Bidding on [P2024-14] Body Language Detection-Based Emotionally Controlled Music Player

Bidder: TEAM2024.07

1. **Project Summary and Understanding:**

   It is important for people these days to have outlets to adjust their emotions and stress. Listening to music is one of them. People tend to listen to music that is contrary to the mood of their mood to get uplifted, or that fits the mood to get understanding.
   This project aims to develop an innovative music player that utilizes body language cues such as head movements, facial expressions, eye movements, and overall body posture to recognize the user's emotion in real time. Through generating a record, the system automatically creates a music playlist that can help adjust the user's mood, making it easier for them to get comfort. By analyzing these non-verbal signals through image and video processing techniques, the music player will automatically curate and control a personalized playlist that aligns with the user's current mood. This system will reduce the manual effort typically required to select music based on emotional needs, providing a seamless and intuitive user experience.

   The core components of this project involve but not limited to:

   - **Emotion Detection**: Implement algorithms to analyze video feeds and detect emotional states based on body language.
   - **Music Player Integration**: Create a music player that can interface with the detected emotions to dynamically adjust the playlist.
   - **User Customization**: Allow users to set preferences for how their emotional states influence music selection, thereby improving user satisfaction.

2. **Team Member and Project Matching Degree (letter):**

   Dear supervisor:

   Our team has a good knowledge of Python, database, UI, and all equipped with basic ideas of artificial intelligence, which is perfect fit for this project. We have a

strong willingness to learn further in image/video processing and machine learning algorithms for emotion detection, as well as equip ourselves with much knowledge in psychology.

Our advantages:

- Proficient in mainstream programming languages: Python, Java, SQLite
- Proficient in web designing skills: HTML, CSS, Python for frontend (streamlit) and backend (flask, Jinja2)
- Psychology as amateur interest, carefully studying for years

Our team members come from a well-known university and are all professional Computer Science students with rich industrial and research experience. We believe that our expertise and teamwork can bring excellent results to your project.

We look forward to further communication with you to discuss the specific needs of the project and details of cooperation. Thank you for considering our bid application and we look forward to hearing from you.

3. Envision Project Solutions:

The project can be divided into three main modular parts:

1. Emotion Detection Through Body Language

- Image acquisition: Design a system that captures and interprets body language, such as hand movements, facial expressions, eye movements, and gestures, which can deduce the user's emotional state.
- Data pre-processing: Including operations such as de-noising, cropping, normalization, etc., to improve the accuracy of subsequent emotion detection.
- Model choosing and training: Train AI models like CNN for deep learning through body language datasets to analyze the video and classify emotions in real-time. Focus on key emotions such as happiness, sadness, surprise, anger, etc.

2. Music Player Playlist Mapping and Control

- Integration with platforms like Spotify API to retrieve and play music based on emotional labels or use locally stored music library organized by emotion labels to generate playlists.
- Allow real-time control over music playback using gestures or body

movements, possible control like playing, pausing, next track.

3. **Customization Based on User Preferences for Different Strategies**
   Provide a settings panel where users can customize how their emotions affect the music selection, since users may have different gesture habits in the same emotion. Users can fine-tune which emotions trigger specific music genres or how the player should respond to certain gestures.

4. Project Management and Scheduling(timeline):

Task	Duration	Start Date	End Date (3 pm)
Create Git Repository		2024.10.8	
Announcement of Bidding Results (hypothetical)	1 week	2024.10.9	2024.10.16
Equipment requests	1 week	2024.10.16	2024.10.23
Completed Ethics forms	/	2024.10.16	2024.10.23 (? 10.31)
Team Project Website	1 week	2024.10.16	2024.10.23
Project Planning and Research	2 weeks	2024.10.23	2024.11.5
Emotion Detection Model Development	3 weeks	2024.11.6	2024.11.27
Interim Group Report (4000-5000 words)	**1 week**	**2024.11.28**	**2024.12.5**
Music Player Integration	2 weeks	2025.2.19	2025.3.5
User Interface Design	2 weeks	2025.2.19	2025.3.5
Testing, Debugging, and Refinement	2 weeks	2025.2.19	2025.3.5
Final Review and Documentation	2 weeks	2025.3.5	2025.3.19

Team final reports (7000-8000 words) and software	**3 weeks**	**2025.3.12**	**2025.4.2**
Recording of Software Demonstration/ Recording of Team Presentation/ Team Promotional Digital Artifact	**2 weeks**	**2025.3.26**	**2025.4.9**
Prepare (TBC) Open Day and Live Q&A (1min Intro)	1 week	2025.4.9	2025.4.16
Individual final reports (2000–2500 words)	2 weeks	2025.4.8	2025.4.22

5. Possible Equipment Requirements:

- ✓ **Computers/Laptops**: For development and testing of the software.
1. **Webcams or Cameras**: To capture video input for emotion detection.
2. **Microphones (Optional):** Audio analysis such as tone of voice is included in emotion detection.
3. **Development Tools**: Python programming environment, libraries (PyTorch, OpenCV, TensorFlow, Keras, etc.), and music player APIs.
4. **Testing Devices**: Various devices (smartphones, tablets, etc.) to test the music player interface and functionality.
5. **Cloud Services**: For hosting the application and managing data storage if necessary