

Developing a personalized food recommendation system based on deep learning models

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Abstract: The thesis focuses on researching and developing a personalized food recommendation system to optimize user experience in the online culinary domain. The author uses the Neural Collaborative Filtering (NCF) deep learning model, combining Generalized Matrix Factorization (GMF) to learn linear interactions and Multi-Layer Perceptron (MLP) to exploit complex nonlinear relationships between users and items. The implementation process includes collecting behavioral data (product viewing history), preprocessing, training the model with 45 epochs, and evaluating it through metrics such as Precision, Recall, F1-Score, and MAP. Experimental results show that the model achieves an accuracy of approximately 81.59% on the training set and remains stable at 75%–76% on the test set. Finally, the system is deployed in practice using the MERN technology stack (MongoDB, ExpressJS, ReactJS, NodeJS) and Flask API to provide an intuitive recommendation interface.

Keywords: Recommendation System, Deep Learning, Neural Collaborative Filtering (NCF).

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