Mood-Tunes

Deep Learning-Powered Music Recommendation

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Objective: Match your Tunes to your mood

Application Workflow:

1. User selects
    a. Image representing his mood
    b. Preferred language of playlist.
2. Detect mood for selected image
3. Recommend the playlist for detected mood.

Technologies Used

1. **Computer Vision**: Open CV (Image Processing)
2. **Deep Learning** :Tensorflow and Keras (CNN Model for mood detection)
3. **Data APIs**: YouTube Data API for Song Recommendations.
4. **Deployment**: Streamlit

Dataset & Challenges

Dataset *:

a. Train and test set consisting 48 x 48 gray scale images
b. 7 features indicating mood
c. Train Set has 28709 Images
d. Test Set has 7178 Images

* Source: https://www.kaggle.com/datasets/msambare/fer2013

Challenge：

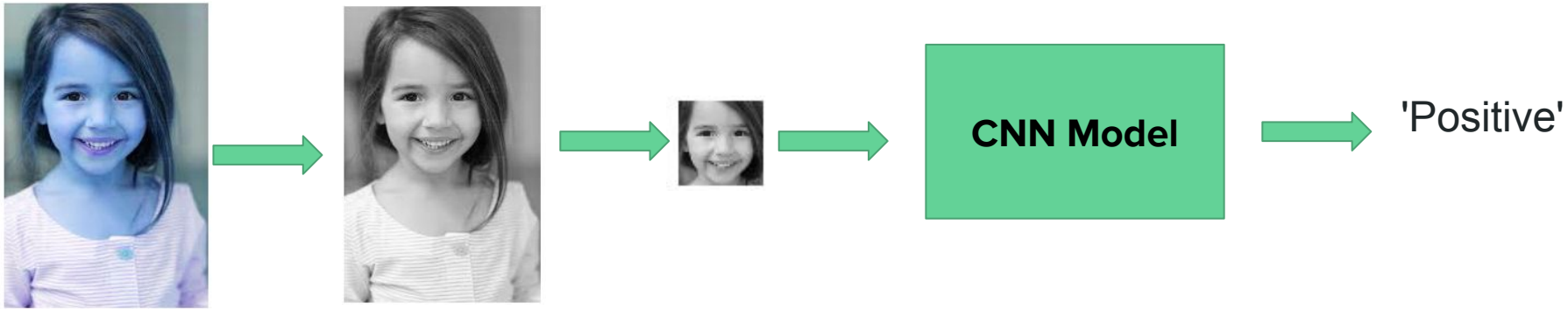
a. Some similar moods interfering with one another
b. For some classes insufficient data

Dataset Preprocessing

Label Merging: Classes labels are merged

1. Angry, Disgust, Fear, Sad = Negative
2. Happy, Surprise = Positive
3. Neutral = Neutral

Mood Detection Workflow



Some results for mood detection:

Prediction Class: Positive,
Confidence: 97.42%

Prediction Class: Negative,
Confidence: 95.94%

Prediction Class: Neutral,
Confidence: 80.97%

Music Recommendation

1. Detected Mood mapped to the suitable music category

   "Positive": "feel good music", "happy upbeat songs"

2. YouTube Data API fetches playlist

Result: Gives most popular Max. 5 playlists related to user’s mood.

Limitation: API Limitation and rate restriction with free tier.

Streamlit

moodtunes-dam7dxjjjnewvuxfb6mmpt.streamlit.app

Programming In A... | Image Processing... | SVN | Agentur | Frontend Dev | WBS | GitHub Dashboard | Problems - LeetCo... | StrataScratch - An... | All Bookmarks

Share

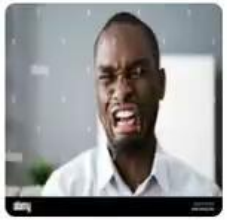
Welcome to Mood-Tunes 🎵

Pick a Vibe, Get a Playlist!

Please select language for your playlist?

English









Manage app

Future Improvements

1. Real time mood detection via webcam
2. Expanding beyond YouTube Data API

Thank You

Appendix

Original Dataset Information

happy: 7215 images

sad: 4830 images

fear: 4097 images

surprise: 3171 images

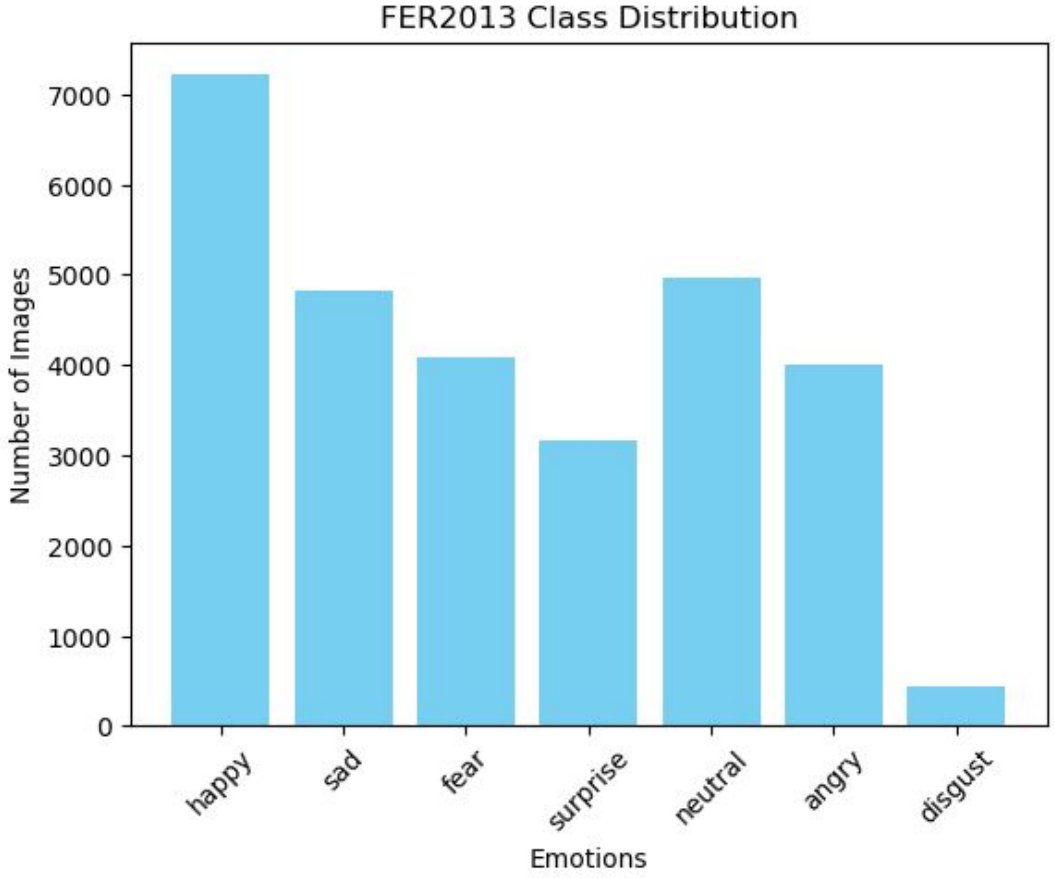
neutral: 4965 images

angry: 3995 images

disgust: 436 images

Imbalance Ratio: 0.06

The dataset is imbalanced.



Merged Labels Dataset Information

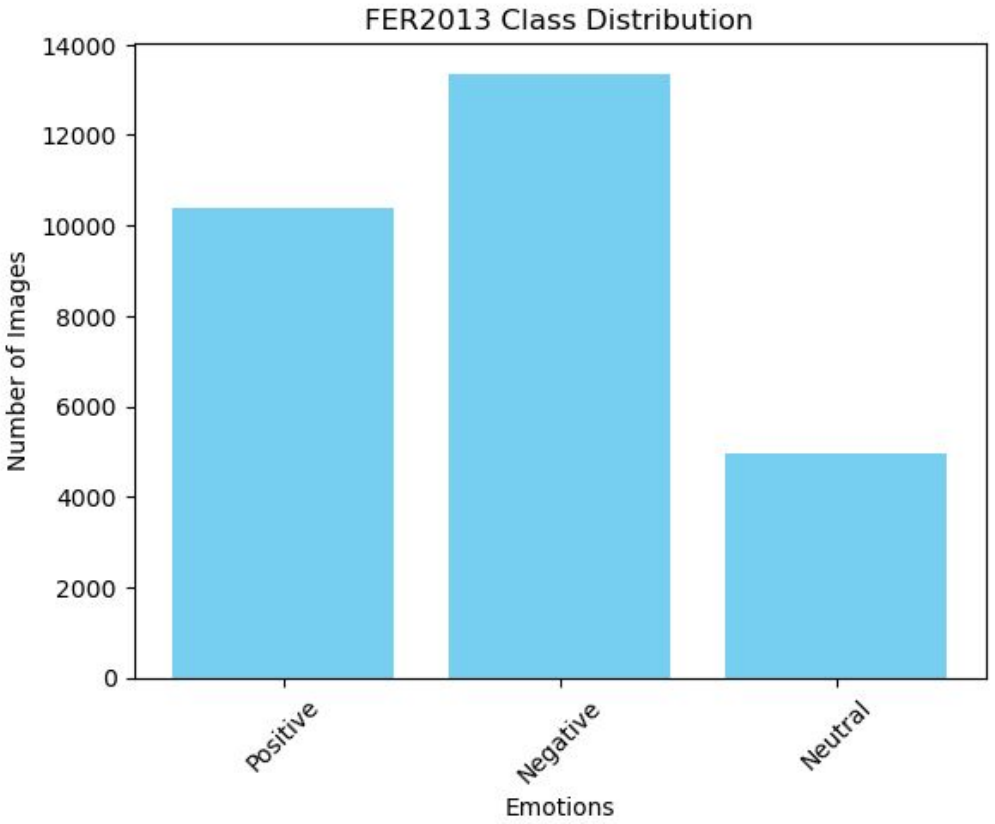
Positive: 10386 images

Negative: 13358 images

Neutral: 4965 images

Imbalance Ratio: 0.37

The dataset is imbalanced.



Face Detection

- Haar Cascade Model is used for face detection
  - Simple and fast
- Modern deep-learning-based face detectors
  - MTCNN
  - SDD
  - FaceNet
  - YOLO

CNN Model Details

Input
Preprocessed image

↓

Conv 2D (64, 128, 256, 512 filters)

↓

Pooling Layers

↓

Flatten Layer

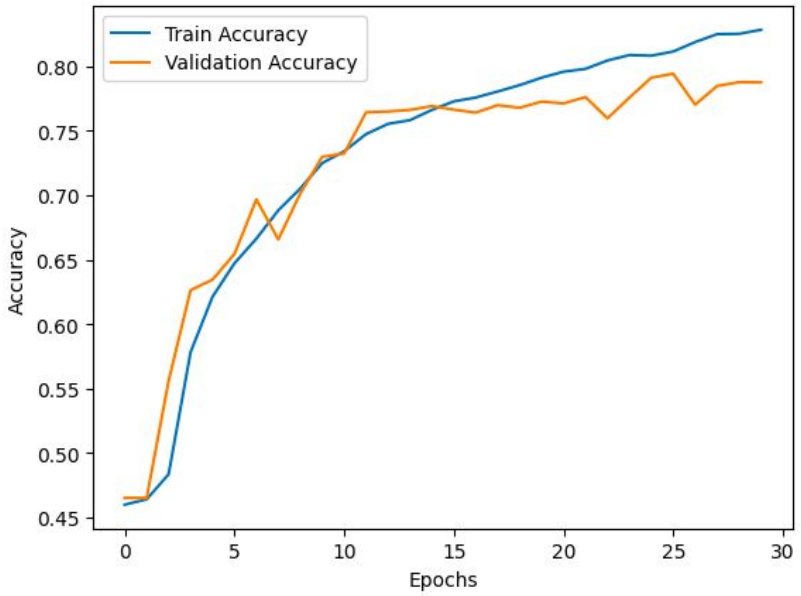
↓

Dense Layers

↓

Output Layer
(3 Classes)

```
accuracy: 0.8314 , loss: 0.4262
val_accuracy: 0.7874 , val_loss: 0.5390
```



Mood to Music Category Mapping

- Positive:
  - feel good music
  - happy upbeat songs
- Negative:
  - stress relief music
  - calm relaxing songs
- Neutral:
  - Lo-Fi Beats music
  - chill study music