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Topic of Research: Rating Based Recommender System using User Textual Reviews

Findings

1. Textual reviews significantly improve recommendation quality

The thesis shows that relying on numerical ratings alone is insufficient. Incorporating user textual reviews adds rich sentiment and contextual information, leading to more accurate and personalized recommendations.

2. Hybrid feature engineering outperforms traditional approaches

Combining statistical features (TF-IDF) with semantic embeddings (Word2Vec, GloVe, BERT) leads to stronger representations than using any single method alone. This hybrid model improves both accuracy and robustness.

3. Deep learning architectures enhance rating prediction

CNN, LSTM, BiLSTM, and especially CNN-BiLSTM models achieve better performance than classical machine learning and matrix factorization approaches by capturing both local and sequential patterns in text.

4. Transformer-based models deliver superior contextual understanding

Models like **BERT** and **RoBERTa** significantly improve sentiment-aware rating prediction due to their ability to capture deep contextual meaning in user reviews.

5. Trust-aware mechanisms reduce noise and manipulation

Introducing trust weighting for credible reviews enhances robustness and fairness of recommendations, reducing the impact of spam or biased reviews.

6. Aspect-based sentiment analysis improves personalization and explainability

Using aspect extraction (LDA) combined with attention-based BiLSTM allows recommendations that reflect fine-grained user preferences, improving interpretability for end users.

7. Significant performance improvement demonstrated across datasets

Empirical evaluation on IMDb and Amazon datasets shows notable improvements:

- RMSE reduced from **1.15 to 0.78**
- F1-score increased from **0.70 to 0.82**
  This confirms the effectiveness of the proposed hybrid and deep learning models.

8. Theoretical and practical contribution to Recommender Systems

The work makes strong contributions in:

- Sentiment-aware modeling
- Explainable AI
- Trust-based filtering
- Deep and transformer-based architectures
  These are relevant for e-commerce, EdTech, streaming platforms, healthcare, and other domains.

9. Well-structured methodology and strong empirical validation

The research is systematic, well-implemented, and validated with comprehensive comparative studies and ablation experiments.

10. Clear scope for future research

The thesis identifies promising extensions, including multilingual systems, multimodal integration, temporal preference modeling, and deployment challenges in real-world environments.