**One-Pager: Movie Recommendation Based on Facial Expressions**

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**Problem or Idea Description**

The objective is to develop a novel machine learning model for recommending movies based on facial expressions. Emotions play a crucial role in the enjoyment of movies, and our proposed solution aims to leverage facial expression recognition to enhance the personalized movie recommendation system.

**Background Information**

Understanding user emotions during movie-watching can significantly improve the overall entertainment experience. Existing recommendation systems often rely on viewing history, genre preferences, and user ratings. Incorporating facial expression analysis can provide a real-time emotional context, offering more accurate and personalized movie suggestions.

**Available Solutions with Links**

• IMDb: <https://www.imdb.com/> IMDb is a popular platform for movie information and ratings. However, it primarily relies on user reviews, ratings, and general preferences rather than real-time facial expression analysis.

• Netflix Recommendation System: <https://help.netflix.com/> Netflix employs a recommendation system based on user behavior and preferences, but it does not currently integrate facial expression analysis.

• IEEE Xplore (Additional): <https://ieeexplore.ieee.org/abstract/document/8653953> This paper discusses a relevant topic in the domain of emotion-aware movie recommendations, providing additional insights into the field.

• Zhang et al. (2022): [LinktoPaper](https://ieeexplore.ieee.org/abstract/document/8653953) Zhang et al. developed a deep learning model for emotion prediction in movie-watching scenarios. Their work focuses on real-time emotion analysis during film consumption.  
  
  
**How to Get the Data**

For the successful development of our machine learning model that recognizes facial expressions and recommends movies based on emotional responses, access to quality datasets is crucial. These datasets will enable the model to learn from a wide array of facial expressions and correlate them with movie preferences. Here's how we can obtain the data for this project:

Facial Expression Recognition (FER2013): The FER2013 dataset is a widely recognized dataset containing images of facial expressions categorized into seven emotions: anger, disgust, fear, happiness, sadness, surprise, and neutral. These images are essential for training the model to accurately recognize different facial expressions. We can access the FER2013 dataset through Papers with Code at <https://paperswithcode.com/dataset/fer2013>. This link provides detailed information about the dataset, including its structure and how it can be used for training machine learning models in emotion recognition.

MovieLens 20M Dataset: For movie recommendations based on the detected emotions, the MovieLens 20M dataset offers a comprehensive collection of movie ratings and metadata, which can be utilized to understand user preferences and recommend movies accordingly. Specifically, the movie.csv file within this dataset provides details on movie titles and genres, which are vital for matching movies to emotional states. We can access the MovieLens 20M dataset on Kaggle at <https://www.kaggle.com/datasets/grouplens/movielens-20m-dataset?select=movie.csv>. This link directs us to the dataset's page where we can download the movie.csv file and explore other related data files.

**Brief Description of Our Solution**

Our solution is based on a movie recommendation system that responds to the emotional mood of the viewer. Using facial expression analysis, our machine learning model determines the viewer's current emotional state. Using this information, the system recommends films that match the viewer's emotional mood. This approach is to create a personalized and immersive movie viewing experience by selecting recommendations based on the user's emotions in real time. By increasing user satisfaction, our system ensures that the recommended films will match and complement the viewer's emotional preferences, providing a unique and enjoyable cinematic journey.

**Tech Stack**

Programming Languages: Python, JavaScript(for capturing images from the webcam)

Machine Learning Frameworks: TensorFlow

Data Processing: Pandas, NumPy

Facial Expression Analysis: OpenCV

Data Visualization: Matplotlib

Data Storage and Access: Google Colab (for Google Drive integration)

Development Environment: Google Colab

Model Evaluation and Management: Sklearn (for train/test split), Keras Callbacks (for model checkpointing and early stopping)

**Any Additional Necessary Information**

As the project progresses, collaboration with psychologists and user experience experts may be explored to refine the emotional categorization and improve the accuracy of movie recommendations. Continuous feedback and user testing will be crucial in enhancing the model's performance.