

Chapter 6

Applications of Deep Learning–Based Product Recommendation Systems

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ABSTRACT

The high-tech world we live in today is dominated by multimedia. Multimedia is being created at a rapid rate in the current technological era. Consumption and the exchange of the same between users happen quickly. Choosing whatever form of content or multimedia to consume next depending on interests and preferences is a conundrum while consuming this content. Nowadays, all online streaming sites utilize multimedia recommender systems. These are utilized to anticipate the following collection of multimedia that users can enjoy based on their prior usage patterns. By identifying the points of commonality between the user and the goods, preexisting models can forecast this utilizing the collaborative field. By treating this as a sequence prediction problem, the proposed model in this chapter increases the predicted accuracy using collaborative filtering (CF), ripple nets, deep learning, and recurrent neural networks (RNNs).

1. INTRODUCTION

A customised computerised recommendation system known as a “multimedia recommender system” (MRS) makes recommendations based on the inherent characteristics of multimedia objects, historical user behaviour, and the collective user community’s behaviour (Yang et al., 2021; Kim et al., 2019) To address the issue of information overload, it is used to filter, prioritise, and effectively provide pertinent and tailored information. The multimedia recommender system uses a variety of media to recommend different material. It can alternatively be explained as a system that uses information filtering to present

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users with information that may be relevant to their everyday lives. The field of movies, music, games, books, and other media can all be predicted using this recommender system (Yang et al., 2021; Greff et al., 2015; Lavanya et al., 2021). The recommendation is challenging, though, and there have been various methods put forth over the years. Most of the methods encounter certain difficulties. The Cold Start problem, which arises when there is insufficient data for a product (due to a new release or low popularity), is one of the most frequent problems encountered. In this study, the model's accuracy has been improved by addressing the shortcomings of the many current models, merging them to provide more accurate results, and providing the user with more exact suggestions.

2. MOTIVATION

With a lot of content available online to consume, time being limited, and a large amount of knowledge to be ingested, there is a possible difficulty of information overload which impacts the quick and timely access to the items of interest (Rendle et al., 2010; Mikolov et al., 2013; Cho et al., 2014; Ruihui et al., 2018). The issue brought about by the enormous growth of the media market is that it is now difficult to decide what kind and how much of it should be consumed in order for it to be best and in line with user preferences (Yang et al., 2021; Brafman et al., 2000; Ruihui et al., 2018; Kim et al., 2019]. As a result, the recommender system provides the user with a very tiny, usable dataset that is well suited to the description after being provided with a big amount of data and the description they are looking for. By retrieving the information the user wants based on preferences, interests, and observed behaviours, recommender systems assist in resolving the issue of information overload. Users in complex information contexts can use it to make great decisions. As a result, there is a great need for effective and precise recommendation strategies within the system that offers users reliable and pertinent recommendations (Lavanya et al., 2021).

3. RELATED WORK

The previous research in this area as well as the competing models are explained in this section.

3.1 Existing Popular Approaches

Due to the advent of data-driven architectures, which attempt to analyse user behaviours and preferences to recommend goods, multimedia recommendation has suddenly grown to be a very hot topic. Machine learning models have been developed using this data-driven methodology, with variable degrees of success. However, recommendation is a highly challenging topic, thus there has always been a global effort to improve models each year. For instance, both the Image Classification Challenge for dog breeds and the Netflix Challenge for creating a model for movie and television show suggestions attracted a lot of interest. To attain the same goal, other models have been suggested. The most widely used models are Collaborative Filtering versions, such as User-to-User CF, Item-to-Item CF, and Hybrid CF (Brafman et al., 2000). The fact that RNN-based (Robin et al., 2017) models can encode sequence data contributes to their popularity. Graph-Based (Yang et al., 2021; Wang et al., 2018), Knowledge-Based (Mikolov et al., 2010), CNN (Hidasi et al., 2015), (Qian, 1999; Zeiler et al., 2012) models, and many others.

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