North East University Bangladesh

Department of Computer Science and Engineering
Course Title: Deep Learning Lab (CSE-460)

Project Proposal
Movie Recommendation System Using Deep Learning

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Introduction

In the era of digital entertainment, personalized recommendations play a crucial role in enhancing user experience. A deep learning-based movie recommendation system can provide more accurate and dynamic suggestions based on user preferences, viewing history, and ratings. This project aims to develop an intelligent movie recommendation system leveraging deep learning techniques to enhance recommendation accuracy and user satisfaction.

Problem Statement

Traditional recommendation systems, such as collaborative filtering and content-based filtering, often struggle with:

- Cold start problems
- Data sparsity issues
- Limited personalization capabilities

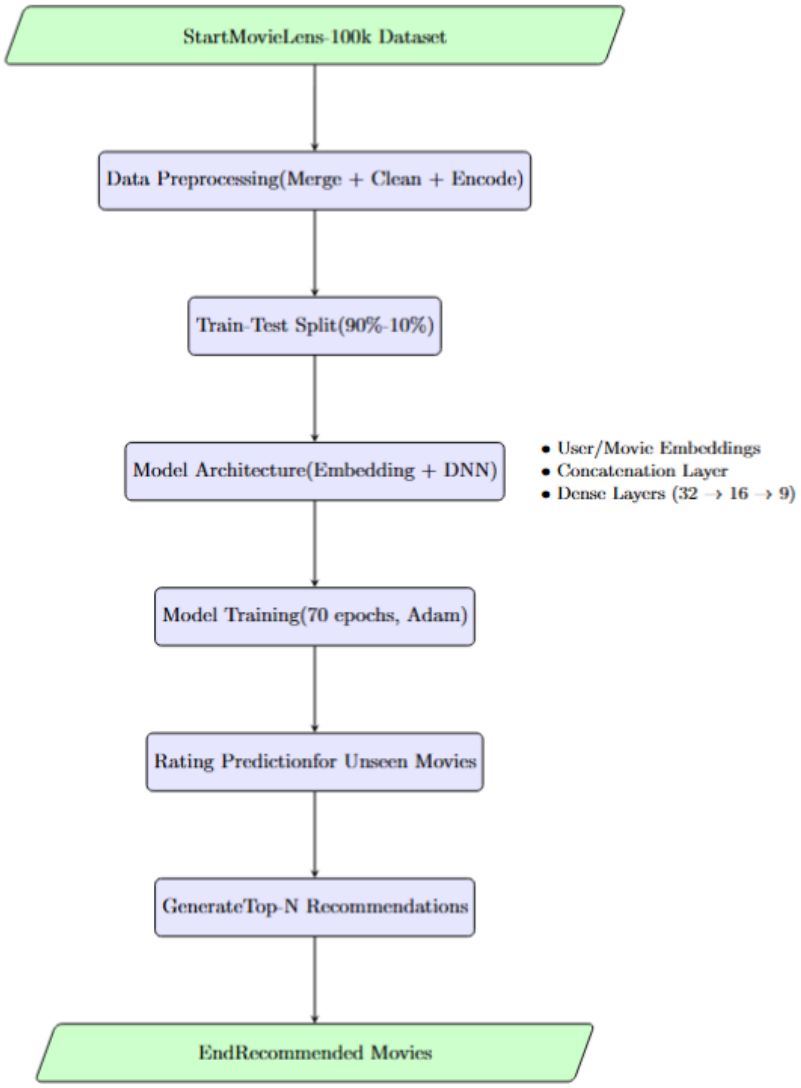
Deep learning techniques, particularly neural networks, offer an advanced approach to understanding complex user behavior patterns and preferences, enabling more accurate recommendations.

Objectives

Primary Objectives

- Develop a deep learning-based movie recommendation system
- Implement neural collaborative filtering (NCF) architecture
- Achieve RMSE ¡ 0.90 on MovieLens-100k dataset
- Develop a web interface for user interaction

Methodology



Implementation Phases

1. **Data Collection**
    - MovieLens-100k dataset (943 users, 1682 movies)
    - 100,000 ratings (1-5 scale)
2. **Model Development**
    - Embedding layers (150 dimensions)

- Neural network architecture:

```
User Input → Embedding → Concatenate →
Dense(32) → Dense(16) → Output(9)
```

3. **Evaluation Metrics**

   - RMSE (Root Mean Square Error)
   - Precision@K
   - Recall@K

Expected Outcomes

Deliverables
• Functional recommendation system with web interface • Comparative analysis report (DL vs traditional methods) • Project documentation with complete source code • Accuracy metrics: Target 75%+ recommendation relevance

Timeline

Phase	**Duration**
Literature Review	1 week
Data Preparation	1 week
Model Development	2 weeks
System Integration	1 week
Testing & Deployment	1 week
Documentation	1 week

Conclusion

This project will demonstrate the effectiveness of deep learning in recommendation systems through:

- Implementation of neural collaborative filtering
- Quantitative comparison with traditional methods
- Practical deployment as a web application

The expected outcome is a significant improvement over conventional recommendation approaches in terms of accuracy and personalization.