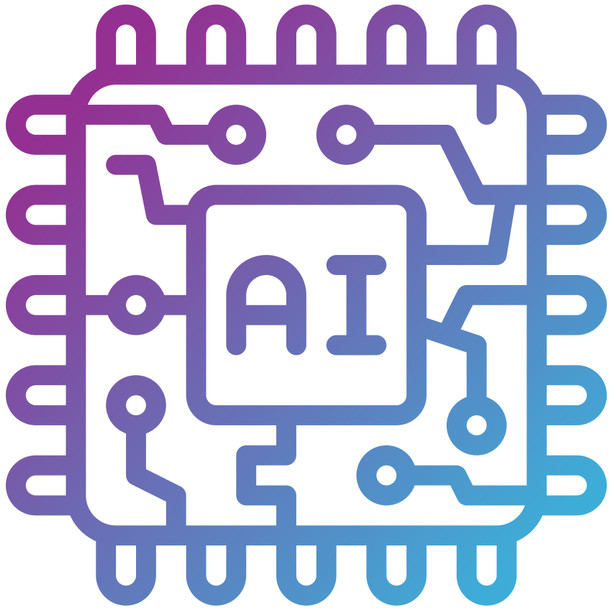
Music Recommendation System

Based on Facial Emotion & Sentiment Recognition by CNN and Random Forest Classifier

Faculty: Dr. Mohan R

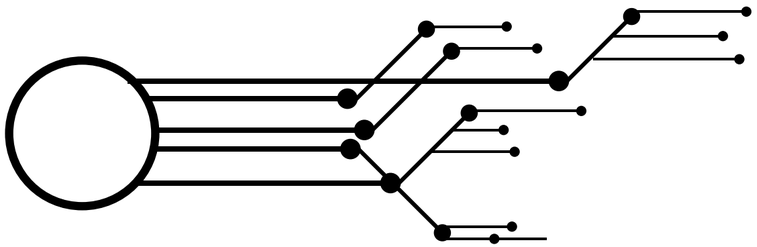
Recify

SUMMARY OF REVIEW-1



- Review 1 of the Recify project provides an insightful examination of its architecture and potential challenges. Recify aims to revolutionize music recommendation by leveraging facial emotion recognition and the Spotify API to deliver personalized playlists aligned with users' emotional states.
- The review underscores the project's objective to develop an emotionally intelligent music recommendation system. It emphasizes the importance of seamlessly integrating various components such as facial emotion recognition and continuous algorithm improvement.
- In summary, Review 1 provides valuable insights into the challenges and objectives of the Recify project, setting the stage for further development and refinement. It prompts the team to address potential biases, data limitations to create a robust and inclusive music recommendation system.

Introduction



- *Recify is a Music Recommendation Project combines the power of facial emotion and sentiment recognition with advanced machine learning techniques and the rich data available through the Spotify API.*

- *Music has the remarkable ability to evoke emotions and reflect our moods, and our project aims to leverage this by recommending personalized music playlists based on the user's facial expressions and emotional state.*

- By analyzing facial expressions and sentiments, our system identifies the user's current emotional state and suggests music tracks or playlists that align with their mood, creating a tailored and immersive listening experience.

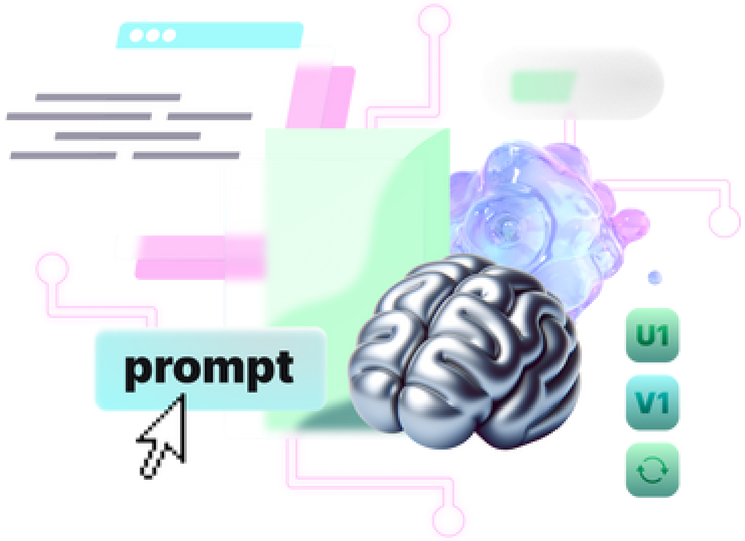
- Through integration with the Spotify API, users gain access to a vast library of music, ensuring diverse and relevant recommendations.

- This project represents an innovative approach to music recommendation, enhancing user engagement and satisfaction by delivering music that resonates with their emotions and sentiments in real-time.

OBJECTIVE OF RECIFY

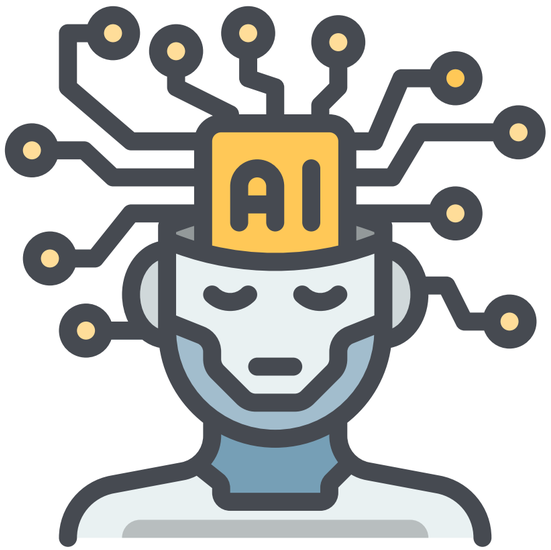
Create an emotionally intelligent music recommendation system that seamlessly integrates facial emotion recognition, sentiment analysis, personalized user preferences, real-time response capabilities, Spotify API integration, user feedback loops,intuitive user interfaces, and continuous algorithm improvement to provide tailored music recommendations that resonate with users' emotional states and preferences.

WORK DONE AFTER REVIEW-1



- The data was extracted and categorized based on different emotions from spotify as song playlists through spotify web API.
- In the context of facial emotion recognition, feature engineering involved extracting relevant features from facial images or videos, including facial landmarks, texture features with deep learning-based features extracted using pre-trained models like Convolutional Neural Networks (CNNs).
- Extensive testing and evaluation were conducted on various machine learning models to determine the most suitable approach for emotion recognition and music recommendation. After thorough testing, the Random Forest model was chosen as the best fit for the project's requirements.

- The code was custom built and modified for implementing the project and was tested several times.



- Improvements were made according to the results to enhance the song recommendations.

- A user friendly web interface was built to display the song recommendations.

- The UI design was guided by principles of simplicity, clarity, consistency, and intuitiveness. Clear navigation, visual hierarchy, and consistent design elements were prioritized to make the interface easy to use.

- The UI was designed to be responsive, ensuring optimal display and functionality across various devices and screen sizes. This included considerations for desktops, laptops, tablets, and mobile phones.

IMPLEMENTATION

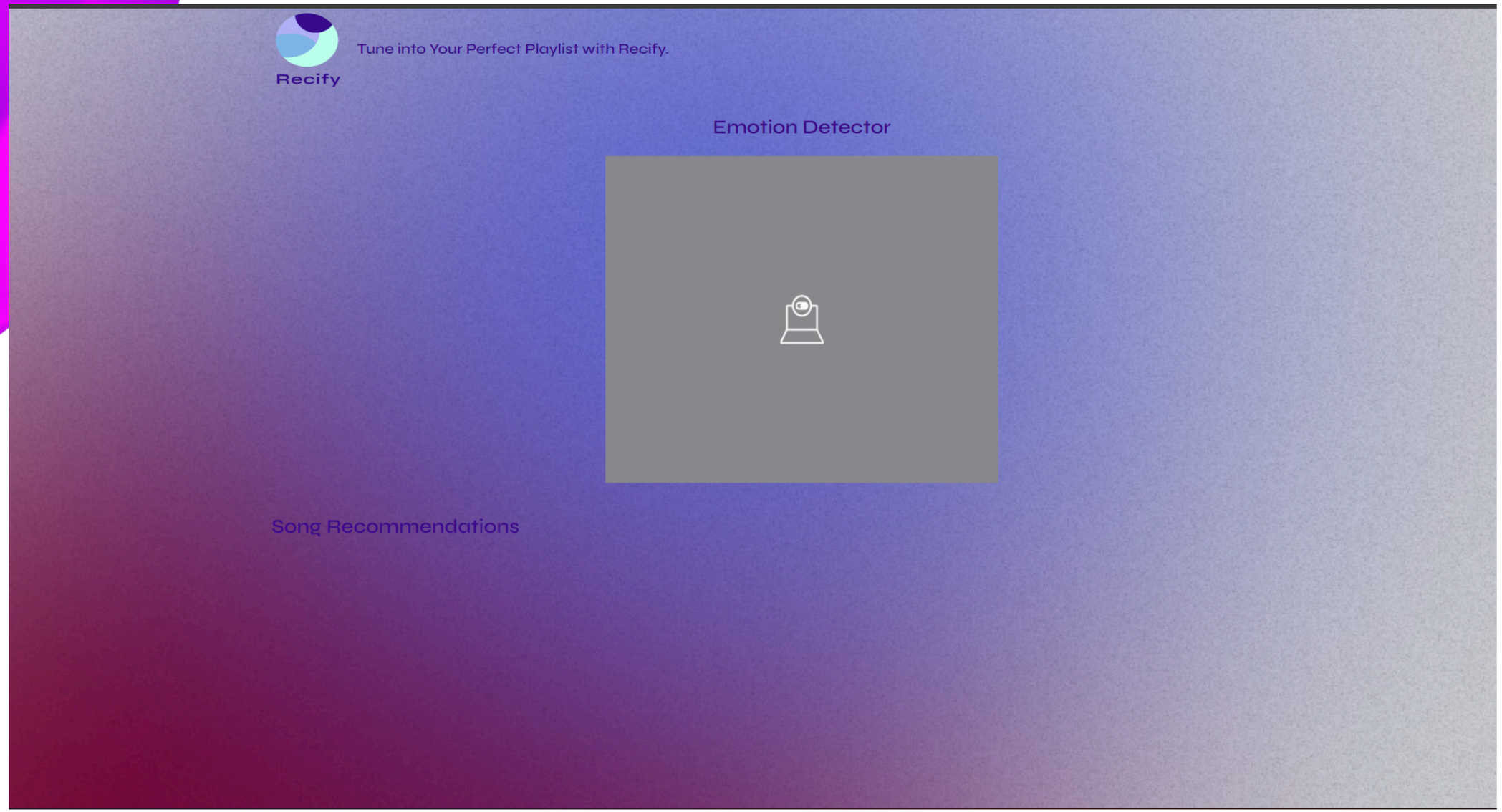
train.py

```
train_generator = train_datagen.flow_from_directory(
    train_dir,
    target_size = (48,48),
    batch_size = 64,
    color_mode = "grayscale",
    class_mode = 'categorical'
)

val_generator = val_datagen.flow_from_directory(
    val_dir,
    target_size = (48,48),
    batch_size = 64,
    color_mode = "grayscale",
    class_mode = 'categorical'
)

emotion_model = Sequential()

emotion_model.add(Conv2D(32, kernel_size=(3,3), activation='relu', input_shape = (48,48,1)))
emotion_model.add(Conv2D(64, kernel_size=(3,3), activation='relu'))
emotion_model.add(MaxPooling2D(pool_size=(2,2)))
emotion_model.add(Dropout(0.25))

emotion_model.add(Conv2D(128, kernel_size=(3,3), activation='relu'))
emotion_model.add(MaxPooling2D(pool_size=(2,2)))
emotion_model.add(Conv2D(128, kernel_size=(3,3), activation='relu'))
emotion_model.add(MaxPooling2D(pool_size=(2,2)))
emotion_model.add(Dropout(0.25))

emotion_model.add(Flatten())
emotion_model.add(Dense(1024, activation='relu'))
emotion_model.add(Dropout(0.5))
emotion_model.add(Dense(7, activation='softmax'))

emotion_model.compile(loss='categorical_crossentropy',optimizer=Adam(lr=0.0001, decay=1e-6),me
```

spotipy.py

```
import spotipy.oauth2 as oauth2
import pandas as pd
from sklearn.preprocessing import OneHotEncoder
from sklearn.ensemble import RandomForestClassifier
from sklearn.model_selection import train_test_split
client_id = 'ab411b28199d4ac0a55db7fc7af98521'
client_secret =  '13e175e5efc54993afb443a162aa54b5'
redirect_uri = 'http://localhost:8080/callback'
playlist_ids = {
    'Angry': '37i9dQZF1EIgNZCaOGb0Mi',
    'Disgusted': '37i9dQZF1E8KEaf5o7wGZB',
    'Fearful': '37i9dQZF1EIfMwRYymgnLH',
    'Happy': '37i9dQZF1EVJSvZp5AOML2',
    'Neutral': '4PFwZ4h1LMAOwdwXqvSYHd',
    'Sad': '37i9dQZF1DWSqBruwoIXkA',
    'Surprised': '7vatYrf39uVaZ8G2cVtEik'
}
def get_track_data(sp, playlist_id):
    track_data = []
    results = sp.playlist_tracks(playlist_id)
    for item in results['items']:
        track = item['track']
        name = track['name']
        album = track['album']['name']
        artist = track['album']['artists'][0]['name']
        emotion = playlist_ids_inv[playlist_id]
        track_data.append({'Name': name, 'Album': album, 'Artist': artist, 'Emotion': emotion})
    return pd.DataFrame(track_data)
def train_classifier(track_data):
    X = track_data[['Name', 'Album', 'Artist']]
    y = track_data['Emotion']
    encoder = OneHotEncoder()
    X_encoded = encoder.fit_transform(X)
    X_train, X_test, y_train, y_test = train_test_split(X_encoded, y, test_size=0.2, random_state=42)
    classifier = RandomForestClassifier(n_estimators=100, random_state=42)
    classifier.fit(X_train, y_train)
    return encoder, classifier
```

RESULT


Recify
Tune into Your Perfect Playlist with Recify.
Emotion Detector
Song Recommendations

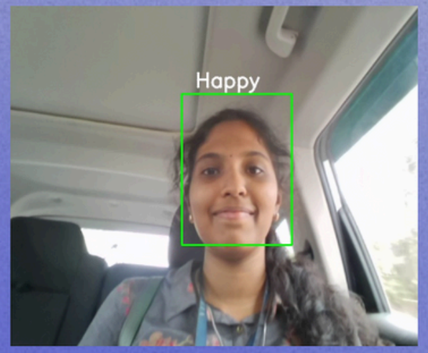
RESULT

Happy

Recify

Tune into Your Perfect Playlist with Recify.

Emotion Detector



Song Recommendations

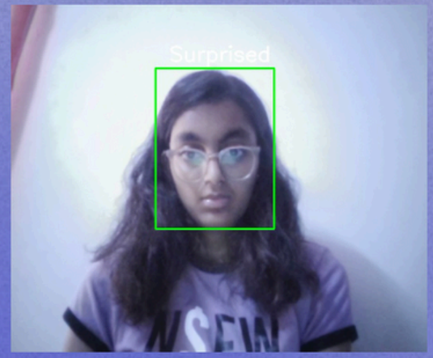
Name	Album	Artist
Beautiful Things	Fireworks & Rollerblades	Benson Boone
Cruel Summer	Lover	Taylor Swift
Unwritten	Unwritten	Natasha Bedingfield
Happy - From "Despicable Me 2"	G I R L	Pharrell Williams
Best Day Of My Life	Oh, What A Life	American Authors
Walking On Sunshine	Katrina & The Waves	Katrina & The Waves
Don't Worry Be Happy	Simple Pleasures	Bobby McFerrin
Hey, Soul Sister	Save Me, San Francisco (Golden Gate Edition)	Train
Classic	MKTO	MKTO
Here Comes The Sun - Remastered 2009	Abbey Road (Remastered)	The Beatles

Surprised

Recify

Tune into Your Perfect Playlist with Recify.

Emotion Detector

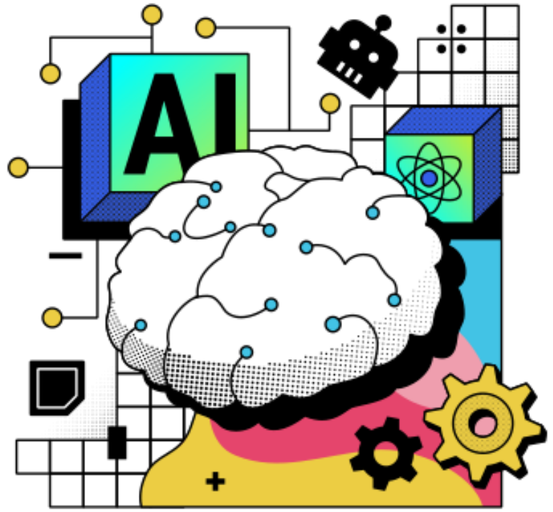


Song Recommendations

Name	Album	Artist
good 4 u	SOUR	Olivia Rodrigo
Todo De Ti	Todo De Ti	Rauw Alejandro
MONTERO (Call Me By Your Name)	MONTERO (Call Me By Your Name)	Lil Nas X
Yonaguni	Yonaguni	Bad Bunny
Kiss Me More (feat. SZA)	Kiss Me More (feat. SZA)	Doja Cat
Beggin'	Chosen	Måneskin
deja vu	SOUR	Olivia Rodrigo
Butter	Butter (Hotter, Sweeter, Cooler)	BTS
Levitating (feat. DaBaby)	Future Nostalgia	Dua Lipa
Peaches (feat. Daniel Caesar & Giveon)	Justice	Justin Bieber

CONCLUSION

- This project attempt to transform music recommendation systems with facial emotion detection and Spotify API integration; which aims to develop an emotionally intelligent music recommendation system.
- Through the analysis of facial expressions and sentiments, Recify aims to deliver personalized music playlists that align with users' emotional states and preferences. By leveraging advanced machine learning techniques and continuous algorithm improvement, the project strives to provide tailored recommendations that enhance user engagement and satisfaction.
- In conclusion, Recify has the potential to transform the way people discover and enjoy music by offering personalized recommendations that resonate with their emotions. It represents a significant step forward in the field of music recommendation systems and sets a high standard for innovation and user-centric design in the industry.



PRESENTED BY

RAHUL ASHOK-22BAI1082

PRAGATI MAHESHWARI-22BAI1072

B.AKASH-22BAI1018

M.KOPIKA-22BAI1109