MINI-PROJECT REPORT

EMOFLIX
MOVIE RECOMMENDATION SYSTEM USING EMOTION DETECTION

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in partial fulfillment of the requirements for the award of the degree in

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at

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(Affiliated to APJ Abdul Kalam Technological University, Kerala)

DEPARTMENT OF COMPUTER APPLICATIONS

CERTIFICATE

This is to certify that the project work entitled **"EMOFLIX - MOVIE RECOMMENDATION SYSTEM USING EMOTION DETECTION"** is a Bonafide record of the work done by **Mr.ARUN SHANKAR S**, Reg No **LMC23MCA-2015**, student of Department of Computer Applications, Lourdes Matha College Of Science And Technology, Kuttichal, Thiruvananthapuram, affiliated to the APJ Abdul Kalam Technological University, Kerala from August 2024 to November 2024 in partial fulfillment of the requirements for the award of the Degree of Master of Computer Applications from APJ Abdul Kalam Technological University, Kerala.

Prof. Sherin Joseph
(Internal Guide)

Date:

Internal Examiner
Department of Computer Applications, LMCST

Prof. Bismi K Charleys
(Head of the Department)

DECLARATION

I undersigned here by declared that the project report **"EMOFLIX - MOVIE RECOMMENDATION SYSTEM USING EMOTION DETECTION"** submitted for partial fulfillment of the requirements for the award of degree of Master of Computer Applications of the APJ Abdul Kalam Technological University, Kerala. This submission represents my idea in my own words and, I have adequately and accurately cited and referenced the original sources. I also declare that I have adhered to ethics of academic honesty and integrity and have not misrepresented or fabricated any data or idea or fact of source in my submission. I understand that any violation of the above will be a cause for disciplinary action by the institute and/or the University.

Place: TRIVANDRUM ARUN SHANKAR S

Date:

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An endeavour over a long time can be successful only with advice and support of many well-wishers. I wish to place on record my profound indebtedness and gratitude to all those who have contributed directly or indirectly to make this project work a success.

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CONTENTS

Abstract

This project presents an innovative movie recommendation system that combines facial expression recognition and user preferences to suggest movies tailored to the user's current emotional state. The system captures real-time video using a webcam and employs a deep learning-based Convolutional Neural Network (CNN) to detect facial emotions such as Happy, Sad, Angry, Surprise, and more. Additionally, user preferences is used to better understand the user's preference for more accurate recommendations.

Based on the detected emotion and sentiment, the system maps emotions to appropriate movie genres — for example, "Happy" suggests Comedy, while "Fear" suggests Thriller. Users can further refine their preferences by entering their desired language and favorite actor. The application, dynamically generates movie search queries that align with the user's mood and input. This dual approach, combining emotion detection with sentiment analysis, creates a highly personalized and engaging movie recommendation experience.

CHAPTER 1

INTRODUCTION

1.1 GENERAL INTRODUCTION

Movie recommendation systems typically rely on user preferences and viewing history, but they often miss the influence of a user's current emotional state. This project introduces a system that combines facial expression recognition with personalized preferences to offer movie suggestions based on both mood and individual tastes.

By analyzing real-time facial expressions, the system detects emotions and maps them to appropriate genres, while also factoring in user preferences like language and favorite actors for a more tailored experience. This approach aims to enhance movie discovery by making recommendations more intuitive and personalized.

1.2 GOAL OF THE PROJECT

This project presents an innovative movie recommendation system that combines facial expression recognition and user preferences to suggest movies tailored to the user's current emotional state. The system captures real-time video using a webcam and employs a deep learning-based Convolutional Neural Network (CNN) to detect facial emotions such as Happy, Sad, Angry, Surprise, and more. Additionally, user preferences is used to better understand the user's preference for more accurate recommendations.

Based on the detected emotion and sentiment, the system maps emotions to appropriate movie genres — for example, "Happy" suggests Comedy, while "Fear" suggests Thriller. Users can further refine their preferences by entering their desired language and favorite actor. The application, dynamically generates movie search queries that align with the user's mood and input. This dual approach, combining emotion detection with sentiment analysis, creates a highly personalized and engaging movie recommendation experience.

CHAPTER 2

LITERATURE SURVEY

2.1 STUDY OF SIMILAR WORK

- ✧ Zhang et al. (2019): Addressed challenges in real-time emotion detection, developing more robust algorithms to improve accuracy in diverse environments.
- ✧ Pantic et al. (2005): Used facial expression recognition to map emotions to specific movies genres,such as recommending comedies for happiness and dramas for sadness, refining genre-based suggestions.

2. 1 EXISTING SYSTEM

Existing movie recommendation systems primarily rely on two traditional approaches: collaborative filtering and content-based filtering. However, these methods do not account for the user's emotional state, which can significantly influence their movie preferences at any given moment. Several studies have explored ways to enhance recommendation accuracy by integrating emotional data with user preferences.

2.2 DRAWBACKS OF EXISTING SYSTEM

1. **Cold Start Problem**: Struggle to provide accurate recommendations for new users or newly added movies due to a lack of data.

2. **Static Recommendations**: Rely heavily on past user behavior and preferences, failing to adapt to real-time factors like a user's current mood or sentiment.

3. **Lack of Real-Time Personalization**: Existing systems do not dynamically adapt to a user's real-time emotional state, which can affect their current viewing preferences.

4. **Limited Personalization**: Lack consideration of dynamic, real-time context (e.g., emotional state), reducing the relevance of recommendations.

Existing systems are effective but fail to provide real-time, emotion-based personalization, highlighting a need for more adaptive approaches that can consider users' real-time emotions and sentiments.

CHAPTER 3

OVERALL DESCRIPTION

3.1 PROPOSED SYSTEM

Our proposed system leverages real-time emotion detection through facial analysis and user preference to provide highly personalized movie recommendations. Key features include:

1. **Emotion Detection:** Uses a deep learning model to analyze facial expressions via a webcam and determine the user's current emotional state (e.g., happy, sad, angry).

2. **Sentiment Analysis:** Incorporates text input sentiment analysis to further refine user context and preferences.

3. **Dynamic Recommendations**: Combines detected emotions and text sentiment with user-defined filters like language and actor preferences to generate movie suggestions in real-time.

4. **Enhanced User Experience:** Adapts to the user's immediate mood and sentiment, offering more relevant and satisfying movie choices.

3.2 FEATURES OF PROPOSED SYSTEM

The proposed movie recommendation system integrates emotion detection with user preferences to offer highly personalized and dynamic suggestions. Key features include:

1. **Emotion Detection via Facial Expression Analysis**:
   The system uses a Convolutional Neural Network (CNN) to analyze real-time facial expressions captured by a webcam. This allows the system to detect the user's current emotional state, such as happy, sad, angry, or surprised. The CNN model is trained on large datasets of facial expressions to ensure high accuracy and reliable emotion recognition.
2. **User Preference Integration**:
   Users can provide additional context through text input, such as preferred movie genres, languages, or favorite actors. This input allows the system to further refine movie recommendations according to the user's explicit preferences, ensuring suggestions are tailored to both mood and personal tastes.
3. **Dynamic Recommendations**:
   By combining the detected emotional state with user-defined filters, such as preferred genres,

language, or actor, the system generates dynamic movie recommendations. This allows the system to adapt in real-time, offering more relevant suggestions based on the user's mood and preferences.

4. **Enhanced User Experience**:
   The system's ability to respond to the user's immediate emotional state leads to a more personalized experience. For example, if a user appears happy, the system may suggest comedies, while if the user is sad, it may recommend feel-good or uplifting films. This dynamic adjustment creates a more engaging and satisfying movie selection process.
5. **High Accuracy**:
   The system's accuracy is largely driven by the use of advanced deep learning techniques, particularly CNNs, for emotion detection. These models are trained on large, diverse datasets to recognize facial expressions accurately in varied real-world conditions, such as different lighting and angles.
6. **Real-Time Adaptability**:
   The system offers real-time adaptability by continuously updating movie suggestions as the user's emotional state or preferences change. This makes the recommendations more responsive to the user's immediate mood, creating a more interactive and intuitive movie discovery experience.

3.3 FUNCTIONS OF PROPOSED SYSTEM

1. **Image Feature Extraction**:
   The system extracts facial features from images captured via a webcam to identify key aspects of facial expressions.
2. **Fine-Tuning the CNN Model**:
   The CNN model is fine-tuned with specialized data to improve emotion detection accuracy in diverse real-world conditions.
3. **Emotion Classification**:
   The system classifies the user's emotional state (e.g., happy, sad, angry) based on the extracted facial features.
4. **Real-Time Movie Recommendation Based on Mood and Preferences**:
   Movie recommendations are generated in real-time by combining detected emotions and user preferences like genre and actors.

5. **Dynamic Adaptation**:
   The system continuously updates recommendations as the user's mood and preferences change, ensuring relevance and personalization.

3.4 REQUIREMENT SPECIFICATIONS

1. A webcam for capturing real-time facial images.
2. Deep learning libraries (e.g., TensorFlow, Keras) for emotion detection, and a movie database for recommendations.
3. Simple and effective user interfaces
4. Cost effective.
5. Minimum time needed for processing
6. Recommendation Engine.
7. Facial Expression Dataset.

3.5 FEASIBILITY ANALYSIS

feasibility study evaluates the proposed system's workability, impact on the organization, ability to meet user needs, and effective use of resources. Before development, a new project typically undergoes this study to determine if it will serve the organization's goals, given the required effort, time, and resources. The feasibility study helps developers foresee the project's future and its practical application. While all projects are technically feasible with unlimited resources and time, the development of computer-based systems often faces constraints such as limited resources and tight deadlines. Feasibility and risk analysis are interconnected, as higher project risks can decrease the likelihood of delivering high-quality software on time.

3.5.1 ECHNICAL FEASIBILITY

Technical feasibility centres on existing system and to what extent it can support proposed modifications. It involves financial enhancement. This evaluation determines whether the technology needed for the proposed system is available or not. This is concerned with specifying satisfy the user requirements. The technical needs of the system may include front-end and backend-selection .An important issue for the development of a project is the selection of suitable front-end and backend. Based on some aspects, we select the most suitable platform that suits the needs of the organization.

3.5.2 OPERATIONAL FEASIBILITY

The present system is easily understandable. The users are presented with friendly user interface that helps them to understand the flow of the system more easily. Maximum transparency has been provided. The new system is very much user friendly and operational cost is bearable. The maintenance and working of the new system needs less human efforts. The proposed project is beneficial to the organization.

3.5.3 ECONOMICAL FEASIBILITY

Economic feasibility is used to determine the benefits and savings expected from the Candidate system and to compare them with costs incurred. If benefits outweigh cost, then decision will be to design and implement system. Otherwise, alterations will have to be made to the proposed system. The proposed system is economically feasible.

3.5.4 BEHAVIOURAL FEASIBILITY

The behavioral feasibility of the system is highly positive. Users are expected to embrace the system due to its convenience, offering real-time movie recommendations based on mood and preferences. The system's ability to provide personalized suggestions and adapt to user emotions aligns with modern expectations for dynamic, user-centric technology. Users are likely to prefer this system over traditional static recommendation systems, which may not account for their current emotional state. Additionally, the user-friendly interface and seamless experience make the system easy for users to interact with, ensuring it is behaviorally feasible and well-received by all stakeholders

CHAPTER 4

OPERATING ENVIRONMENT

4.1 Hardware Requirements

- Processor : Intel (R) Core i3
- Speed : 2.4 Ghz
- RAM : 8GB
- Hard Disk : 200 GB
- Key Board : Standard Windows Keyboard
- Mouse : Two or Three Button Mouse
- Monitor : SVGA

4.2 Software Requirements

- Operating System : Windows 10/11
- Application Server : Tomcat 8.X
- Front End : HTML,Streamlit
- Python Version : Python 3 or above

4.3 TOOLS AND PLATFORMS

4.3.1 PYTHON

Python is a high-level, interpreted programming language known for its simplicity and versatility. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming. Python's readability and ease of learning make it a popular choice for beginners and experts alike. It is widely used in various domains such as web development, data analysis, machine learning, artificial intelligence, automation, and scientific computing. Python has a rich ecosystem of libraries, such as NumPy, pandas, matplotlib, TensorFlow, and Scikit-learn, which further enhance its capabilities in data manipulation, analysis, and modeling.

4.3.2 JUPYTER NOTEBOOK

Jupyter Notebook is an open-source web application that allows you to create and share documents containing live code, equations, visualizations, and narrative text. It is widely used for interactive computing and data analysis. Jupyter supports many programming languages, but it is most commonly used with Python. It allows users to write and execute Python code in a step-by-step, modular way, which is particularly useful for data scientists, researchers, and educators. Jupyter Notebooks also integrate seamlessly with libraries like Matplotlib and seaborn for data visualization, making it an essential tool for data exploration and analysis. It allows easy sharing of work through interactive documents, making it an effective tool for collaboration.

4.3.3 CONVOLUTIONAL NEURAL NETWORKS (CNNS)

A Convolutional Neural Network (CNN) is a deep learning model commonly used for image recognition and visual tasks. CNNs automatically learn spatial hierarchies of features, making them effective for tasks like classification, detection, and segmentation.

Key Components:

1. Convolutional Layer: Applies filters to the input image to extract features (e.g., edges, textures).
2. Activation Function (ReLU): Introduces non-linearity by turning negative values to zero.
3. Pooling Layer: Reduces the spatial size of the feature maps (e.g., Max Pooling, Average Pooling).
4. Fully Connected Layer: Performs high-level reasoning and decision-making.
5. Softmax Layer: Converts output into probabilities, especially for classification tasks.

CHAPTER 5

DESIGN

5.1 SYSTEM DESIGN

System Design involves translating system requirements and conceptual design into technical specifications and general flow of processing. After the system requirements have been identified, information has been gathered to verify the problem and after evaluating the existingsystem, a new system is proposed.

System Design is the process of planning of new system or to replace or complement an existing system. It must be thoroughly understood about the old system and determine how computers can be used to make its operations more effective.

System design sits at technical the kernel of system development. Once system requirements have been analysed and specified system design is the first of the technical activities-design, code generation and test- that required build and verifying the software. System design is the most creative and challenging phases of the system life cycle. The term design describes the final system and the process by which it is to be developed.

System design is the high-level strategy for solving the problem and building a solution. Systemdesign includes decisions about the organization of the system into subsystems, the allocation of subsystems to hardware and software components and major conceptual and policy decisionthat forms the framework for detailed design.

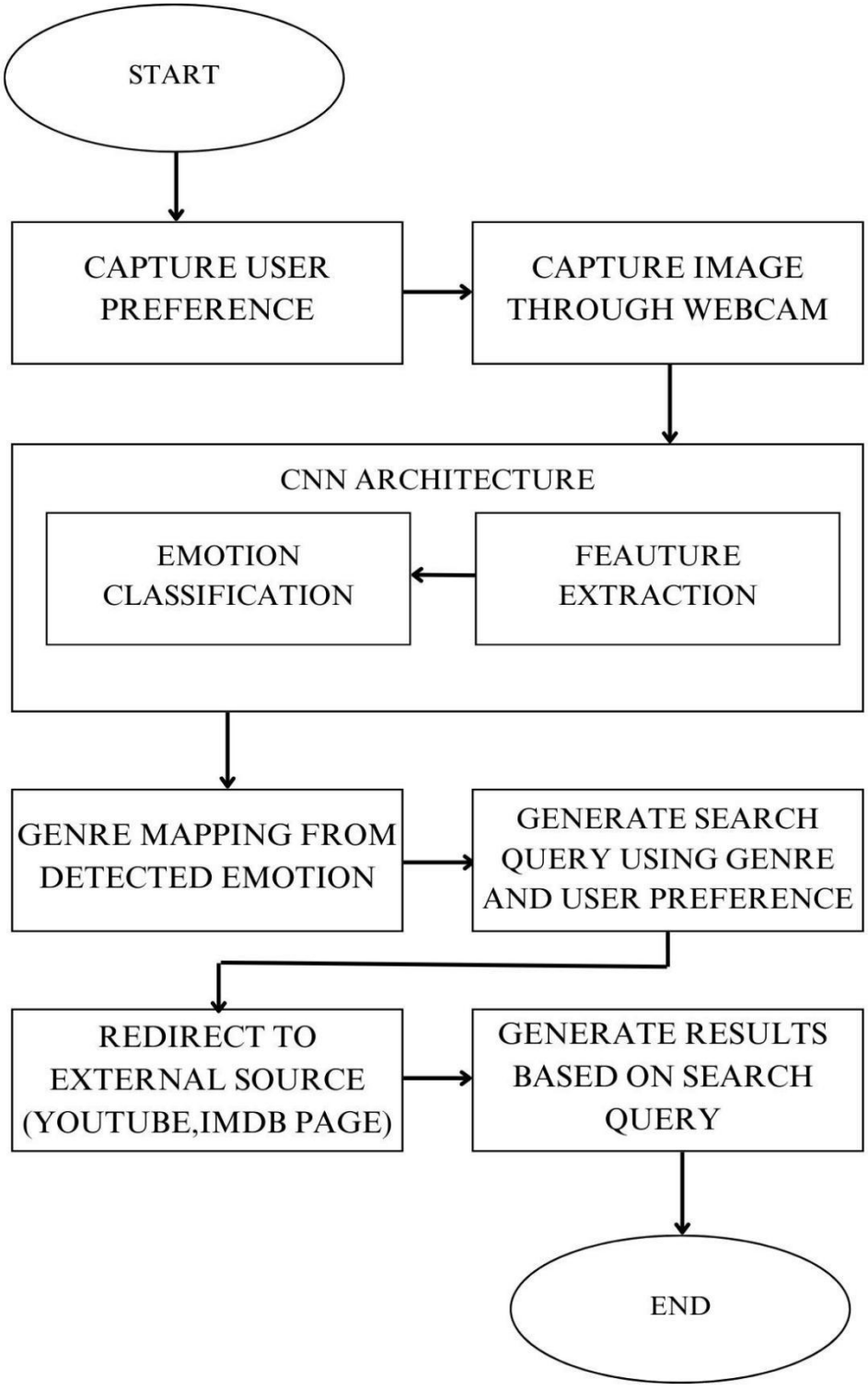
There are two levels of system design:

- Logical design.
- Physical design.

In the logical design, the designer produces a specification of the major features of the systemwhich meets the objectives. The delivered product of logical design includes current requirements of the following system components:

- Input design.
- Output design.

5.2 WORK FLOW DIAGRAM



5.3 INPUT DESIGN

The input design is the process of converting the user-oriented inputs in to the computer-based format. The goal of designing input data is to make automation as easy and free from errors as possible. The input design requirements such as user friendliness, consistent format and interactive dialogue for giving the right message and help for the user at right time are also considered for the development of the project.

The following points should be considered while designing the input:

- What data to input?

- What medium to use?

- How the data should be arranged or coded?

- The dialogue to guide users in providing input.

- Data items and transactions needing validation to detect errors.

- Methods for performing input validation and steps to follow when errors occur.

Input Design Breakdown:

User Input Components:

1. Capture real-time video to detect the user's emotion.

2. Text input to select or enter preferred actor and language.

Inaccurate input data is the most common cause of error in processing data. Errors entered by the data entry operators can be controlled by the input design. The arrangement of messages as well as placement o[redacted]d titles on display screens or source document is also a part of input design. The design of input also includes specifying the means by which end user and system operators direct the system what action to take. The input design is the link between the information

system and the user. It comprises the developing specification and procedures for data preparation and those steps that are necessary to put transaction data into a usable form for processing data entry.

The user interface design is very important for any application. The interface design defines how the software communicates within itself, to system that interpreted with it and with human who use it. The interface design is very good; the user will fall into an interactive software application.

Input design is the process of converting user-oriented inputs to a computer-based format. The data is fed into the system using simple interactive forms. The forms have been supplied with messages so that user can enter data without facing any difficulty. The data is validated wherever it requires in the project. This ensures that only the correct data have been incorporated into the system. Inaccurate processing of data is the most common cause of errors in data processing. Erroneously entered by data entry operators can be controlled by correct input design. This type of input design allows user to input only the required data into the processing units and also these input from check for validation of the input values, thus preventing errors. .

5.4 OUTPUT DESIGN

Output generally refers to the results and information that are generated by the system. When designing output, system analyst must accomplish the following:

- Determine what information to present.

- Decide whether to display, print the information and select the output medium.

- Arrange the presentation of information in an acceptable format.

- Decide how to distribute the output to intended recipients.

Output Design Breakdown:

1. **Search Query Display:** Show the generated search query based on the user's detected emotion and preferences.

2. **Search Results Display:** Present the results obtained from executing the search .

The major idea of output is to convey information so its layout and design need careful consideration. Efficient, intelligible output design improves the system relationship with the users and help in making decisions. The output designs decide how well the implementation of the system has been useful to the user. The output design should be understandable to the user.

5.5 PROGRAM DESIGN

Module Breakdown:

Deep Learning Module:

1. Defines the Convolutional Neural Network (CNN) architecture for emotion detection.
2. Manages model training, evaluation, and performance optimization.
3. Handles feature extraction from video frames to identify user emotions.

User Interface Module:

1. Facilitates user interaction.
2. Collects user input for preferences (e.g., actor, language).
3. Integration of webcam to capture real-time video.
4. Sends user preferences and captured emotions to the backend for processing.

Mapping Module:

1. Uses user preferences and detected emotions to generate search queries.
2. Maps detected emotion to appropriate Genre.

By adopting this design approach, the system is poised for effective collaboration among developers, streamlined maintenance, and straightforward scalability as additional features or improvements are introduced

CHAPTER 6

FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

6.1 FUNCTIONAL REQUIREMENTS

The functional requirements represent the intended behaviour of the system. The proposedsystem consists of

- Keyboard to input data
- Mouse
- Webcam

6.2 NON-FUNCTIONAL REQUIREMENTS

Accuracy: Accuracy in functioning and the nature of user-friendly should be maintained by thesystem.

Speed: The proposed system should be in real time for generating result.

Flexible: The proposed system should be flexible to new updates and patches in near future.

CHAPTER 7

TESTING

7.1 SYSTEM TESTING

- Definition: End-to-end testing of the entire EmoFlix system, including the model, application interface, and outputs.
- In EmoFlix: Testing the entire workflow from inputting an image or video, detecting facial expressions, and displaying the correct classification. This includes integration of the model, front-end, and back-end.

7.2 UNIT TESTING

- Definition: Testing individual components or units of the application.
- In EmoFlix:Testing each function or module separately.
- Verifying the CNN model predicts correctly for known input data.
- Testing the pre-processing pipeline (e.g., resizing or normalizing images).

7.3 INTEGRATION TESTING

- Definition: Testing the interaction between integrated modules or components.
- In EmoFlix:
- Ensuring the facial expression recognition model interacts properly with the web interface.
- Validating the integration of the output visualization (graphs or metrics) with predictions.

7.4 BLACK BOX TESTING

- Definition: Testing the system's functionality without examining the internal logic.
- In EmoFlix:
- Providing inputs (e.g., facial images) and verifying outputs (e.g., "Happy", "Sad") without considering how the CNN model works.
- Focus on input-output accuracy rather than the algorithm.

7.5 VALIDATION TESTING

- Definition: Ensures the system meets user requirements and project goals.
- Checking if the application meets the requirement of correctly identifying emotions.
- Example: Comparing the results with benchmark datasets like FER-2013 to ensure consistency.
- A deviation from specification is uncovered and a deficiency list is created.

7.6 OUTPUT TESTING

- Definition: Verifying the correctness and usability of the outputs.
- In EmoFlix:
- Ensuring predicted labels are accurate and visually represented (e.g., in charts or user interfaces).
- Testing output reports, such as performance metrics like accuracy or confusion matrix.

7.7 USER ACCEPTANCE TESTING

- Definition: Testing by end-users to ensure it meets their expectations.
- In EmoFlix:
- Allowing users to test the app and provide feedback on usability and accuracy.
- Checking the user experience, such as interface responsiveness and prediction clarity.

7.8 WHITE BOX TESTING

- Definition: Testing internal structures, logic, and code paths.
- In EmoFlix:
- Examining the model's training and inference pipeline.
- Validating individual functions like image preprocessing, CNN layer execution, and softmax output.
- Ensuring edge cases like empty images or corrupted data are handled correctly.

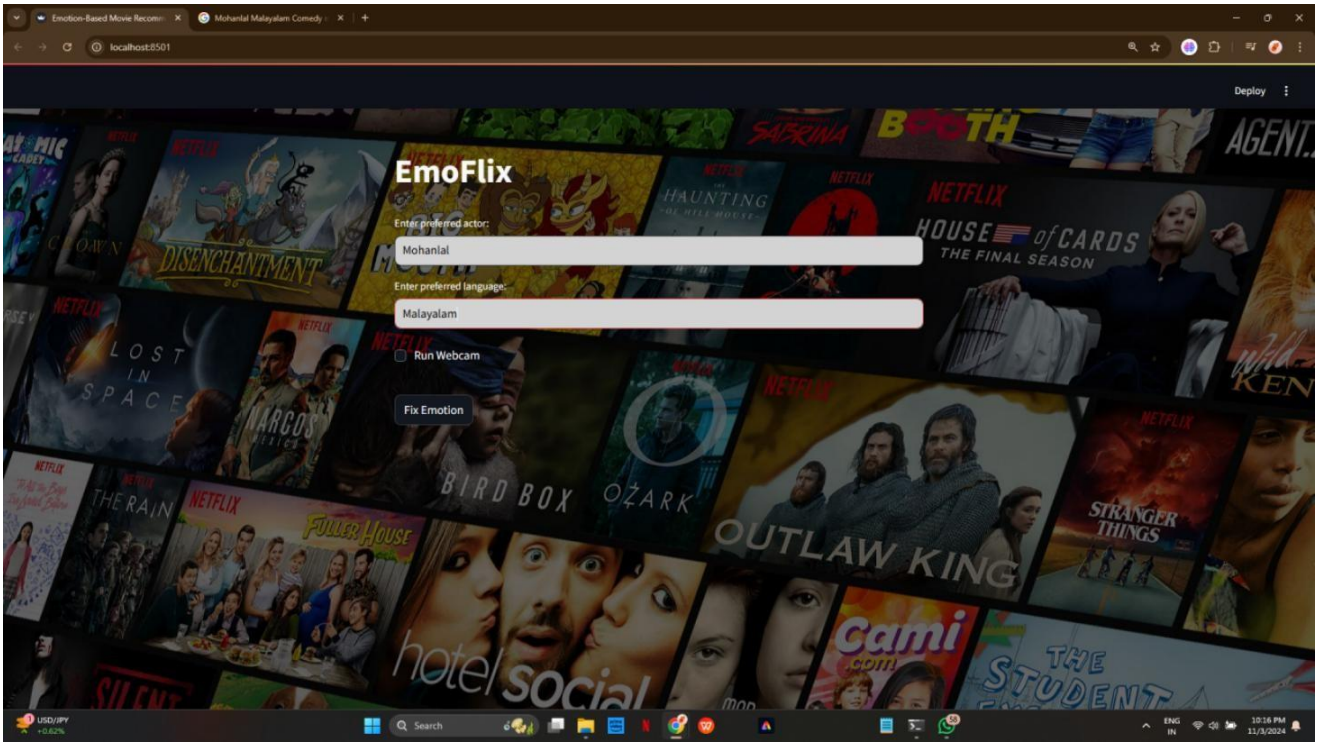
CHAPTER 8

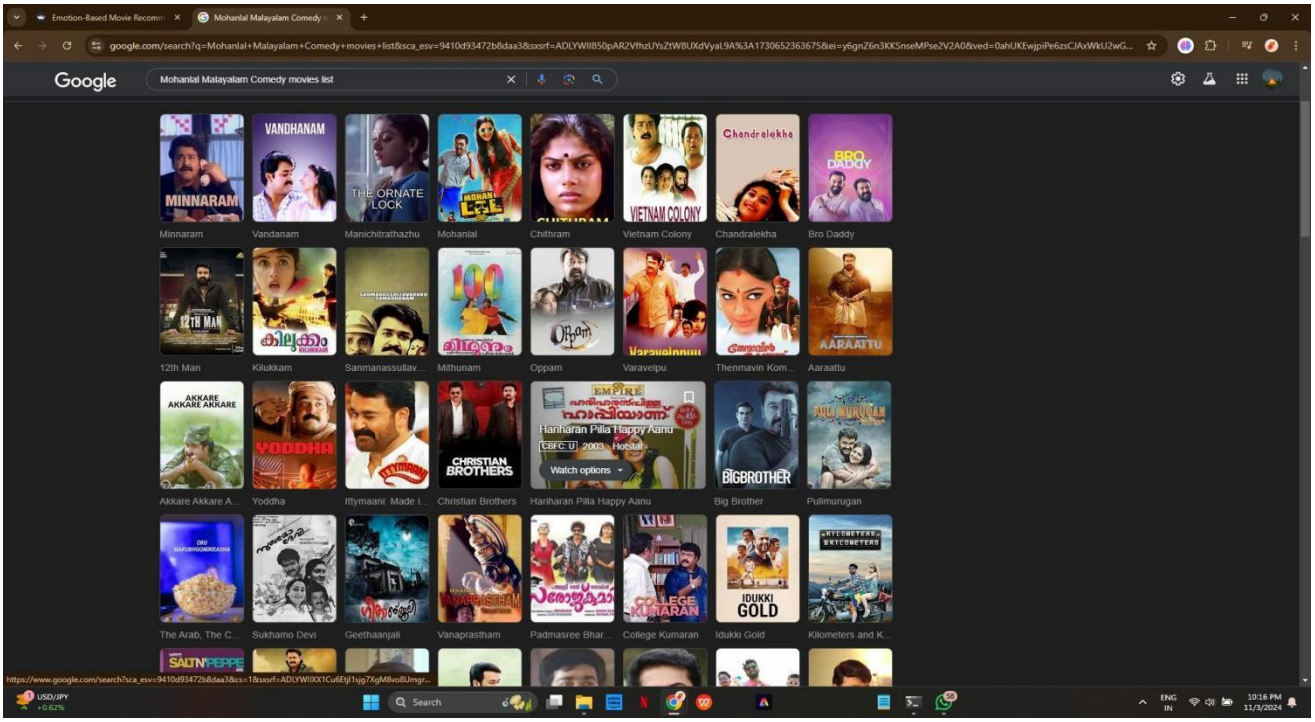
RESULTS AND DISCUSSION

8.1 RESULTS

An effective movie recommendation system using emotion has implemented with a training accuracy of 88% and validation accuracy of 74%.

8.2 SCREENSHOTS





CHAPTER 9

CONCLUSION

9.1 SYSTEM IMPLEMENTATION

System implementation is a critical phase in the development lifecycle where the developed system is transitioned from a theoretical design to an operational tool. It involves bringing the system into use, testing it thoroughly, and ensuring it functions efficiently and effectively for the users. A well-implemented system builds user confidence and meets the expectations set during the planning and design phases.

Implementation is the process of taking the system from its design phase to a fully functional product. The implementation plan includes an overview of the system, major tasks, resources required, and any specific site requirements. This plan is developed during the design phase and updated during development to ensure smooth execution.

There are three types of system implementations:

1. **Implementation of a New Computer System to Replace a Manual System**:
   This type involves converting manual processes into an automated system. Common challenges include file conversion, user training, and creating accurate data files.
2. **Implementation of a New System to Replace an Existing One**:
   Replacing an older system with a new one can be complex and may involve significant challenges. If not carefully planned, issues such as data migration, system compatibility, and user adaptation can arise, sometimes taking up to a year for full conversion in large systems.
3. **Implementation of Modified Applications on the Same Computer System**:
   This type involves replacing an existing application with a modified version while using the same underlying system. It is generally easier to manage, as long as the changes to the files and architecture are minimal.

9.2 FUTURE ENHANCEMENT

1. **Integration with Streaming Platforms**:
   Future versions of the system can integrate with popular streaming platforms (e.g., Netflix, Amazon Prime, Disney+) to provide real-time movie recommendations based on user preferences and emotional state, allowing users to directly access suggested content.

2. **Personalized User Profiles**:

   The system can be enhanced by creating personalized user profiles that track preferences over time, allowing for more accurate recommendations based on long-term behavior and past interactions.

3. **Advanced Emotion Recognition**:

   Enhancing the emotion detection model with advanced techniques like multi-modal emotion recognition (e.g., combining voice tone analysis with facial expression recognition) to improve the system's accuracy in detecting complex emotional states.

4. **Improved Natural Language Processing (NLP)**:

   Integrating NLP techniques could allow the system to process and understand user feedback and sentiment more effectively, refining movie suggestions based on user reviews or comments.

5. **Cross-Platform Support**:

   Expanding the system's compatibility across different devices (smartphones, tablets, smart TVs) and operating systems (Android, iOS, Windows) to make it more accessible and flexible for a wider audience.

6. **Real-time Collaborative Filtering**:

   Incorporating real-time collaborative filtering techniques to allow users to receive recommendations based not only on their mood and preferences but also on similar users' experiences and ratings.

7. **Voice-Based Interaction**:

   Adding a voice interface could enhance user experience by allowing users to interact with the system through voice commands for mood detection or movie preferences, making the system more hands-free and accessible.

8. **Enhanced User Interface (UI)**:

   The user interface could be further improved to offer a more immersive experience, including the use of advanced graphics, animations, and more intuitive navigation to make the system more engaging.

\

9.3 CONCLUSION

The proposed movie recommendation system combines emotion detection through facial expressions and user preferences to provide personalized movie suggestions. By leveraging deep learning models for emotion recognition and incorporating user-defined filters such as genre, language, and favorite actors, the system offers an innovative approach to movie recommendations that adapts to the user's current emotional state. This system not only enhances user experience by providing more relevant and dynamic suggestions but also represents a significant advancement in recommendation technology. With future enhancements, such as integration with streaming platforms and voice-based interactions, the system has the potential to become even more intelligent and accessible, catering to a wide range of users. The development of this system opens up new possibilities for personalized entertainment experiences in an increasingly digital world.

CHAPTER 10

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10.2 WEBSITES

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2. **Keras** (https://keras.io/)w3schools.com
3. **tensorFlow** (https://www.tensorflow.org/)geeksforgeeks.org

CHAPTER 11

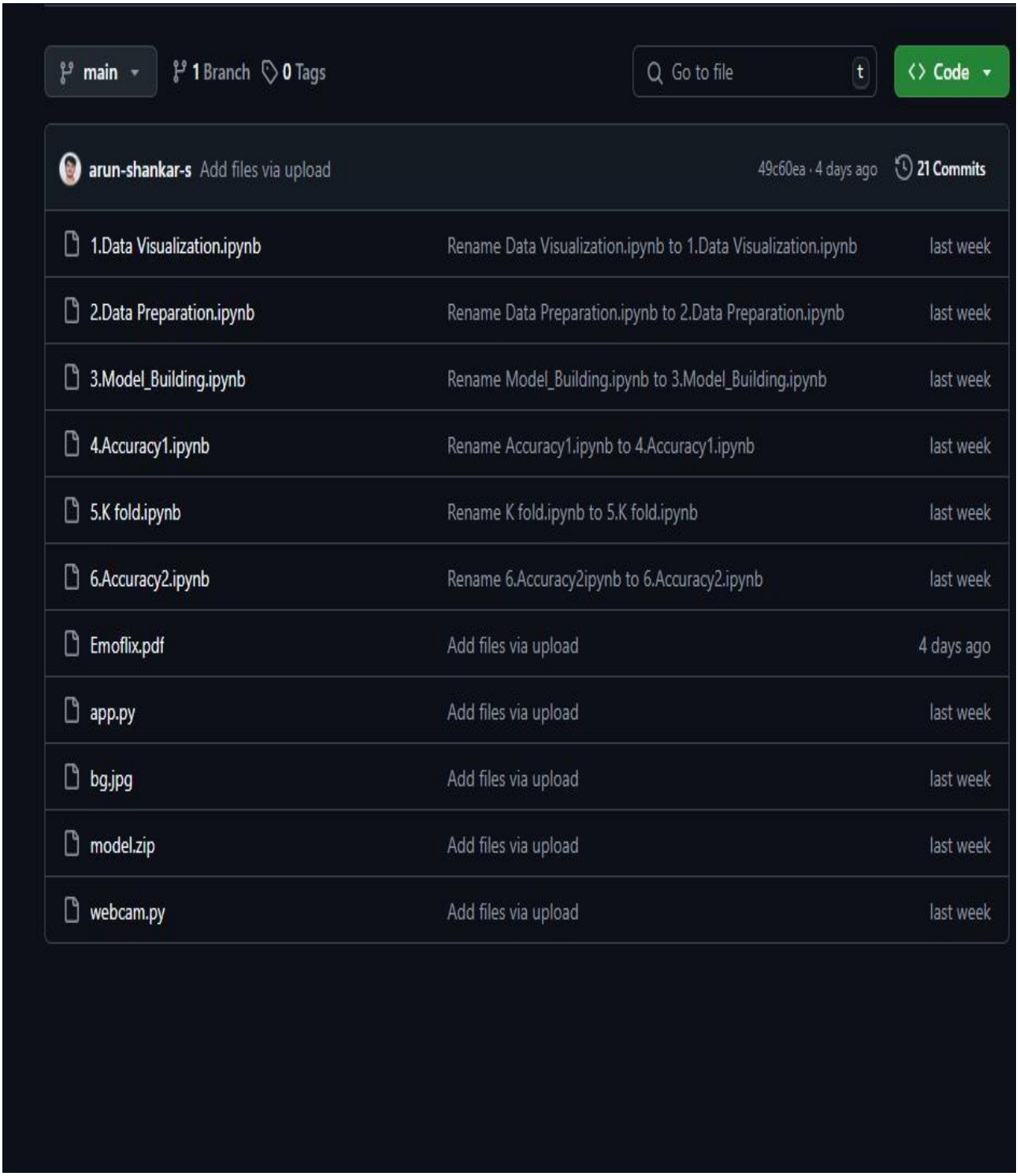
APPENDICES

11.1 LIST OF TABLES

K-FOLD CROSS VALIDATION

Fold	Training Accuracy (%)	Validation Accuracy (%)
1	66.57	72.05
2	67.33	71.69
3	67.64	71.25
4	71.6	69.94
5	72.59	70.78
6	73.9	72.93
7	74.01	72.34
8	75.7	72.23
9	76.64	87.64
10	78.53	88.98

11.2 GIT PROJECT REPOSITORY



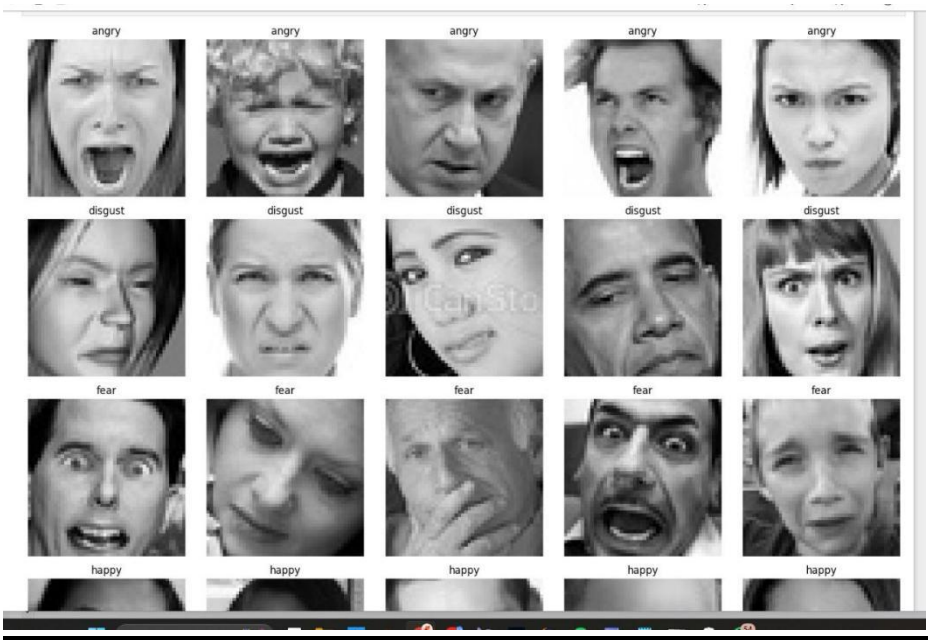
11.3 DATASET DETAILS

FER-2013 DATSET

The FER 2013 (Facial Expression Recognition 2013) dataset is a widely used benchmark dataset for facial expression recognition tasks in machine learning.

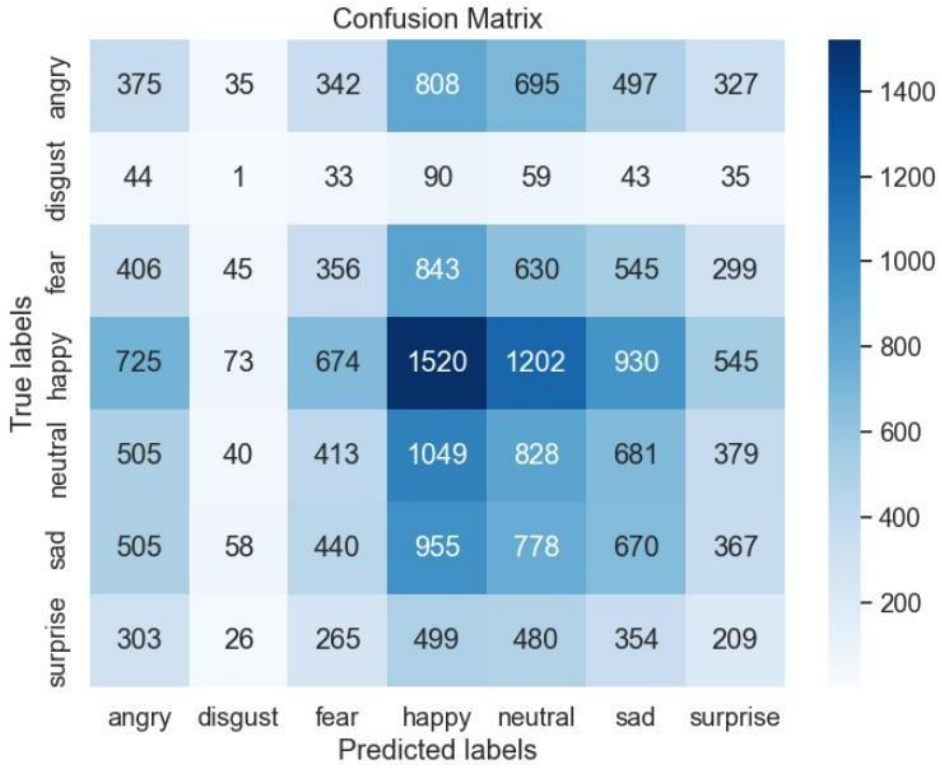
Dataset Size: Contains 35,887 grayscale images of faces.The dataset has 7 facial expression classes:

1. Angry
2. Disgust
3. Fear
4. Happy
5. Sad
6. Surprise
7. Neutral

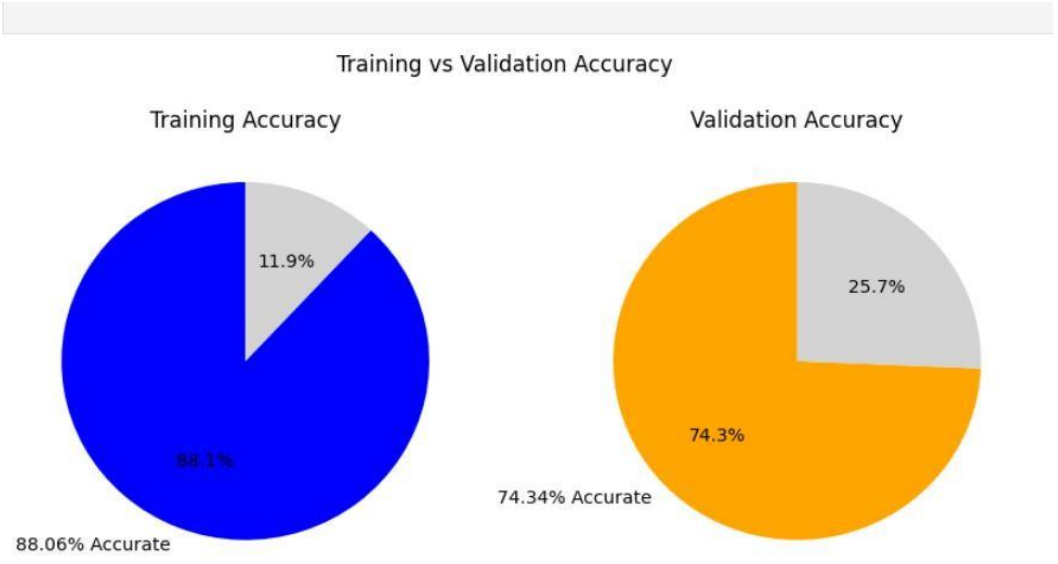


11.4 MODEL PERFORMANCE AND ACURACY

CONFUSION MATRIX



PIE CHART (ACCURACY)



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