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**INF1002 Programming Fundamentals - Python Project Proposal**

**Team Information**

**Team ID:** [Your Team ID]  
**Project Title:** Intelligent Movie Recommendation System with Sentiment Analysis

**Team Members:**

* Member 1: [Name] - [Student ID] - [Email]
* Member 2: [Name] - [Student ID] - [Email]
* Member 3: [Name] - [Student ID] - [Email]
* Member 4: [Name] - [Student ID] - [Email]

**Project Description**

**Overview**

We propose to develop an intelligent movie recommendation system that combines collaborative filtering, content-based filtering, and sentiment analysis of user reviews. The system will analyze movie datasets, user ratings, and review sentiments to provide personalized movie recommendations with explainable reasoning.

**Problem Statement**

Traditional recommendation systems often lack transparency in their suggestions and may not consider the emotional context of user reviews. Our system addresses this by incorporating sentiment analysis of reviews to better understand user preferences and provide more accurate, explainable recommendations.

**Key Features**

1. **Multi-Algorithm Recommendation Engine**
   * Collaborative filtering based on user-item interactions
   * Content-based filtering using movie features (genre, director, cast)
   * Hybrid approach combining both methods
2. **Sentiment Analysis Integration**
   * Analyze user review sentiments using NLP techniques
   * Weight recommendations based on sentiment scores
   * Identify trending movies with positive sentiment
3. **Interactive Dashboard**
   * User-friendly interface for movie search and recommendations
   * Visualization of recommendation reasoning
   * Movie trend analysis and insights
4. **Performance Analytics**
   * Recommendation accuracy metrics
   * System performance evaluation
   * A/B testing framework for algorithm comparison

**Dataset**

**Primary Dataset:** MovieLens 25M Dataset (Kaggle/GroupLens)

* 25 million ratings from 162,000 users on 62,000 movies
* Movie metadata (genres, tags, release dates)
* User demographic information

**Secondary Dataset:** IMDB Movie Reviews Dataset

* 50,000 movie reviews with sentiment labels
* Additional movie information and ratings

**Technology Stack**

* **Core:** Python, Pandas, NumPy, Scikit-learn
* **ML Libraries:** Surprise (recommender systems), NLTK/TextBlob (NLP)
* **Visualization:** Matplotlib, Seaborn, Plotly
* **Interface:** Streamlit or Flask for web interface
* **Version Control:** GitHub

**Initial Task Allocation**

**Member 1: Data Processing & Analysis Lead**

* Dataset acquisition and preprocessing
* Exploratory data analysis and visualization
* Data quality assessment and cleaning
* Feature engineering for movie attributes

**Member 2: Recommendation Algorithm Developer**

* Implement collaborative filtering algorithms
* Develop content-based filtering system
* Create hybrid recommendation approach
* Algorithm performance optimization

**Member 3: Sentiment Analysis Specialist**

* Implement sentiment analysis pipeline
* Text preprocessing and feature extraction
* Integration of sentiment scores with recommendations
* Evaluation of sentiment classification accuracy

**Member 4: System Integration & Interface Developer**

* Design and implement user interface
* System architecture and module integration
* Performance metrics and evaluation framework
* Demo preparation and documentation

**Project Timeline Alignment**

**Week 1 (Current)**

* Team formation and project proposal
* Initial research and dataset exploration
* Set up GitHub repository and development environment

**Week 2 (System Design)**

* Detailed system architecture design
* Database schema and data flow diagrams
* Algorithm selection and implementation strategy
* Updated task allocation based on system design

**Weeks 3-4 (Development)**

* Core algorithm implementation
* Data preprocessing pipelines
* Basic recommendation engine functionality
* Initial sentiment analysis integration

**Weeks 5-6 (Testing & Finalization)**

* Comprehensive system testing
* Performance evaluation and optimization
* User interface development and integration
* Documentation and demo video preparation

**Expected Outcomes**

1. A fully functional movie recommendation system with explainable AI features
2. Comprehensive analysis of different recommendation algorithms
3. Integration of sentiment analysis to enhance recommendation quality
4. Interactive dashboard for movie exploration and recommendation visualization
5. Detailed performance evaluation and comparison with baseline methods

**Success Metrics**

* Recommendation accuracy (RMSE, MAE)
* User satisfaction simulation
* System response time and scalability
* Sentiment analysis accuracy
* Code quality and modularity

This project combines machine learning, data analysis, and software engineering principles while addressing a real-world problem that students can relate to and find engaging.