SEMESTER PROJECT PROPOSAL

ANIME RECOMMENDATION SYSTEM

Group Members

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Summited to:

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1. Abstract

The rapid expansion of anime content across various digital platforms has created challenges for users in discovering anime that aligns with their interests. This project proposes the design and development of an intelligent Anime Recommendation System that automatically suggests relevant anime titles based on user input. The system utilizes Machine Learning (ML) and Natural Language Processing (NLP) techniques to analyze anime features such as genres and descriptions. By transforming textual data into numerical representations and applying similarity-based recommendation techniques, the system provides accurate and personalized anime suggestions without requiring explicit user ratings or historical interaction data.

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2. Problem Statement

With the rapid growth of anime content across multiple streaming platforms, users often face difficulty in discovering anime that matches their interests. Manually browsing thousands of anime titles based on genre, ratings, or popularity is time-consuming and inefficient. Therefore, there is a need for an **automated, accurate, and personalized anime recommendation system** that enhances user experience by providing relevant anime suggestions.

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3. Proposed Solution

This project proposes an **Anime Recommendation System** that suggests similar anime based on the anime name entered by the user. Instead of asking users to rate anime or create profiles, the system focuses on the **features of the anime itself**.

The system uses **machine learning and Natural Language Processing (NLP)** to study anime information such as genres and descriptions. This information is converted into numerical form so the model can understand and compare different anime.

When a user types the name of an anime, the system finds other anime with similar features and shows the **top matching recommendations**. This approach is fast, easy to use, and works well even for new users.

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4. Methodology

Step 1: Data Loading and Exploration

- **Dataset:** Anime dataset (anime.csv).
- **Records:** Thousands of anime titles with user ratings.
- **Attributes:** Anime name, genre, type, episodes, rating, popularity, and user ratings.

Step 2: Data Cleaning and Balancing

- Removed missing or duplicate entries.
- Handled null values in ratings and genre fields.
- Ensured fair representation of different anime genres.

Step 3: Data Preprocessing

- Cleaned text fields such as genres and descriptions.
- Converted categorical data into machine-readable format.
- Normalized numerical features like ratings and popularity scores.

Step 4: Feature Extraction

- Transformed anime attributes into feature vectors.
- Applied techniques such as:

  TF-IDF for genre and description analysis

Step 5: Model Training

- Split dataset into **training (80%)** and **testing (20%)**.
- Achieved effective personalization for users.

Step 6: Model Evaluation

- Evaluated system performance using:
  - Accuracy of recommendations
  - Precision of suggested anime
  - User similarity scores
- Achieved **high recommendation relevance and consistency**.

Step 7: Model Deployment and Testing

- Saved trained recommendation models.
- System correctly generated personalized anime recommendations.

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5. Tools and Technologies

Category	Tools/Libraries
Programming Language	Python
Data Handling	Pandas, NumPy
Text Preprocessing	NLTK, Regex, String
Machine Learning	Scikit-learn
Feature Extraction	-
Model Evaluation	Accuracy, Precision, Classification Report
Model Storage	-
IDE	Google Colab / VS Code

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6. Expected Results

Precision@5 should be more than 75%.

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7. Project Timeline

Total Duration: 10 Days

Phase	Description	Duration
Phase 1	Data Collection & Exploration	1 day
Phase 2	Data Balancing & Preprocessing	1 day
Phase 3	Model Training & Tuning	3 days
Phase 4	Evaluation & Optimization	3 days
Phase 5	Serialization & Report Writing	2 days

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8. Estimated Budget

Resource	Estimated Cost (PKR)
Data Preparation & Processing	N/A
Cloud GPU / Colab Pro	N/A
Model Deployment (Optional)	N/A
Miscellaneous	N/A
Total	N/A

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9. Conclusion

This project successfully created an **Anime Recommendation System** that suggests similar anime when a user enters the name of an anime they like. The system looks at important details such as genre and story type to find anime that are closely related.

The model works well even if the user does not have any previous watch history, making it easy to use for new users. It helps users discover new anime without spending a lot of time searching.

Overall, this project shows how machine learning can be used to make **smart and helpful recommendations**, and it can be added to anime websites or apps to improve the user Experience,

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10. References

[1] Kaggle, "Anime Recommendation Database," Kaggle Dataset. [Online]. Available: https://www.kaggle.com

[2] A. Gunawardana and G. Shani, "A survey of accuracy evaluation metrics of recommendation tasks," *Journal of Machine Learning Research*, vol. 10, pp. 2935–2962, Dec. 2009.

[3] T. K. Landauer, P. W. Foltz, and D. Laham, "An introduction to latent semantic analysis," *Discourse Processes*, vol. 25, no. 2–3, pp. 259–284, 1998.

[4] P. Lops, M. de Gemmis, and G. Semeraro, "Content-based recommender systems: State of the art and trends," in *Recommender Systems Handbook*. Springer, 2011, pp. 73–105.