# **Semantic enhanced Markov model for sequential E-commerce product recommendation**

<https://link.springer.com/article/10.1007/s41060-022-00343-y>

To alleviate sparsity and ambiguous prediction problems, this paper proposes semantic-enabled Markov model recommendation (SEMMRec) system which inputs customers’ purchase history and products’ metadata (e.g., title, description and brand) and extract products’ sequential and semantic knowledge according to their (i) usage (e.g., products co-purchased or co-reviewed) and (ii) textual features by finding similarity between products based on their characteristics using distributional hypothesis methods (Doc2vec and TF-IDF) which consider the context of items’ usage. Next, this extracted knowledge is integrated into the transition probability matrix P� to generate personalized sequential and semantically rich next item recommendations. Experimental results on various E-commerce data sets exhibit an improved performance by the proposed model

<https://www.sciencedirect.com/science/article/abs/pii/S1567422316300837>

# **Predicting long-term product ratings based on few early ratings and user base analysis**

However, when the observed average is based on a small number of individual user-submitted ratings, the decision-maker may not feel as confident about the product, even when the average is high. The long-term average rating predictions can help online retailers to identify products to promote on their websites as “top picks”. The paper proposes a Bayesian Network model to predict the long-term average product ratings based on a (limited) number of early submitted ratings

<https://www.sciencedirect.com/science/article/abs/pii/B9780128194454000138>

# **Time and feature specific sentiment analysis of product reviews**

Important - In this work an “aging factor” to assign time-specific weights to the reviews has been introduced.

Abstract-

Customer reviews are a great source of firsthand experience–related information about the product. These can be usefully exploited to gain an insight about the product, its features, its improvements, its loopholes, etc. Such reviews are important for both companies and for the customers. For companies, these reviews act as feedback about their products, and for the customers, they are useful for analyzing whether or not to purchase the product. However, it becomes very difficult to go through all the reviews and analyze the product. Moreover, if one is interested only in few features of the product, it becomes a double-fold task for him. Also, it is very difficult to say that how good the product is as per the current market. Hence, sentiment analysis has been explored to analyze the review comments considering time- as well as feature-specific sentiments of product reviews. In this work an “aging factor” to assign time-specific weights to the reviews has been introduced. All the weighted reviews about the specific features sum up to give an overall idea about that feature. Customer reviews about a mobile phone, collected from Kaggle, have been used to perform the experiment. Various machine-learning algorithms, for example, Naïve Bayes, [support vector machine](https://www.sciencedirect.com/topics/chemical-engineering/support-vector-machine), random forest, and maximum entropy classifiers have been experimented upon, and the best working algorithm was chosen for further steps. At last an insight about the future work in this direction has been given.

<https://www.sciencedirect.com/science/article/abs/pii/S1568494622009437>

Most of the existing SA-based sequential recommendation models do not make use of temporal information, i.e., timestamps of user–item interactions, except for an initial attempt (Li et al., 2020). In this paper, we propose a Time-Aware Transformer for Sequential Recommendation (TAT4SRec), an SA-based [neural network model](https://www.sciencedirect.com/topics/computer-science/neural-network-model) which utilizes the temporal information and captures users’ preferences more precisely.

. Different from conventional recommendation such as content-based recommendation [3] and collaborative filtering [4], [5], sequential recommendation models have the capability of modeling the user–item interactions in a dynamic way and capturing sequential patterns [2], [6], [7], [8], hence they may provide more accurate recommendation. As a result, sequential recommendation models have been extensively studied in recent years and they have been successfully applied in various applications such as movie and music recommendation, e-commerce, traveling [9], [10], etc.

**Important**

A variety of sequential recommendation models have been proposed. The Markov-Chain (MC)-based models [11], [12], [13] are early attempts for sequential recommendation, for example, Factorizing Personalized Markov Chain (FPMC) [11] factorizes the user–item transition matrix to learn the short-term transition patterns and perform well in high-sparsity scenarios [14]. Since Recurrent Neural Network (RNN) is able to capture longer sequential dependence than MC, Recurrent Neural Network (RNN) models are proposed for their ability to capture long-range sequential dependence [15]

# A Multimodal User-Adaptive Recommender System

<https://www.mdpi.com/2079-9292/12/17/3709>

However, the untapped potential of incorporating item images into the recommendation process warrants investigation. This paper introduces an original convolutional neural network (CNN) architecture that leverages multimodal information, connecting user ratings with product images to enhance item recommendations.

<https://pubsonline.informs.org/doi/abs/10.1287/mnsc.1110.1458>

**Abstract**

This paper examines the informational role of product ratings. We build a theoretical model in which ratings can help consumers figure out how much they would enjoy the product. In our model, a high average rating indicates a high product quality, whereas a high variance of ratings is associated with a niche product, one that some consumers love and others hate. Based on its informational role, a higher variance would correspond to a higher subsequent demand if and only if the average rating is low. We find empirical evidence that is consistent with the theoretical predictions with book data from Amazon.com and BN.com. A higher standard deviation of ratings on Amazon improves a book's relative sales rank when the average rating is lower than 4.1 stars, which is true for 35% of all the books in our sample.

# Clickstream Prediction Using Sequential Stream Mining Techniques with Markov Chains

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we propose three stream mining algorithms to first find frequent sequential patterns. The algorithms then form statistical models, which are stored as Markov chains or transition matrices capturing frequent sequential patterns mined so far, to predict future user clickstream (e.g., the web page the user will visit next). Experimental results show the efficiency and prediction accuracy of our proposed Markov chain-based sequential stream mining algorithms in clickstream prediction.