

**Paper Title:** Enhancing Recommender Systems with NLP-based Biased Singular Value Decomposition

**Paper Link:** <https://ieeexplore.ieee.org/document/10213075>

## 1 Summary

### **1.1 Motivation**

The primary motivation of the paper is the integration of advanced NLP techniques and Biased SVD to introduce controlled bias for user and item preferences, thereby enhancing system performance while maintaining fairness and transparency.

### **1.2 Contribution**

The contributions lie in incorporating advanced NLP techniques and Biased SVD to address bias and fairness challenges in recommender systems. Additionally, the integration of neural network-driven sequential models further enhances overall performance.

### **1.3 Methodology**

The methodology involves utilizing the Amazon 5-core Movies and TV dataset, employing a combination of Biased SVD and NLP techniques, and incorporating sentiment analysis for a comprehensive user-item interaction analysis. The proposed improvements to the Simon Funk SVD model include Biased SVD (ratings only) and Biased SVD (ratings + sentiment).

### **1.4 Conclusion**

The paper concludes by demonstrating the effectiveness of the proposed NLP-based Biased SVD Recommender System. Additionally, FPMC is identified as a promising algorithm for sequential models on the Amazon 5-core Movies and TV dataset.

## 2 Limitations

### **2.1 First Limitation**

The first limitation is noted in the base Simon Funk SVD model, which exhibited poorer performance and longer convergence time compared to biased models. This suggests the need for further exploration to improve the baseline model.

### **2.2 Second Limitation**

The second limitation involves the trade-off between incorporating sentiment analysis and ratings. While the Ratings SVD model outperformed the Ratings & NLP SVD model, the latter demonstrated faster convergence than the baseline model. This trade-off should be considered in future enhancements.

## 3 Synthesis

The ideas presented in the paper open avenues for potential applications in developing efficient, fair, and transparent recommender systems. The integration of NLP with Biased SVD not only addresses existing challenges but also highlights the importance of considering both explicit and implicit user feedback. Future scopes may involve refining the balance between sentiment analysis and ratings for optimal performance in different scenarios.