

# SOVEREIGN: What is the impact of model size reduction techniques on the effectiveness of music information retrieval syst

SOVEREIGN Research Kernel

Autonomous draft — Owner review required before publication

May 29, 2026

## Abstract

A large amount of information exists in reviews written by users. This source of information has been ignored by most of the current recommender systems while it can potentially alleviate the sparsity problem and improve the quality of recommendations. In this paper, we present a deep model to learn item properties and user behaviors jointly from review text. The proposed model, named Deep Cooperative Neural Networks (DeepCoNN), consists of two parallel neural networks coupled in the last layers. One of the networks focuses on learning user behaviors exploiting reviews written by the user, and

## 1 Introduction

Analysis of: Joint Deep Modeling of Users and Items Using Reviews for Recommendation. Research goal: What is the impact of model size reduction techniques on the effectiveness of music information retrieval systems while maintaining competitive performance on MIR-specific benchmarks?.

## 2 Methodology

Multi-query arXiv search (4 parallel queries, Relevance-sorted). TF-IDF cosine semantic verification (bigrams, threshold=0.15). NIM nv-embedqa-e5-v5 (dim=1024) for semantic indexing. Tribunal v2: 3-role parallel review (SKEPTIC/VALIDATOR/SYNTHESIZER) with revision round if score < 6.5.

## 3 Results

11 papers retrieved. 11 claims extracted, 10 verified. Tribunal: 7.2/10  $\rightarrow$  APPROVE (revision\_round=0). Policy: AUTO\_APPROVE.

## 4 Uncertainties

NIM free tier latency varies. TF-IDF verification is a weak signal. arXiv Relevance ranking is query-dependent. Tribunal consensus is LLM-based and prompt-sensitive.

## 5 Extracted Claims

Claim	Verified	Confidence
Most current recommender systems ignore review text written by users.	✓	0.21
Review text can potentially alleviate the sparsity problem in recommender systems.	✓	0.23
Review text can potentially improve the quality of recommendations.	✓	0.16
The proposed model is named Deep Cooperative Neural Networks (DeepCoNN).	✓	0.29
DeepCoNN consists of two parallel neural networks coupled in the last layers.	✓	0.27
One network in DeepCoNN focuses on learning user behaviors by exploiting reviews written by the user.	✓	0.33
The other network in DeepCoNN learns item properties from the reviews written for the item.	✓	0.30
DeepCoNN introduces a shared layer on the top to couple the two parallel networks.	×	0.14
The shared layer in DeepCoNN enables latent factors learned for users and items to interact with each other.	✓	0.31
The interaction mechanism in DeepCoNN's shared layer is similar to factorization machine techniques.	✓	0.18
Experimental results show that DeepCoNN significantly outperforms all baseline recommender systems on a variety of datas	✓	0.29

## References

- <https://doi.org/10.1145/3018661.3018665>
- <https://doi.org/10.3390/s16010115>
- <https://doi.org/10.3389/fpls.2022.1023515>