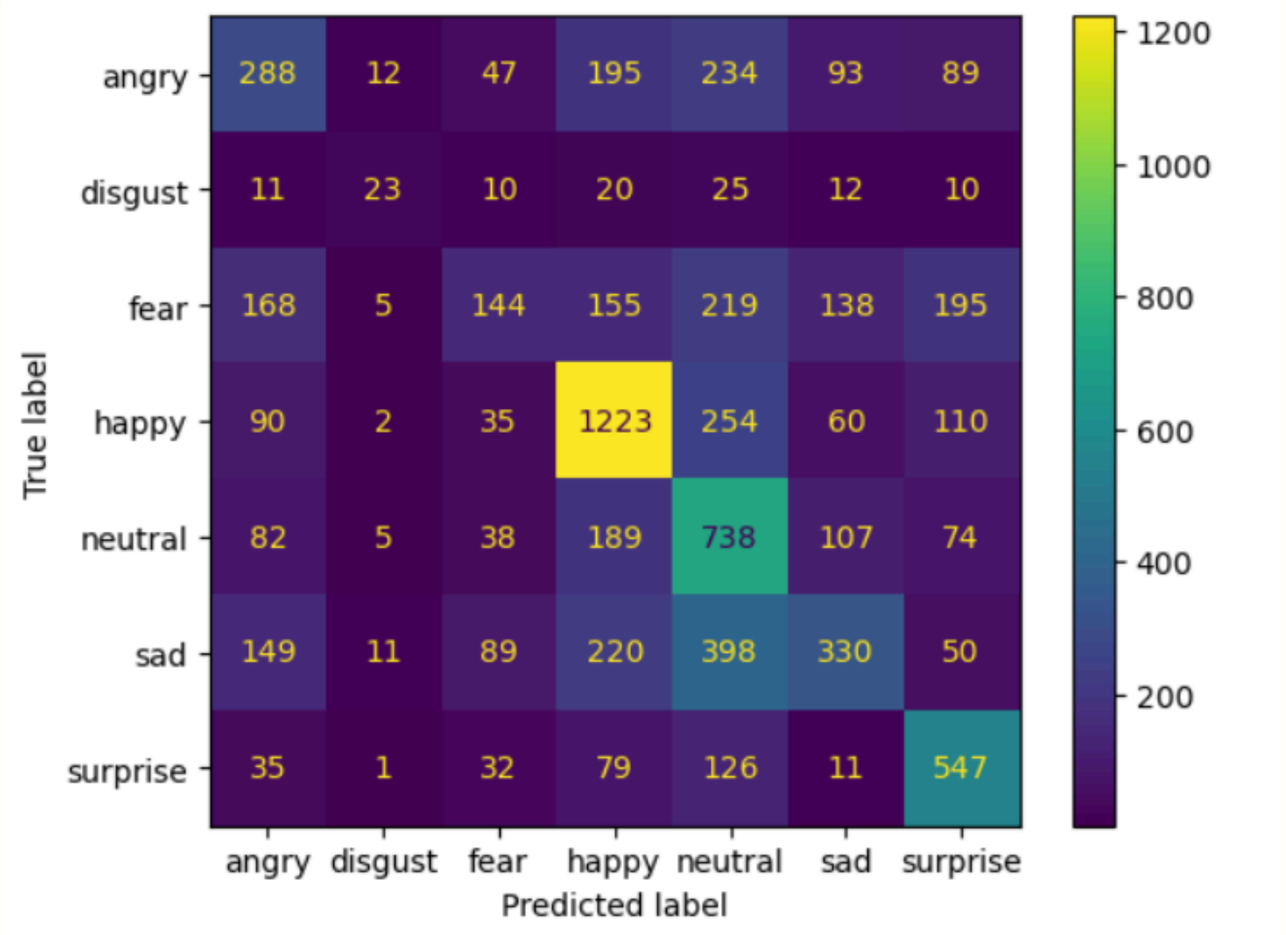
Feature Engineering

- Image Scaling / Normalization
- Data Augmentation
- Label Encoding

Results & Evaluation

```
t_lost,t_acc = model.evaluate(val_gen, verbose=1)
```

```
225/225 ━━━━━━━━━━━━━━━━━━━━ 213s 923ms/step - accuracy: 0.4588 - loss: 1.4075
```



The current model provides a baseline emotion recognition system that can assist in non-critical applications such as educational demonstrations, user interface experimentation, or early-stage emotion-aware systems. While not yet suitable for high-stakes decision-making, it shows potential for future improvement and deployment.

Measure of Success

This project is considered successful if the model performs better than random classification and demonstrates the ability to learn meaningful patterns from the data. Despite achieving an overall **accuracy of 40%,** the model exceeds baseline performance and shows reasonable class-level predictions. This project successfully applies appropriate preprocessing, model training, and evaluation techniques, while clearly identifying limitations that affect performance.

Challenges & Limitations

1. Severe class imbalance
   - Used class weights to balance out the data
2. Long model training time due to large dataset
   - Use early stopping
3. Inaccurate Predictions
   - Kept trying different methods

Future Work & Recommendations

- Increase and balance dataset
- Improve model
- Refine data preprocessing and augmentation
- Model Evaluation and Monitoring

Tech Stack

Language

Python

Libraries

Tensorflow, Pandas, Numpy, Seaborn, Matplotlib, PIL

Infrastructure

Streamlit

THANK YOU!
Q&A SESSION