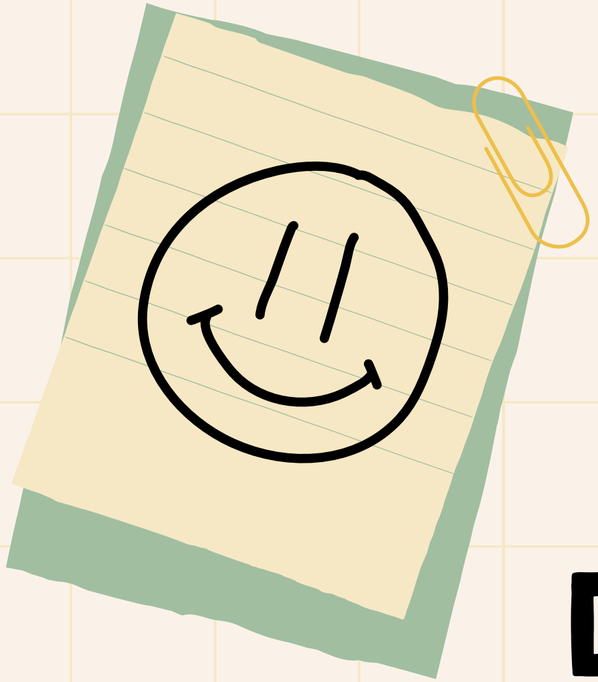

REAL-TIME EMOTION DETECTION FOR VIRTUAL LEARNING ENVIRONMENTS

S.Mohana krishna-23R11A0534
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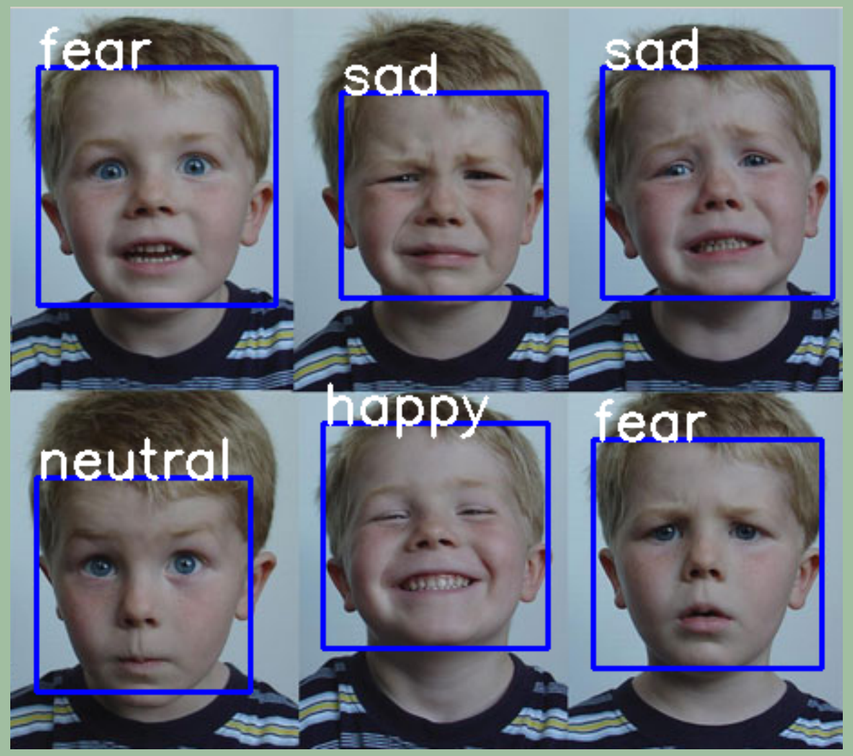
INTRODUCTION

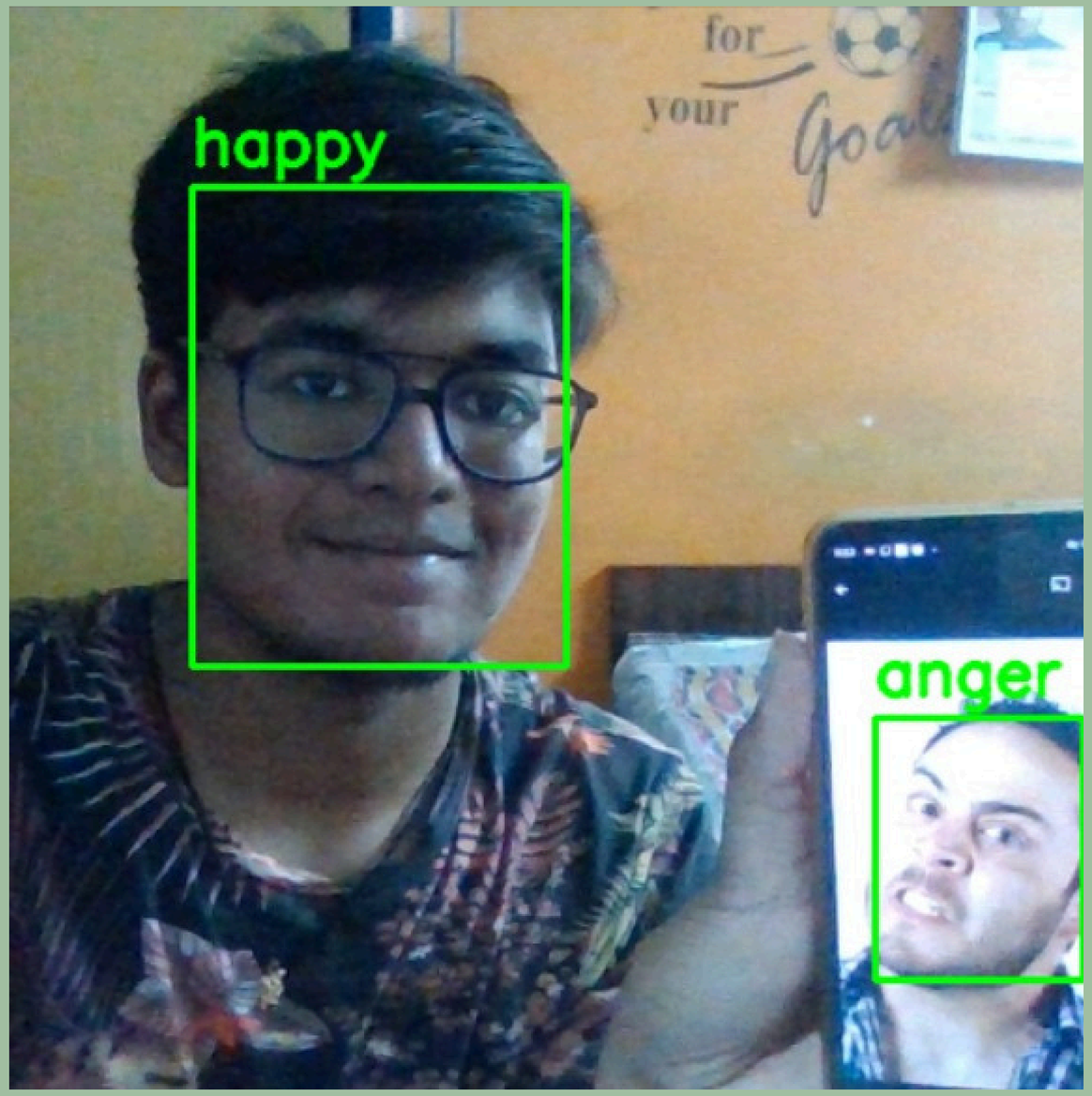


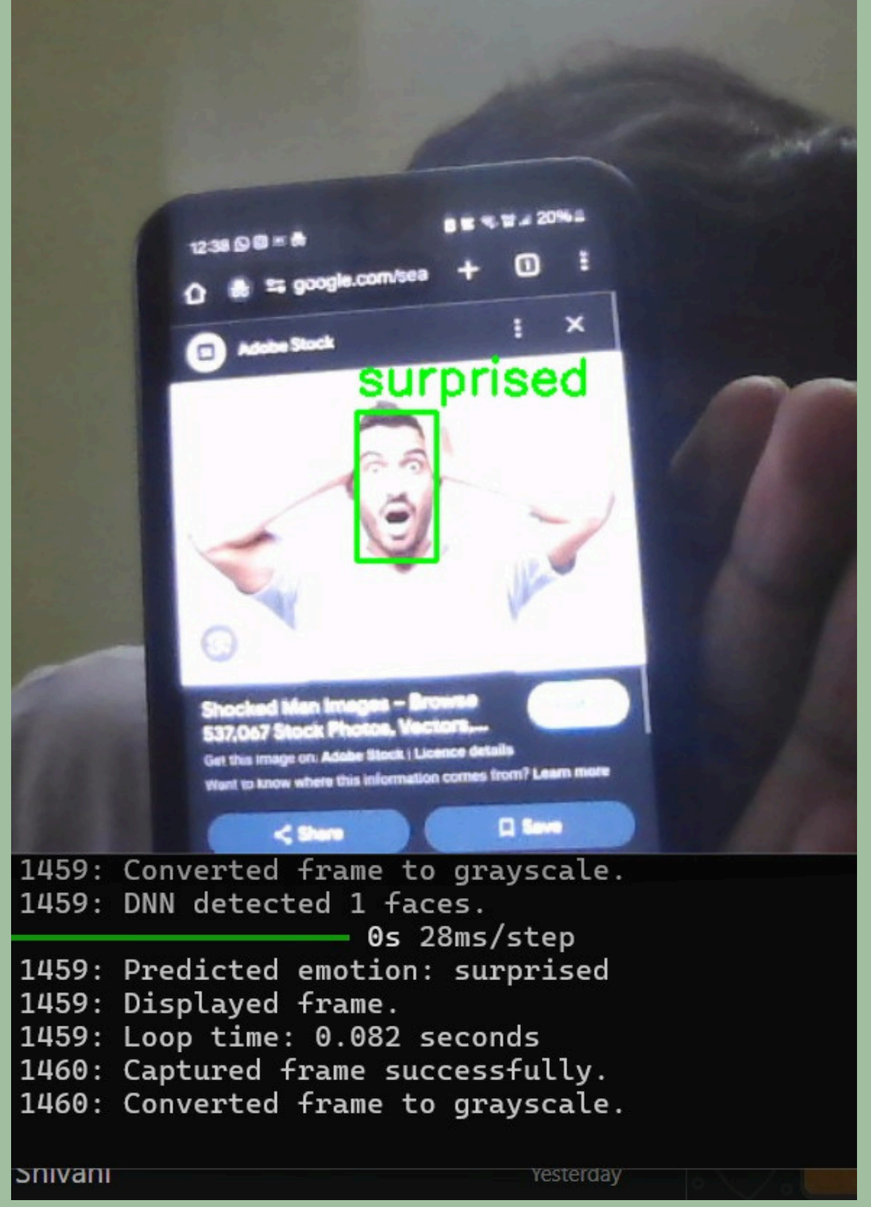
Virtual communication often lacks emotional awareness, making interactions less effective.
This project presents a real-time emotion detection system that identifies facial expressions corresponding to seven key emotions: angry, disgusted, fearful, happy, neutral, sad, and surprised.
The system enhances user experience in various virtual environments like meetings, support systems, and online learning.

Methodology

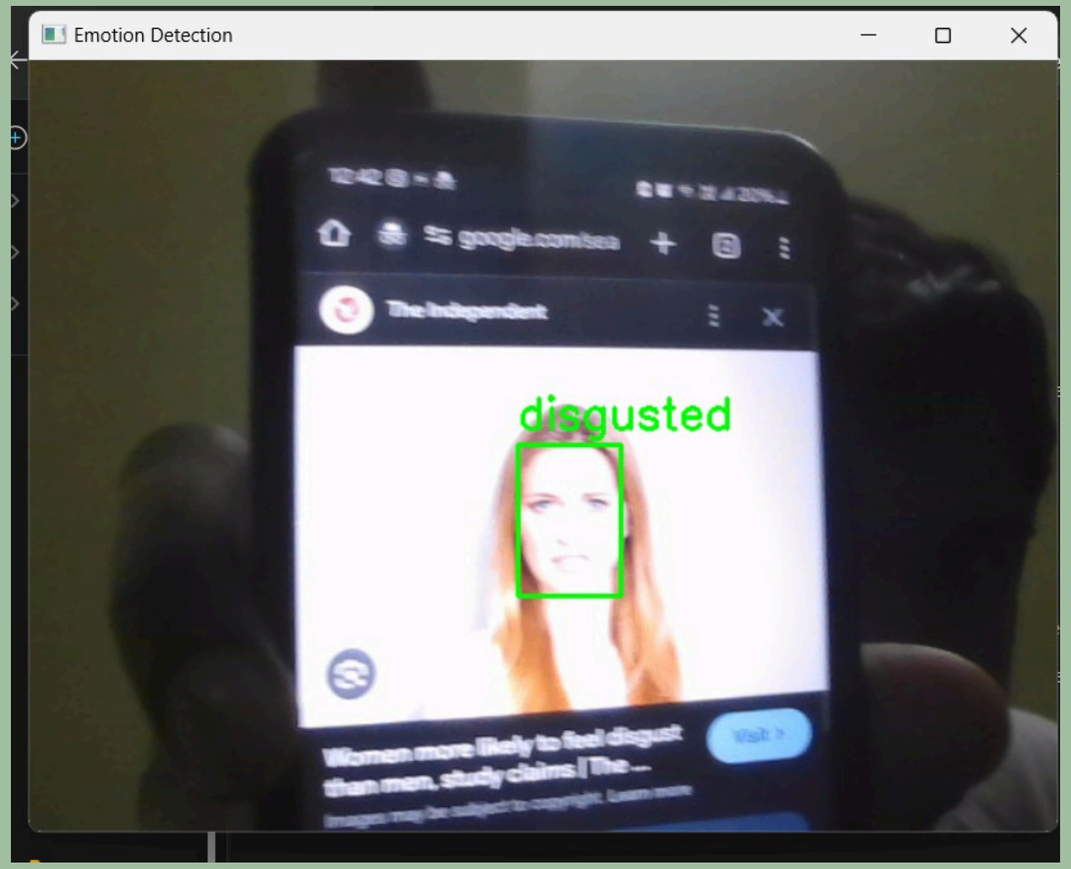
1. Dataset: Collected and labeled images for 7 emotions.
2. Model: Trained a CNN using Keras, saved as .h5 and .keras.
3. Face Detection: Used Haar Cascade and DNN model for real-time detection.
4. Real-Time Prediction: Webcam input → Face detected → Emotion predicted.
5. Integration: Combined detection and prediction in a single script with live emotion overlay.

EXAMPLE IMAGES OF EMOTIONS

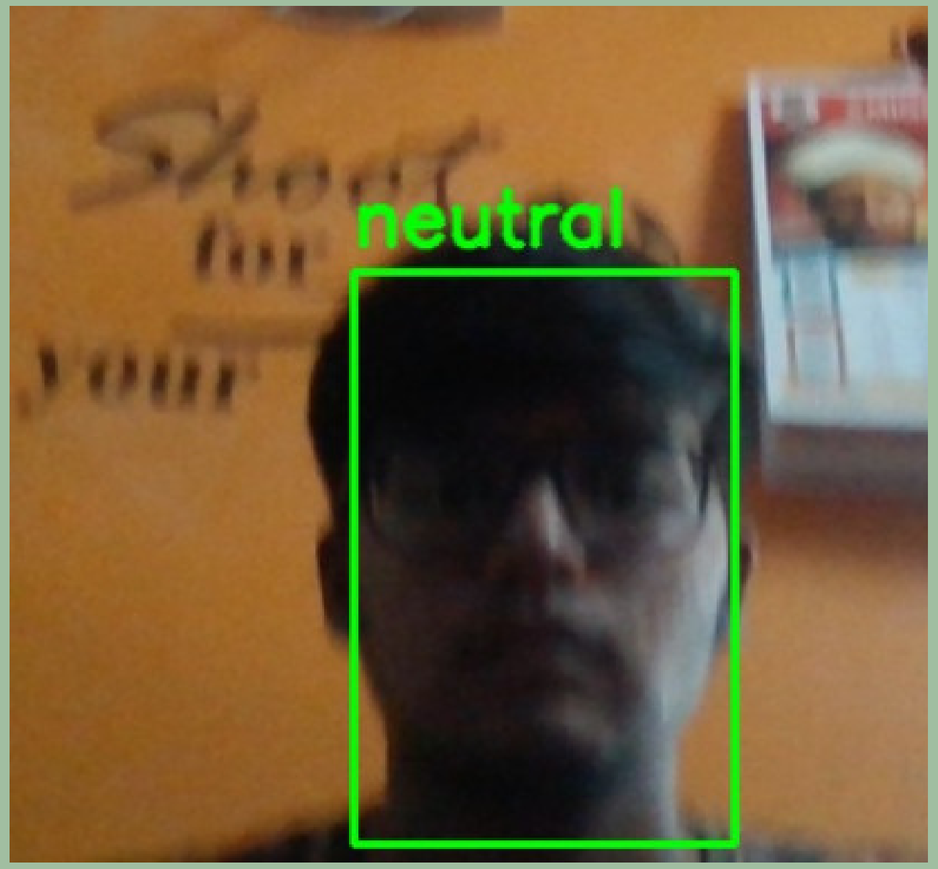




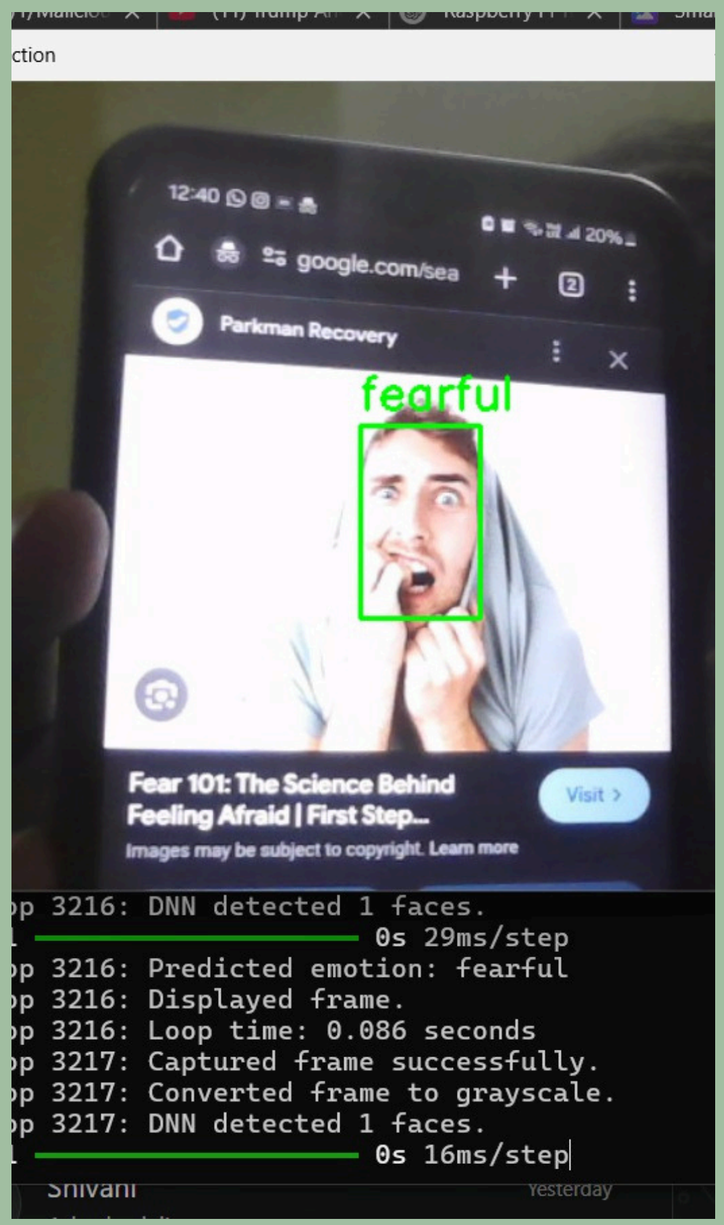
HAPPY **ANGRY** **SURPRISED**

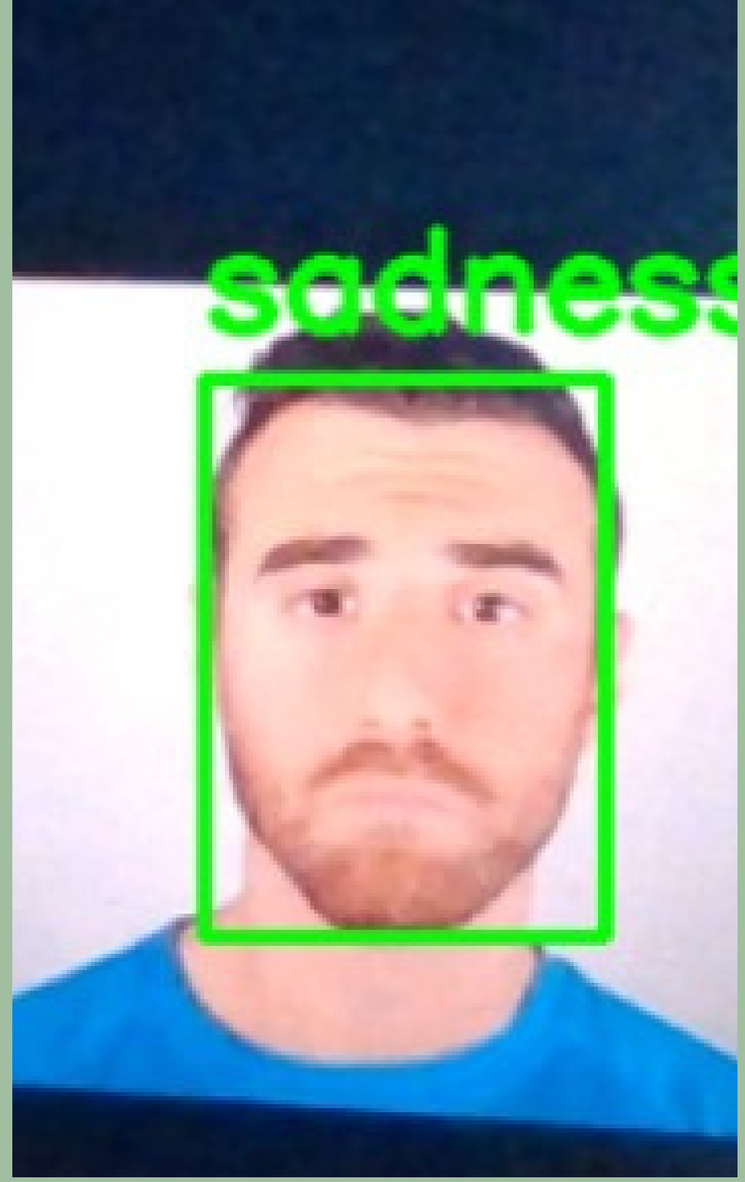


DISGUSTED



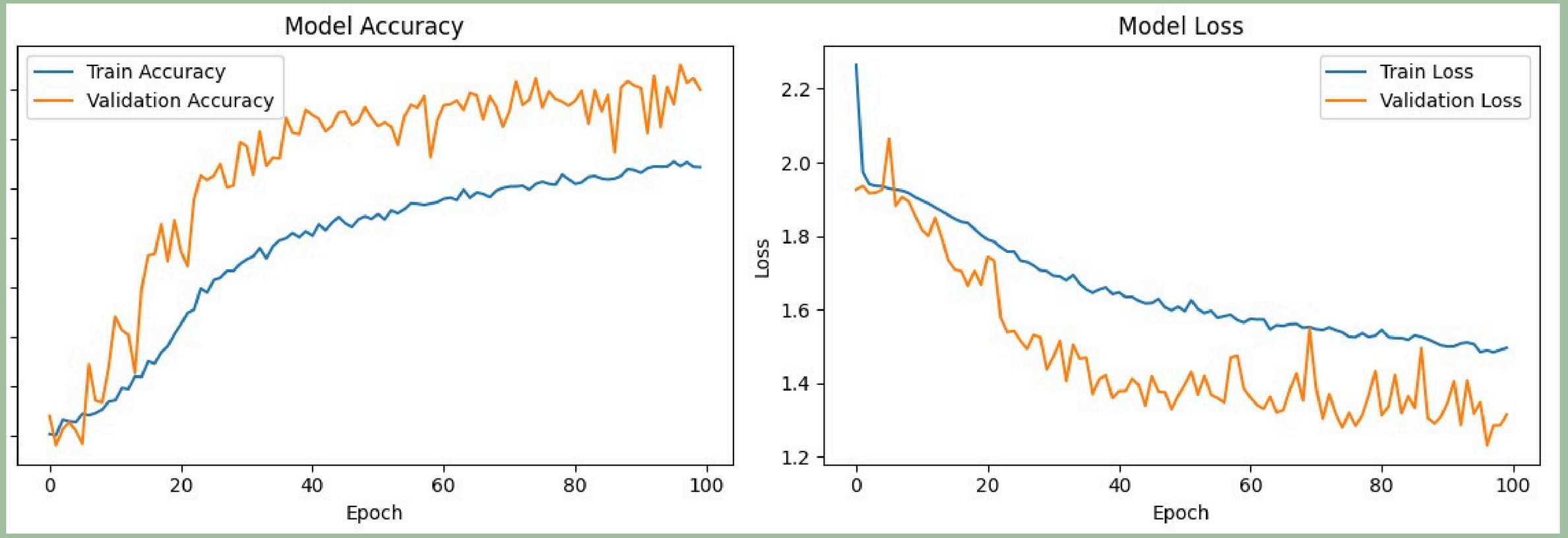
NEUTRAL


ction
12:40
20%
google.com/sea
Parkman Recovery
fearful
Fear 101: The Science Behind Feeling Afraid | First Step...
Visit
Images may be subject to copyright. Learn more
op 3216: DNN detected 1 faces.
0s 29ms/step
op 3216: Predicted emotion: fearful
op 3216: Displayed frame.
op 3216: Loop time: 0.086 seconds
op 3217: Captured frame successfully.
op 3217: Converted frame to grayscale.
op 3217: DNN detected 1 faces.
0s 16ms/step
Shivani
Yesterday


sadness

FEARFUL

SAD


Model Accuracy
Train Accuracy
Validation Accuracy
0
20
40
60
80
100
Epoch
Model Loss
Train Loss
Validation Loss
2.2
2.0
1.8
1.6
1.4
1.2
Loss
0
20
40
60
80
100
Epoch

🔹 ACCURACY (LEFT GRAPH):

- TRAINING ACCURACY GRADUALLY INCREASED, REACHING ~40%.
- VALIDATION ACCURACY IMPROVED QUICKLY AND STABILIZED AROUND 50%.
- INDICATES THE MODEL IS LEARNING TO PREDICT EMOTIONS REASONABLY WELL.

🔸 LOSS (RIGHT GRAPH):

- BOTH TRAINING AND VALIDATION LOSS DECREASED STEADILY OVER EPOCHS.
- VALIDATION LOSS REMAINED LOWER THAN TRAINING LOSS.
- SHOWS THE MODEL IS NOT OVERFITTING AND GENERALIZES WELL TO NEW DATA.

CONCLUSION

- THIS PROJECT SUCCESSFULLY DEMONSTRATES A REAL-TIME FACIAL EMOTION DETECTION SYSTEM USING DEEP LEARNING AND COMPUTER VISION TECHNIQUES.
- BY IDENTIFYING SEVEN KEY HUMAN EMOTIONS FROM FACIAL EXPRESSIONS, THE SYSTEM CAN ENHANCE DIGITAL COMMUNICATION IN VIRTUAL ENVIRONMENTS SUCH AS ONLINE LEARNING, MEETINGS, AND SUPPORT PLATFORMS.
- THE MODEL SHOWS STEADY IMPROVEMENT IN TRAINING, WITH PROMISING ACCURACY AND LOSS TRENDS. WHILE THERE IS ROOM FOR OPTIMIZATION, THE CURRENT RESULTS HIGHLIGHT THE SYSTEM’S POTENTIAL FOR PRACTICAL APPLICATIONS.

THANK YOU