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Recommendation System for Newly Published Research Papers using Joint Multi Relation Model

Madhesh V[1], Manikandan R[2], Mohamed Yasar A[3], Naveen Kumar G[4], Nithiya K[5]
Students, Department of Computer Science Engineering[1,2,3,4]
Assistant Professor, Department of Computer Science Engineering[5]
Anjalai Ammal Mahalingam Engineering College, Thiruvarur, India

Abstract: *Fetching recently published research papers is a time consuming and tedious process for young researchers and even for experts. In real time searching papers based on keywords and queries in search engines may not result apt or proper research papers that the user searched for. Because these research papers lack proper links and citations that help to find the most concerned papers. To overcome this problem a hybrid model is proposed with time constraint that combines the Text mining and Recommendation algorithm. The preference of papers and articles are jointly modeled with matrices sharing common dimensions of researchers and papers. The initial process starts with text mining algorithm that matches keywords with the data available in web pages. The post process consists of recommendation algorithms with latent matrix factorization and tensor matrix with similar preferences in a dimensional space. This paper explains the hybrid experimental model that helps users to fetch the most recent and relevant paper in a short period of time.*

Keywords: Recommendation system, joint multi relational model, sentimental analysis, tensor matrix and factor matrix

I. INTRODUCTION

Reading previously published articles is a vital duty for a to begin or carry out scientific inquiry.However, it takes a lot of time and effortto sift through hundreds of papers for relevant scientific research. Aside from that A researcher must examine recently published articles promptly because they include the most recent research findings However, because these publications consistently rank significantlylower than classic works due to their lack of citations and linkages, we frequently can't find them on the first page with contemporary search engines. In order to achieve this, we work to offer a method for recommending recently released articles to specific scholars.We need to address the following four issues in particular in order to suggest recently published articles to researchers: Cold Start Issue, Personalization Support, Interest Evolution, and User Behavior Difference are the first three. These four problems are interrelated, and we can solve them using a single model that can handle various relationships between researchers and papers. In the left portion, researchers are connected by lines of various lengths and hues, which can be read as a variety of social relationships, such as coauthors and coworkers. When researchers have similar research interests, they can group together as communities. Researchers are more likely to favour similar studies when they belong to the same community.The right portion shows how different relationships, such as citations, same topics, and common authors, connect different articles. Each relationship can be understood to mean different things depending on your point of view. Multiple relations actually suggest connecting recently published data.In order to address the issues of the cold start problem, personalization support, interest evolution, and user behaviour difference, we recommend recently published studies in this paper and suggest a multiple relation modelling method. The core relations of temporal user preference for papers and the auxiliary relations of social and article linkages are planned to be represented by a joint multi-relational (JMR) model. Articles are associated in three different ways in this combined relational model to facilitate multi-view article retrieval from a specialised viewpoint. The method of factorization can be thought of as an expanded derivation of earlier matrix factorization.In order to create similarity matching and simulate user behaviour for the paper recommendation re-ranking model, Li et al.1 introduce knowledge graph.

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II. LITERATURE SURVEY

Extensive Lise Getoor et al.'s "A Multi-Relational Approach to Recommendation Systems" was published in 2005.The framework for creating recommendation systems based on multi- relational data is proposed in this paper. The authors present a probabilistic graphical model that may represent the intricate connections among users, items, and qualities in a recommendation system.

Yehuda Koren's "Collaborative Filtering with Temporal Dynamics" (2010)

The method for modelling the temporal dynamics of user preferences in a recommendation systemis presented in this research. The author suggests a joint matrix factorization model that can account for both the relationships between various things and users that change over time.

By Julian McAuley et al. (2013), "Jointly Modelling Interactions between User Preferences and Item Attributes in Recommendation"

In order to represent the intricate relationships between user preferences and item features in a recommendation system, this study suggests a combined multi-relational model. On a number of real-world datasets, the authors demonstrate that their model outperforms conventional matrix factorization methods.

(2018) by Yingxin Liang et al., "Jointly Modelling Deep Video and User Embeddings for Recommendation"

In a video recommendation system, this study suggests a combined multi-relational model that can capture the intricate links between video content, user behaviour, and user demographics. On a sizable dataset, the authors demonstrate that their model outperforms a number of cutting-edge methods.

Lei Zheng et al.'s article "Jointly Modelling Social Networks and Item Attributes for Product Recommendation" was published in 2018.

In a product recommendation system, this study suggests a combined multi-relational model that can capture the intricate relationships between social network data and item features. On a real- world e-commerce datasets, the authors demonstrate how their model outperforms a number of cutting-edge methods.

III. MACHINE LEARNING ALGORITHM

3.1 Joint Multi Relational Model

It is commonly accepted that adding more relationships not only addresses the cold start issue but also enhances performance by taking into account extra factors. The preference of cold start users is biased towards their trusted users, where trust-based recommendation embraced additional knowledge of a trusted network. The trials showed that So Rec performed significantly better than the alternative techniques because it introduced social interactions to the user item relation. In order to understand the interactions between friendship and interest, Yang et al. demonstrated the strong correlation between the information contained in interest networks and friendship networks. By creating a three-order tensor, Karamazov ET Al. integrated context as a new dimension into the user-item relation to model multiple relations. In order to capture complicated relationships between several types of entities, recommendation systems may employ a joint multi-relational model, a form of machine learning model. The entities in a recommendation system could be persons, things (like goods or movies), or features(including genres, ratings, or other metadata).A network or graph is used to represent the entities and relationships in a collaborative multi-relational model. The model then develops the ability to forecast the probability of various associations between the entities. For instance, depending on a user's prior purchasing behaviour, the features of the item, and the features of other goods they have purchased, it might forecast whether the user will buy a specific item In a system for recommending papers, a joint multi-relational model may be able to predict a user's interest in a given paper based on their prior reading habits, the authors of the paper, its keywords, and the citation network connecting it to related papers. Because it can capture complicated interactions that are challenging to express using more straightforward techniques like matrix factorization or collaborative filtering, the joint multi-relational model is valuable in recommendation systems. The model's ability to include a variety of entities and relationships allows it to give users more specialised and precise recommendations

3.2 Proposed System

Data gathering: Gather information from a range of sources, including scholarly databases, research archives, and online publishing platforms. Data cleaning techniques including datanormalization, feature extraction, and

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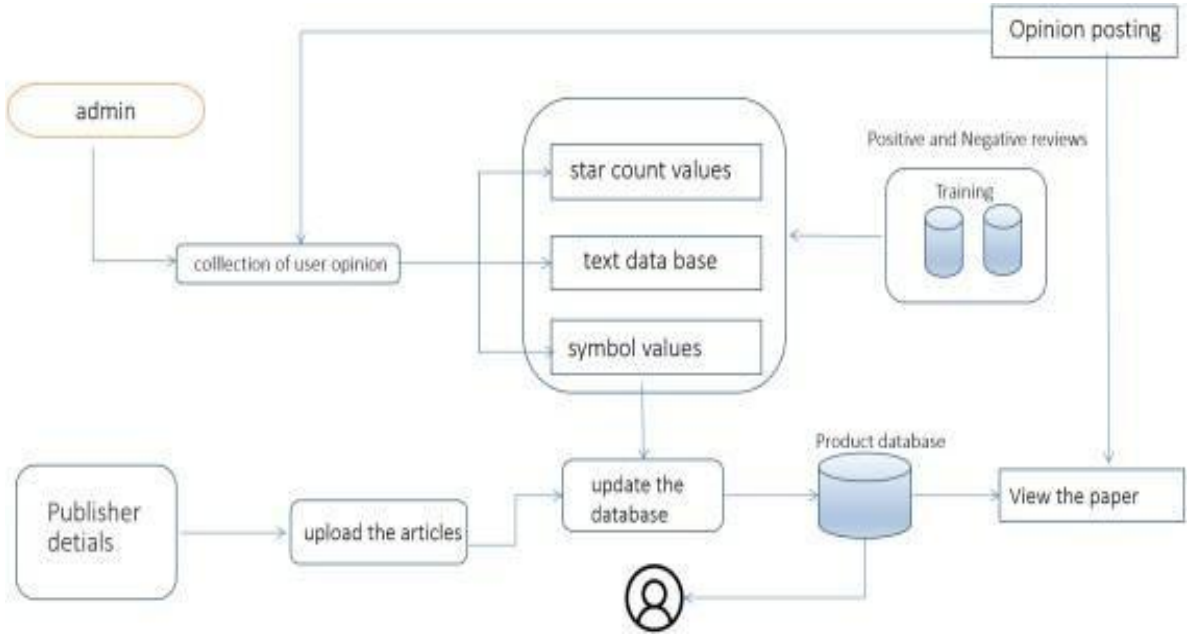
conditionality reduction are used to remove duplicates, format the data into a standard format,and per-process the gathered data. Extracting pertinent features from the pre- processed data, such as authors, keywords, abstracts, publication dates, and citation counts, is known as feature engineering. Modelling create a collaborative multi-relational model that can depict the intricate connections between the many aspects of the articles. To find the latent features that most accurately characterize the papers, the model should employ methods like matrix factorization, clustering, and deep learning. The model will be trained using the preprocessed data, and its performance will be assessed using metrics like precision, recall, and F1 score. Implementation: Implement the model in a user- friendly interface where users may enter their research interests and get recommendations for pertinent papers based on a combined multi-relational model. Continuous Improvement: Track the system's effectiveness over time and revise the model when new information becomes available. To increase the accuracy of the recommendation system, take into account user comments.



IV. CONCLUSION AND FUTURE SCOPE

A possible strategy for a recommendation system is a joint multi-relational model. The accuracy and relevance of recommendations can be increased by building a model with various relations. Joint modelling can also capture the interactions between several data kinds, producing recommendations that are more useful. The effectiveness of this strategy, however, is dependent on the calibre and volume of the data used to train the model as well as the particulars of its implementation. Therefore, additional analysis and testing are required to completely determine the effectiveness of this recently announced recommendation system. We offer a joint model that incorporates the temporal preference of users for articles with ancillary social and article relations in order to make personalised recommendations for recently published papers and solve the cold start issue. Tensors and matrices are used to model these many relations, which are connected on some shared dimensions to spread their influence. In order to support such joint tensor/matrix factorization and obtain the factor matrices, we have developed an effective algorithm. These factor matrices allow for the prediction of future preferences for recently published articles. Scalability of the suggested approach should be assessed, especially for big datasets and intricate relational structures. The development of salable methods and algorithms to manage enormous and varied datasets could be the main topic of future research. The proposed model might not be transparent, which would make it challenging for users to comprehend how suggestions are made. Future studies might concentrate on creating AI methods that are easy to grasp so that users can understand the recommendations. By incorporating user preferences, interests, and context into the suggested approach, personalisation could be improved. To make recommendations more pertinent, this could involve combining user input and behavioral data. The suggested model might be improved further to offer customers recommendations for new or unexpected

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goods. Users might learn about new products through this that they might not have otherwise thought about. The performance and precision of the suggested model could be increased by combining it with additional recommendation strategies like content-based, collaborative filtering, and deep learning models

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