# Content Suggesting System based on the user's personality and current mood

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## 1 Introduction

Media content on the internet refers to the broad range of digital material available online. It includes a range of media, such as movies, TV shows, music, books, articles, images, and more. With the emergence of digital platforms and advancements in technology, the internet has become a hub for accessing and sharing media content worldwide. Users can now enjoy a wide range of options conveniently, anytime, and anywhere, often through streaming services, online stores, social media, and other digital platforms. Using digital media like watching movies and listening to music not only offers an escape and distraction from daily stressors, but it could also be beneficial to your mental health.

But it's hard to find media content on the internet that exactly matches users' needs and interests. Even though there are many content-suggesting systems available on the internet, they only recommend content through emotion or they recommend only one or two categories of digital media.

So, is there a more relevant and accurate way of automating the content suggestion based on the user's mood and personality? The process here is to determine the user's personality and mood at that moment, analyze those two factors, and recommend music, movies, TV shows, books, andpodcasts to lift their mood.

### 1.1 Summary of literature

There are many content recommendation systems all over the internet. Also, there are mood detection methods through face recognition and personality testing methods. But these three terms are not used together.

### 1.2

- FaceFetch: A User Emotion Driven Multimedia Content Recommendation System Based on Facial Expression Recognition – After identifying a user's emotion through the camera, the system can understand a user's emotional state through a desktop as well as a mobile user interface and pull multimedia content such as music, movies, and other videos of interest to the user from the cloud. The authors of this system [1] capitalize on sophisticated technology to detect and interpret users' facial features, such as smiles or frowns, to identify their emotional states. By using these emotions, the authors of [1] aim to provide personalized recommendations that resonate with users' feelings and preferences. Some challenges include improved accuracy in facial expression recognition and addressing potential privacy concerns related to facial data. Despite these obstacles, the authors paved the way for emotion-driven recommendation systems by offering a fascinating glimpse into the future of content discovery.

- Analyzing emotion-based movie recommender system using fuzzy emotion features: People share their experiences, opinions, sentiments, and emotions by writing reviews and comments for products they purchase online or after watching a movie, reading books, etc. By using those data, the authors [2] aim to generate top-N recommendations with an emotion-based model. While the study shows some promising results in emotion-based item similarity, it acknowledges that fuzzy emotion features might not have increased prediction accuracy compared to discrete emotion features. Extracting emotions from diverse sources and creating new strategies for enhancing recommendation algorithms are some of the future improvements of the product. Overall, this research provides valuable insights into the potential of emotions in movie recommendations and opens the door to further investigations.

| Aspect | FaceFetch | Analyzing Emotion-Based Movie Recommender | Generic Music Recommendation Model | Content Suggesting System (Personality and Mood-Based) |
|---|---|---|---|---|
| **Data Source** | Facial expression recognition from users | Emotions extracted from movie reviews | Music features extraction from film music | User personality traits and real-time mood data |
| **Personalization** | Emotion-driven, context-sensitive recommendations | Emotion-focused, top-N movie recommendations | Emotion-based music recommendations | Personalized recommendations based on personality and mood |
| **Data Collection** | Facial expressions from user interactions | Emotions extracted from text-based movie reviews | Music features from film soundtracks | Personality traits and mood through questionnaires or sensors |
| **Emotional Range** | Focused on real-time emotional states | Emotions conveyed in movie reviews | Emotions conveyed in film music | Considers long-term personality traits and current mood |
| **Recommendation Model** | Item similarity based on emotion analysis | Association discovery between emotions and movie features | Association discovery between emotions and music features | Multifaceted model using personality and mood data |
| **User Interface and Experience** | Relatively passive user involvement | Emotion-based recommendations from movie reviews | Emotion-based music recommendations from film music | Potentially interactive and engaging user experience |
| **Cross-Domain Recommendations** | Not explicitly stated in the provided context | Potential for cross-domain recommendation using emotions | Potential for cross-domain music recommendations | Potential to link emotions for cross-domain recommendations |
| **Prediction Accuracy** | Not explicitly stated in the provided context | Results show emotion-based method's superiority | Top-one result's average score achieves 85% | Potential for improved accuracy with personalized data |
| **Ethical Considerations** | Emotion-based data collection, privacy concerns | Ethical considerations in emotion analysis from text reviews | Not explicitly stated in the provided context | Personality-based data collection, privacy considerations |
| **Limitations** | Not explicitly stated in the provided context | Limitations in fuzzy emotion features and prediction accuracy | Not explicitly stated in the provided context | Personalization challenges, data quality, privacy concerns |

Figure 1: Comparison between existing systems and proposed solution

- Emotion-based Music Recommendation by Association Discovery from Film Music: This article presents a versatile approach to music recommendation; it introduces a generic model grounded in emotion analysis. By constructing the recommendation model from film music, where music plays a pivotal role in conveying emotions, the authors of [3] extract chord, rhythm, and tempo features to discern emotional associations. The model's core lies in the association discovery between emotions and music features. It leads to an impressive 85 percent average score in top-one results using recommended features. While the research focuses on emotions conveyed in film music, future enhancements may explore cross-domain recommendations and take into account users' personalities and real-time mood data for even more personalized music suggestions. With its novel feature extraction and association discovery techniques, this model contributes significantly to the field of emotion-based music recommendation.

These existing systems only recommend content through emotion. [1], [2], [4] To increase the accuracy of the content, the input of the user's personality will be highly useful. Also, they recommend only one or two categories of digital content. [3], [4], [5], [6] Some of these systems only analyze existing user data and recommend content after categorizing them using their emotions. [2] It is not suitable for entirely new users.

### 1.3 Problem definition

Digital media has become an integral part of our daily lives and society as a whole. Audio and visual media can uplift a person's mood today. Therefore, many people are addicted to using audio-visual media to boost their mood. But it's hard to find media content on the internet that exactly matches users' needs and interests. Existing systems will recommend content only using emotion or based on user reviews of existing users. 1.2 So, to answer the question "Is there a more relevant and accurate way of automating the content suggestion based on the user's mood and personality?", the accuracy of the proposed content recommender will be higher if it uses both current mood and personality.

## 2 The goal of the project

The goal of this project is to provide a technical solution to find more relevant and accurate media content to match the user's mood and personality. Here, the percentage of the user's personality is determined using a questionnaire. Different personalities can be identified by doing that. This personality questionnaire will be based on the opinions of a person with extensive knowledge of psychology. The current mood of the user is determined by analyzing the facial features of his face. All these operations will be operated on a cloud platform including facial recognition and machine learning models.

### 2.1 Inclusions:

- Develop a web application: Develop a web application for users to answer personality questionnaires and detect their emotional state. Then recommend media content based on that.
- User Personality Profiling: Implement algorithms to analyze user personality traits through user-provided questionnaires or data from social media profiles (with user consent).
- Real-time Mood Detection: Develop mechanisms to capture users' current moods, potentially through facial expression recognition
- Content Collection: Integrate with multimedia content sources (e.g., movies, music, books) and create a diverse content library suitable for the recommendation.
- Cloud-based Data Storage: Utilize cloud technologies for secure and scalable data storage, ensuring efficient management of user-profiles and content metadata.
- Machine Learning Models: Develop machine learning techniques to create personalized recommendation models that combine personality traits and current moods with content features.
- API Integration: Integrate with external services for content collection. (e.g., IMDB, iTunes APIs)
- User Interface and Experience: Design an interactive user interface to allow users to view recommended content.
- Privacy and Security Measures: Implement robust privacy measures to ensure user data protection and adhere to data protection regulations.

### 2.2 Exclusions:

- Develop a mobile application: The project will not develop a mobile application, instead, it will be noted as future development.
- Medical Diagnostics: The system will not attempt to diagnose or provide medical advice based on users' emotions or personality traits.
- Psychological Assessments: The system will not act as a substitute for professional psychological assessments or counseling.
- Unethical Data Collection: The project will not engage in unethical data collection practices, and all data collection will be done with explicit user consent.

- Persistent User Tracking: The system will not store sensitive user data indefinitely or track users without their knowledge.
- Discriminatory Recommendations: The system will not provide recommendations that promote discrimination, violence, or harmful content.
- Real-time Emotion Profiling: The system will not continuously monitor and analyze users' emotions in real-time without their consent.

# 3 Aims and Objectives

## 3.1 Aim

The aim is to provide a technical solution using both the current mood and the user's personality, to suggest more relevant and accurate media content for the user on the internet

## 3.2 Objectives

- Identify the personality of users.
  - Develop a personality questionnaire based on the opinions of a person with extensive knowledge of psychology, to determine the percentage of the user's personality which will help to identify different personalities. And create a user profile based on that.
- Detect the current mood of the user.
  - Develop a mood recognition function using cloud Services which will help to identify the current mood of the user. It should be able to Identify facial expressions with a success rate of at least 95 percent by conducting multiple tests within a time frame of 6 months.
- Identify the related content for both personality and mood.
  - Develop a Machine learning model to analyze those two factors and recommend music, movies, TV shows, books, and podcasts by using the ML, and AI services on the cloud within 6 months.
- Recommend digital content for users.
  - Create an interactive website using cloud services, to List down and view the recommended content for the users. And redirect users to content providers.
- Store users and content data.
  - Maintain a database and storage on the cloud to store the user's data and content metadata throughout the project.
- Improve user experience.
  - Improve the user experience by creating attractive and flexible user interfaces and content features as the last phase of the project.

# 4 Proposed methodology

As the system development methodology of the application, the waterfall model will be used. The Waterfall methodology is a sequential project management approach. It breaks down a project into distinct phases that follow a step-by-step progression. The model will move to the next phase only when its current phase is completed and perfected. Starting with project planning and research, we'll progress through data collection, model development, integration, and testing, ultimately leading to system development and ongoing maintenance. This approach provides a clear road map for the project's execution, enabling us to deliver robust and well-tested content suggesting a system. Also considering the time for completing the project, this method is the most suitable and effective methodology.

- Project Planning and Research: In this phase, we will thoroughly plan the entire project. We'll gather requirements and define the specific goals and objectives of the content-suggesting system. Extensive research will be conducted to identify suitable technologies, data sources, and APIs for personality profiling and mood detection.
- Data Collection and Preparation: Once the planning is complete, we'll move on to collecting relevant data for the content-suggesting system. This includes gathering user personality data through questionnaires and capturing real-time mood information through facial expression recognition. The collected data will be cleaned, processed, and prepared for later stages.
- Model Development and Training: In this step, we'll develop the core of the content-suggesting system. Machine learning models will be created to analyze personality traits and real-time mood data and integrate them with content features. These models will be the main process of the recommendation engine.
- Integration and Testing: Once the models are ready, we'll integrate them into the content-suggesting system, ensuring that they work seamlessly together. Comprehensive testing will be conducted to verify the accuracy and efficiency of the recommendation engine. This stage is critical in identifying and resolving any issues before moving to the next phase.
- Development and Maintenance: Next, we'll move to the development phase, where the complete

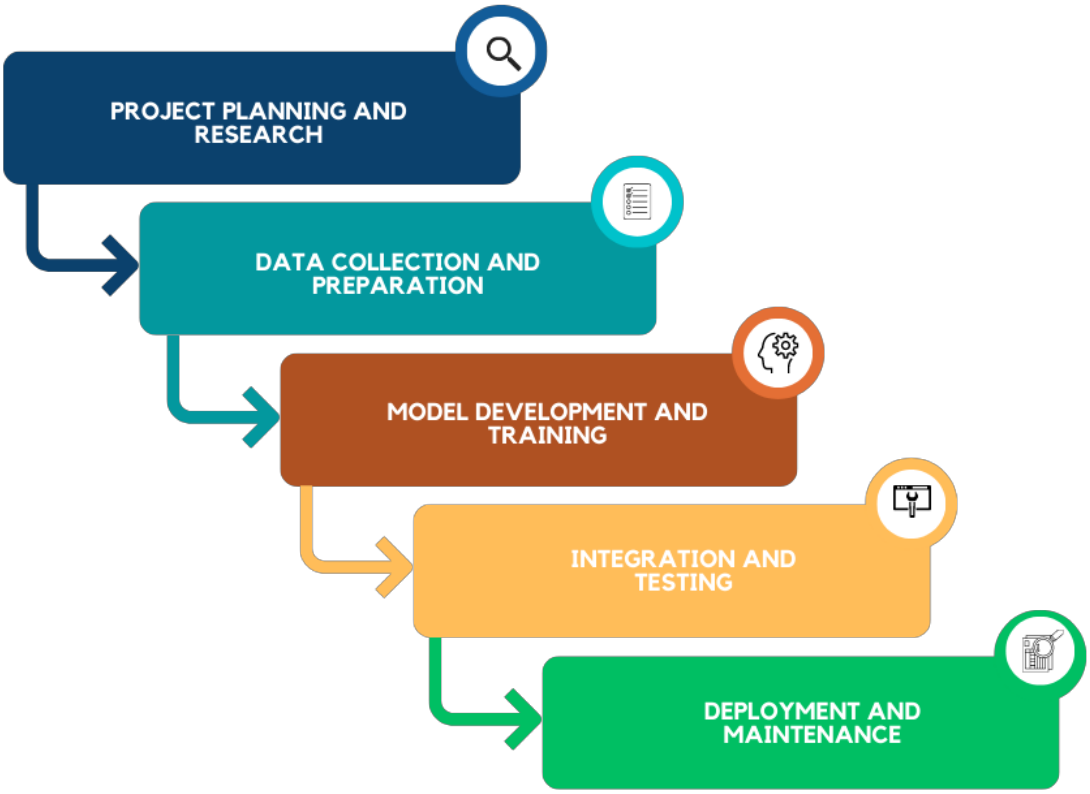


Figure 2: Waterfall Methodology

content-suggesting system will be built. User interfaces will be designed to allow users to interact with the system, and view personalized recommendations. After the system's deployment, we'll continue to maintain and improve it and change requirements.

## 5 Resource requirements

- Human resources (Divided between two members)
  - Project Management: Oversee the project, plan resources, and manage timelines.
  - Machine Learning Development: Model development, training, and integration
  - Data Analysis: Data collection, preparation, and analysis
  - Cloud Development: Managing and Developing the cloud resources
  - Quality Assurance: Testing and debugging the system
  - Front-End Development: User interface design and implementation
  - Documentation: Creating project documentation and user manuals
- Hardware
  - Servers: EC2 Instances: For running machine learning algorithms and other computational tasks.
  - Storage: S3 Bucket: For storing data and files.
  - Networking
- Software
  - AI/ML Libraries
  - Operating System
  - Database
  - Programming language
  - Web Framework
  - Machine Learning Frameworks: e.g., TensorFlow, PyTorch - For model development and training. Jupyter Notebooks: Collaborative model development and experimentation.
- Front-End Frameworks
- User interface development.
- Testing Frameworks: Unit and integration testing.
- Collaboration Tools: e.g., Slack, Microsoft Teams, Zoom - Team coordination and communication.

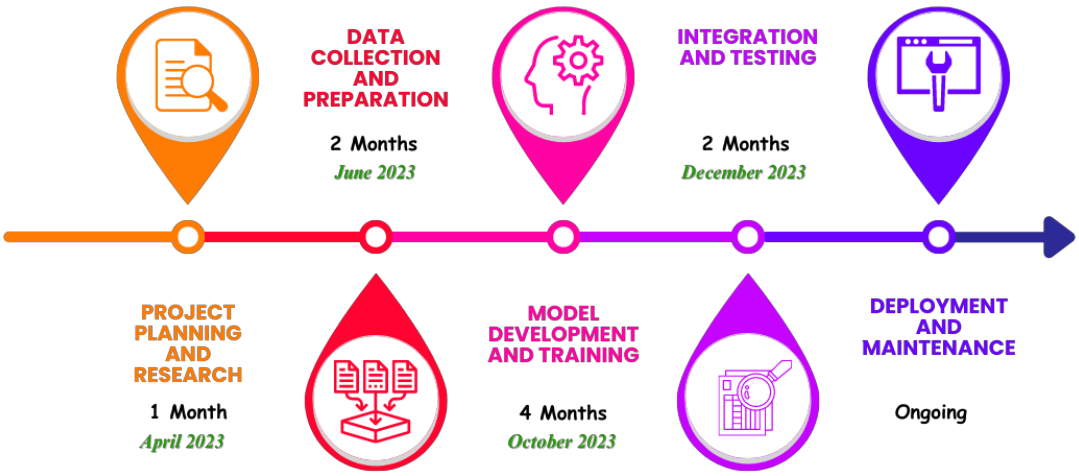


Figure 3: Time plan

- Documentation Platform: e.g., Office 365 - Project documentation management.
- Integrated Development Environment (IDE)
- Version control system

# 6 Time plan

- Project Planning and Research (Both members are responsible)
  - Identify project objectives and goals.
  - Conduct meetings to gather requirements.
  - Perform research and analyze similar existing systems.
  - Define the scope and boundaries of the project.
  - Identify suitable cloud technologies, including AWS services.
  - Plan the team's roles and responsibilities.
  - Create a project timeline and schedule.
- Data Collection and Preparation (Both members are responsible)
  - Design personality questionnaires for user data collection.
  - Develop data collection mechanisms and integrate them into the system.
  - Set up APIs or data connectors to retrieve content data.
  - Integrate facial expression recognition APIs for real-time mood detection.
  - Collect sample data for model development and testing.
  - Clean, pre-process, and transform the collected datafor model training.
- Model Development and Training ( AA1680 - M.K. Damindu Pahasara)
  - Select appropriate machine learning algorithms and frameworks.
  - Develop models for personality analysis based on collected data.
  - Create models for real-time mood detection from mood questionnaires or facial expressions.
  - Train the personality and mood detection models on prepared datasets.
  - Validate and fine-tune the models for accuracy and performance
- Integration and Testing (Both members are responsible)
  - Integrate the personality and mood detection models into the content-suggesting system.
  - Conduct unit testing for each system component.
  - Perform integration testing to ensure the seamless functioning of the system.
  - Implement error handling and logging mechanisms.
- Development and Maintenance (AA1706 - A.S. Bandarathilaka)
  - Develop the user interface for the content-suggesting system.

- Implement user authentication.
- Deploy the system on AWS using suitable hosting services (e.g., S3, CloudFront).
- Monitor system performance using AWS CloudWatch.
- Implement AWS Backup for critical data.
- Set up auto-scaling for resource optimization.
- Create comprehensive system documentation and user manuals.
- Plan for ongoing maintenance and future enhancements.

# 7 Conclusion

In conclusion, the main goal of this proposed system is to provide a technical solution to find suitable media content to match the user's needs and interests. This will create a personalized recommendation engine using cloud technologies and machine learning models. Then the users can easily find suitable media content based on their current mood and personality. The project will analyze user personalities and current moods using thorough planning, data collection, and model development. Integrating Cloud services for mood detection will enhance the ability to detect emotions. Integration and testing will ensure a smooth user experience. Ongoing maintenance will keep this system adaptable. This project will be a significant step in delivering content recommendations for users on a personal level using the power of AI and cloud computing.

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