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Google Gemini (Text Emotion Detection)

What is Gemini?
Gemini is a suite of large language models (LLMs) developed by Google DeepMind. It powers advanced conversational and generative tasks like text classification, summarization, content generation, and more. In this project, it's used for emotion detection from user input text.

Role in Moodify:
Gemini analyzes user-typed messages and classifies them into emotional categories such as joy, sadness, anger, or surprise. This emotional label is then used to suggest relevant music.

Key Features:
- API configuration via google.generativeai
- Predefined candidate emotions
- Zero-shot classification capabilities

Benefits:
- Accurate emotional understanding
- No training required
- Scalable and production-ready

Cautions:
- API key should be secured
- Subject to API limits or downtime

DeepFace (Facial Emotion Detection)

What is DeepFace?
DeepFace is an open-source facial analysis library for Python that supports face recognition and emotion detection using pre-trained deep learning models.

Role in Moodify:
It analyzes webcam input in real-time to detect emotions based on the user's facial expressions, such as happy, sad, angry, or neutral.

Key Features:
- Uses OpenCV for video capture
- Real-time emotion inference using DeepFace.analyze()
- Displays emotion on video feed using cv2.putText()

Benefits:
- High accuracy with pre-trained models
- No training needed
- Real-time detection

Cautions:
- Depends on webcam and lighting quality
- May lag on slower devices

YouTube Data API (Music Fetching)

What is the YouTube Data API?
This API allows programmatic access to YouTube data, enabling searches, video metadata retrieval, and more.

Role in Moodify:
After detecting the user's emotion, the app sends a search query to the YouTube API to fetch relevant music videos based on that mood.

Key Features:
- Searches based on emotion-mapped queries
- Retrieves video titles, thumbnails, and links
- Embeds YouTube videos in the app

Benefits:
- Access to a massive music library
- Easy integration and responsive content
- No need to host audio files

Cautions:
- Quota limits apply
- Search results can vary in relevance
- API key should be kept secure

Emotion Mapping (Query Translation)

What is Emotion Mapping?
It’s a way of translating detected emotional states into useful search queries or actions in the app.

Role in Moodify:
Maps each emotion to a specific search query for music. For example, "happy" → "happy Bollywood songs", "sad" → "emotional piano music".

Key Features:
- Dictionary-based query mapping
- Connects emotion detection to song fetching

Benefits:
- Provides logical and relevant song suggestions
- Easy to customize or localize
- Helps maintain consistency across mood types

Cautions:
- Can be rigid if hardcoded
- Needs regular tuning for user satisfaction