Web-Based Mood Tracking System

Introduction

This project addresses the challenges of current mood-detection applications by developing a web-based system that integrates active and passive data collection to enhance the accuracy of bipolar disorder symptom detection.

Background

To mitigate the risk of experiencing bipolar disorder, our online mood tracking project could enhance self-monitoring of users' mental health.

Objectives

- Enhance Bipolar Disorder Symptom Detection by integreting machine learning for emotion recognition
- Empower Users with Early Detection and Self-Monitoring by daily mood logging and report of mood analysis
- Implementing emotion recognition data to measure the mood swing and cycle

Conclusion

I have explored several models for this detected mood system including pre-trained networks based on ResNet50 and VGG16.
I believe I have preform a satisfactory performance application on tracking on the mood and emotion status.
The future extensions of this work could integrate Psychological research to further adapt our models to the real world

Research

Dataset for Speech Emotion Recognition

I utilize the CREMA-D and RAVDESS datasets for training, with the TESS dataset for testing. By training the model and detect emotional states with recording of user speech

Methodology

The model is constructed using a pre-trained VGG base with frozen layers, processing 224x224x3 Mel spectrogram inputs, followed by an average pooling layer, a 128-unit ReLU dense layer. I also added 50% dropout layers to address high variance
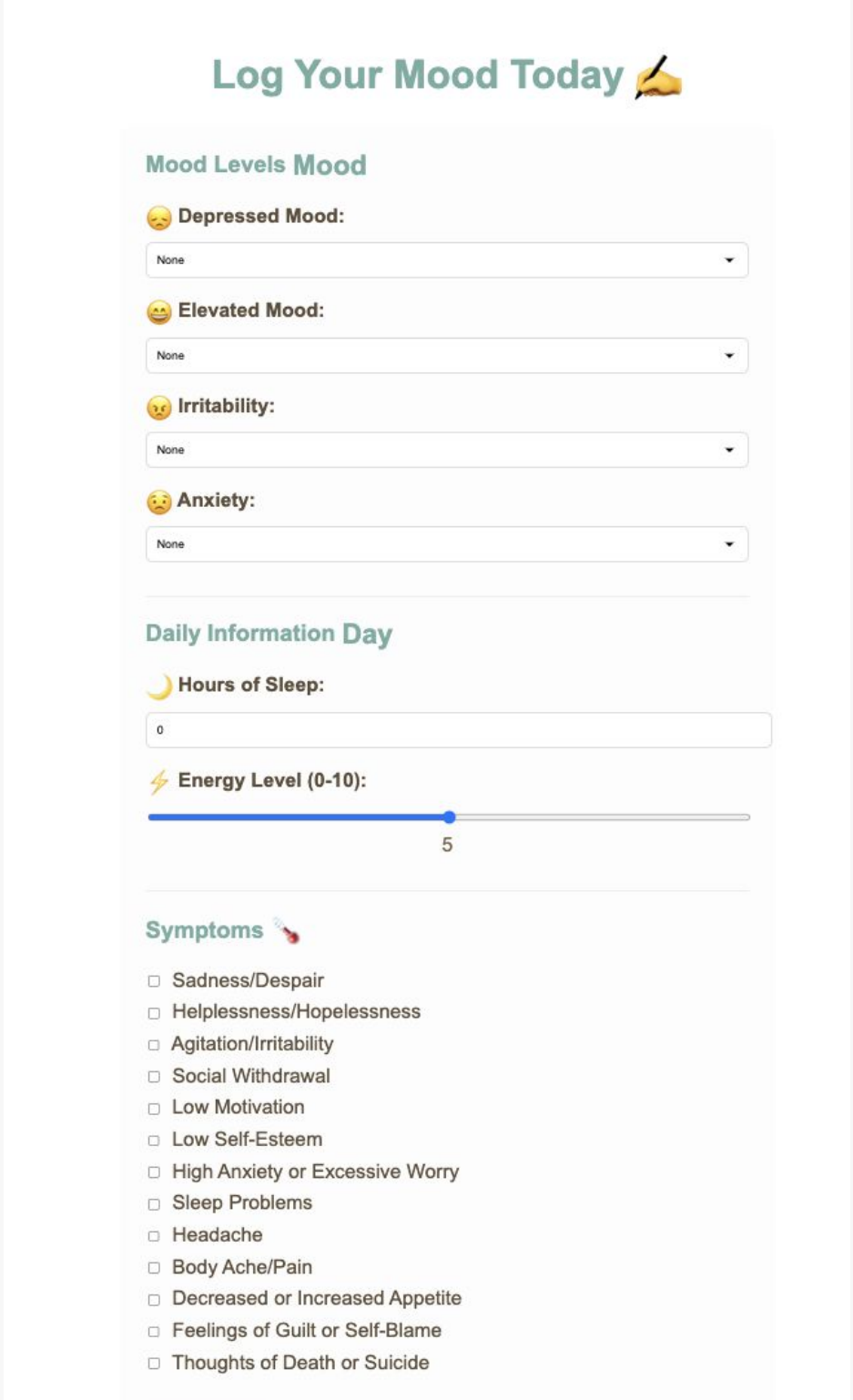and improve our accuracy
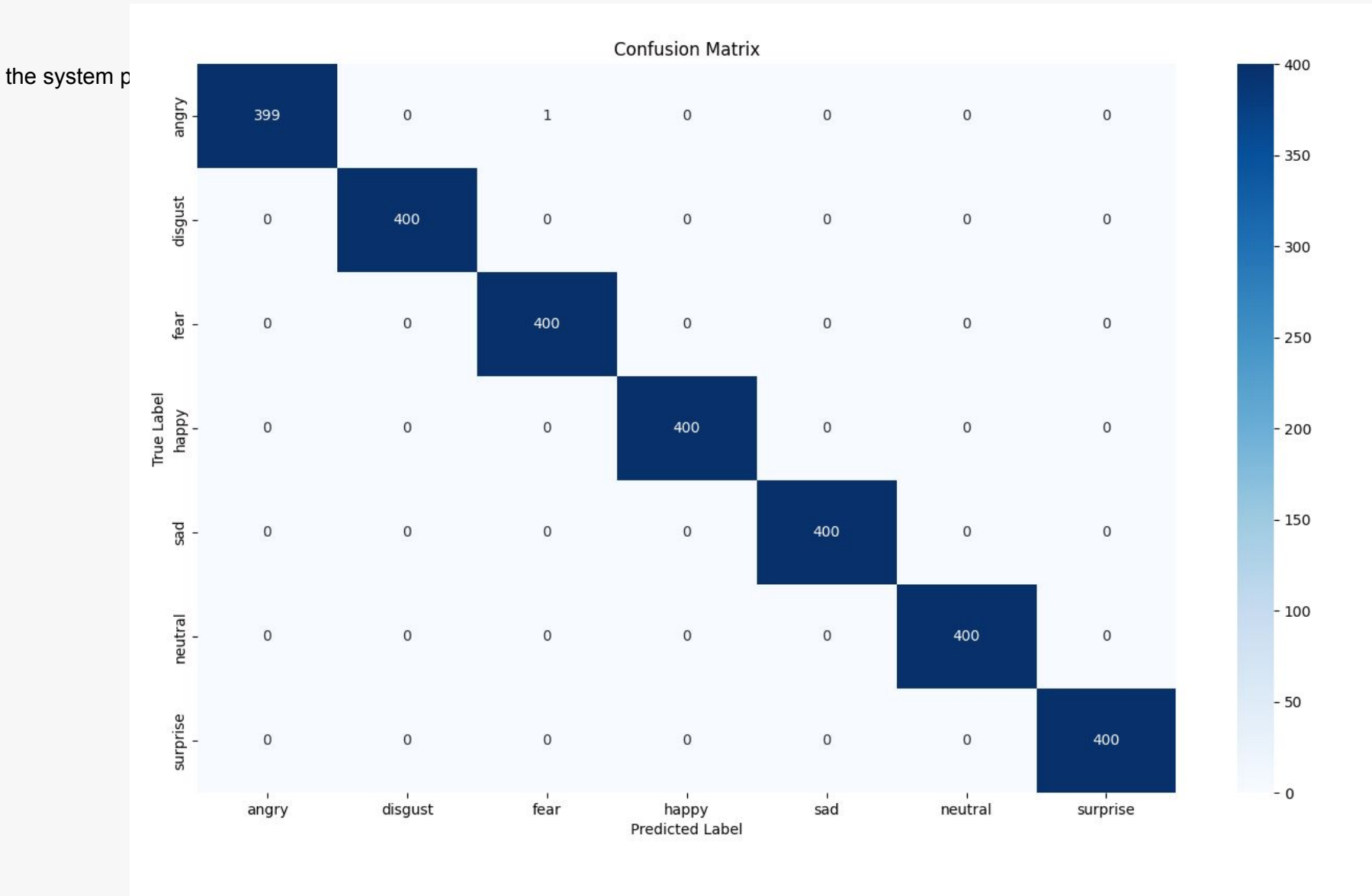
The overall prediction accuracy for this model is approximately 99% on KDEF testing set.

The Web app using the speech emotion recognition model categorizes the detected emotions and integrates them with self-reported mood logs for further analysis
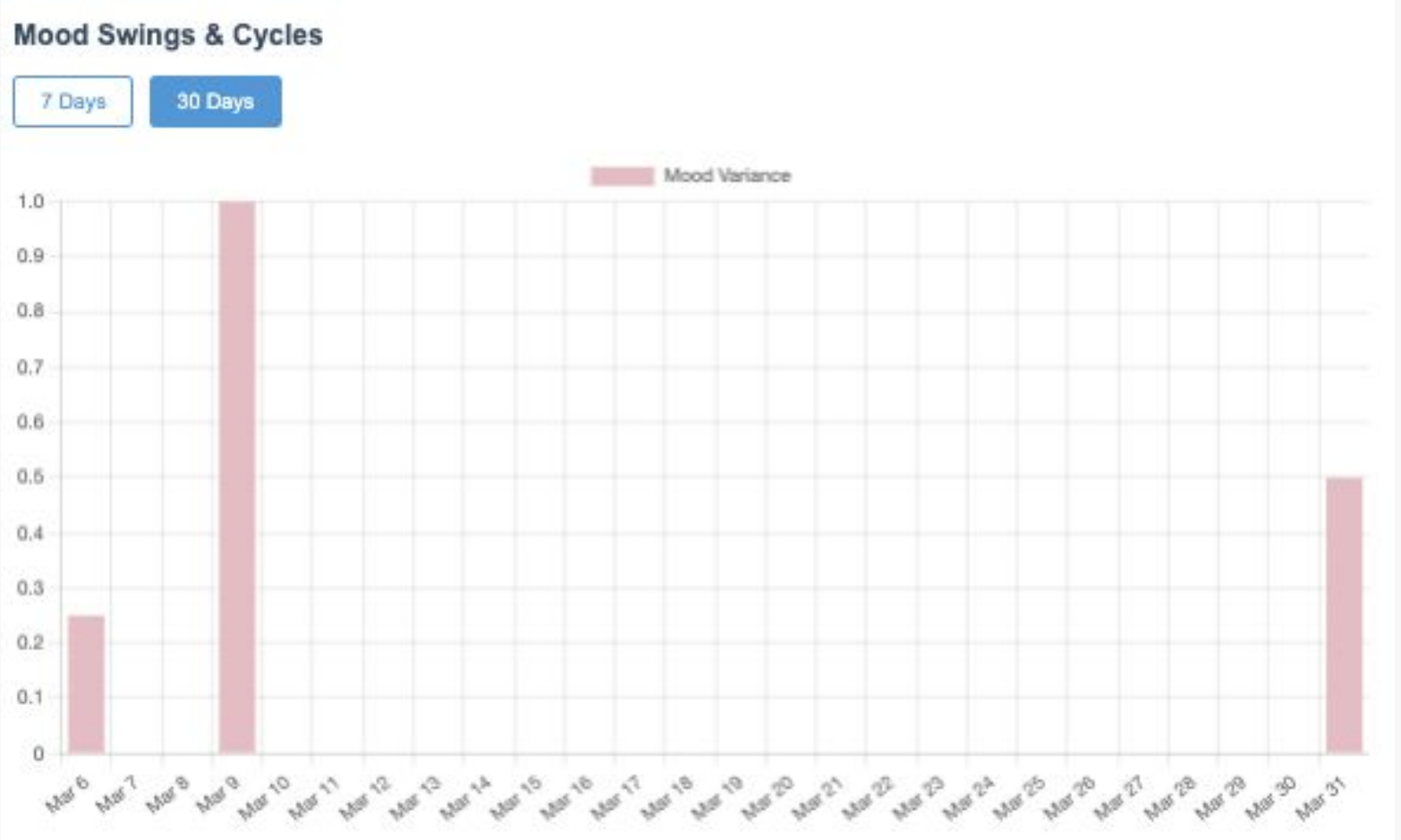
Mood Logging Layout

By integrating the daily self mood log could help confirm the accuracy of bipolar disorder mood analysis.
This logging data includes :
Mood Level , Hours of Sleep , Energy Level and Symptoms.
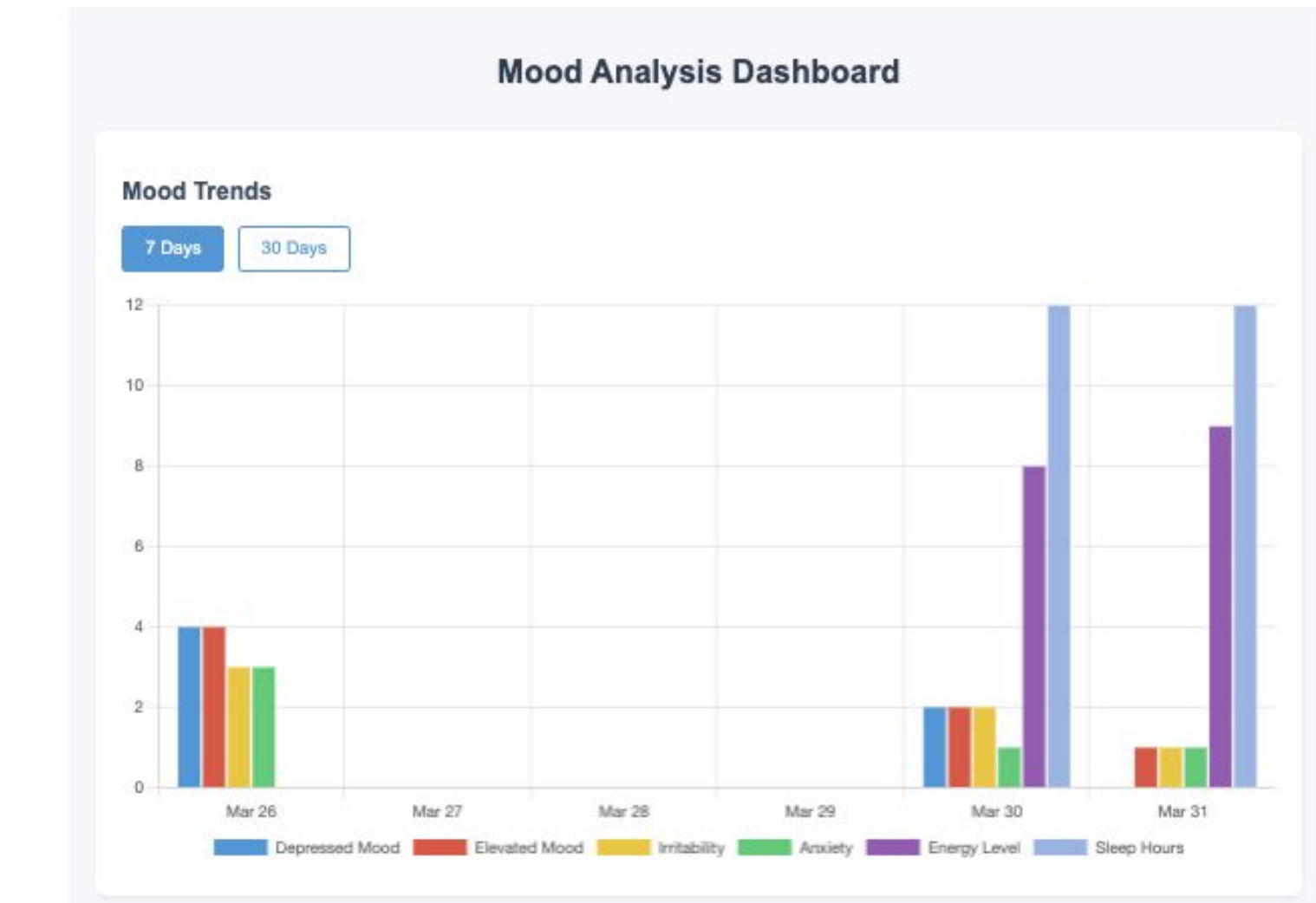
The Web app provided two layouts of 7 days and 30 days for users to keep track of their trends and status of mood.


By calculating of Daily Manic and Depressive Counts to measure mood swings to differentiate if the bipolar patients user is occurring rapid mood changes.

Dataset for Facial Expression Detection

I use FER2013 and CK+ as dataset and KDEF for testing set. By integrating the model in the web app to tune the model to work better in real world scenarios .

Methodology

Building a CNN with two blocks: the two blocks consist of two 3x3x32 same-padding and two 3x3x64 with same-padding ReLU convolutional layers followed by a 2x2 MaxPool layer. The model incorporates dropout layers for regularization and is completed with 2 fully connected layers and a seven-unit softmax output layer.
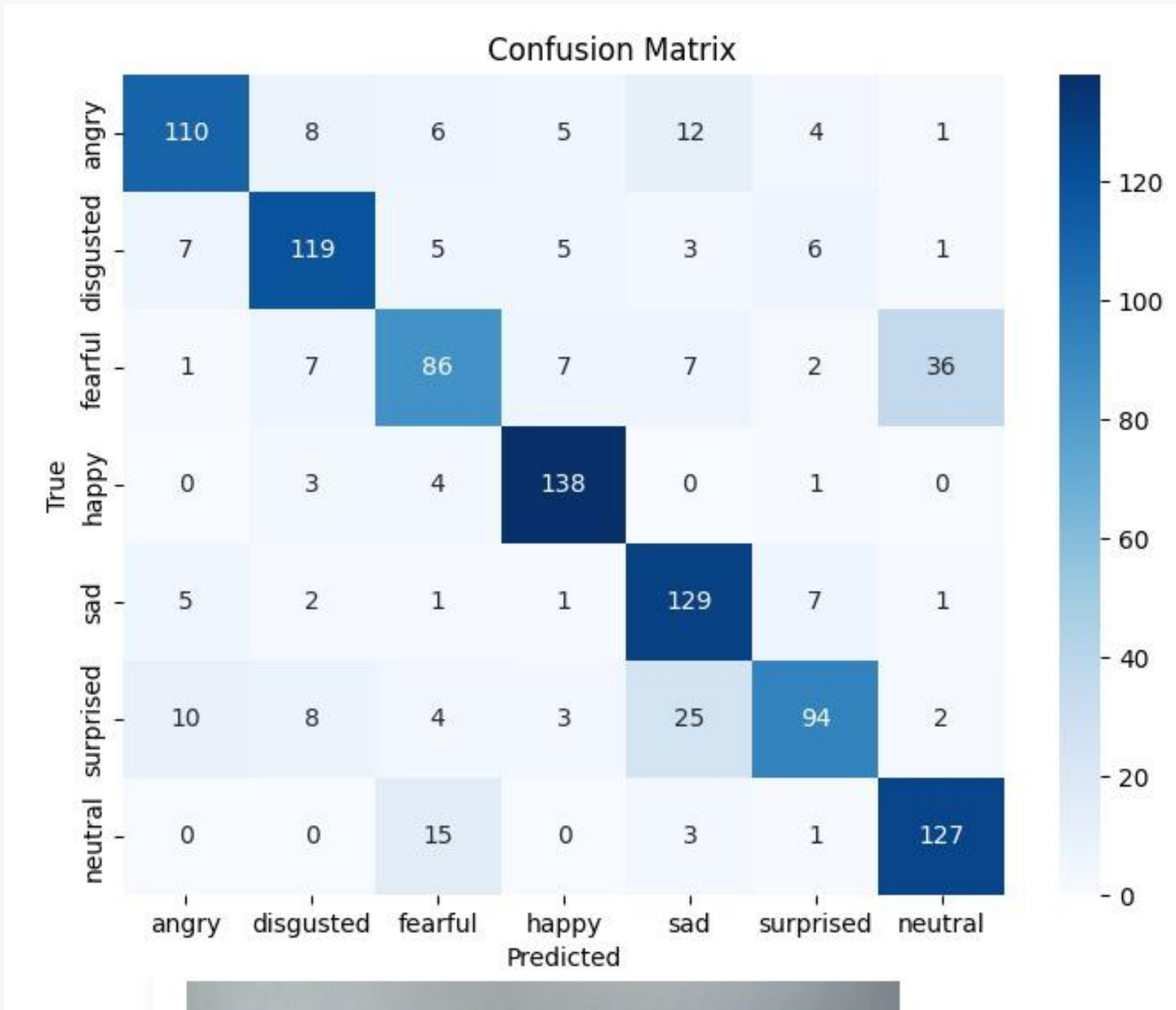
The overall prediction accuracy for this model is approximately 78.13% on KDEF testing set.

Happy -> 94% accuracy recognition

Sad -> 88% accuracy recognition

The real time detection will surrounded by rectangular enclosing box and show the detected emotion under the screen