

DSA RECOMMENDATION SYSTEM

TEAM : LEECHERS

GITHUB : [HTTPS://GITHUB.COM/UDAYB3/ML DSA RECOMMENDATION PROJECT](https://github.com/udayb3/ML DSA RECOMMENDATION PROJECT)

PROBLEM STATEMENT

Until now, there was no dedicated system for recommending Data Structures and Algorithms (DSA) problems, which posed significant challenges for students. Many struggled to identify which questions to practice in a structured and effective manner tailored to their strengths and weaknesses. To address this gap, our team undertook the project of developing a DSA Recommendation System aimed at helping students practice DSA systematically and improve their problem-solving skills efficiently.

Project Objective

Our objective was to create a DSA Recommendation Model that:

1. Assists students in selecting questions based on their individual strengths, weaknesses, and learning progress.
2. Ensures comprehensive coverage of DSA topics in a systematic manner.
3. Offers a personalized experience to help students practice smarter, not harder.

PREVIOUS APPROACH

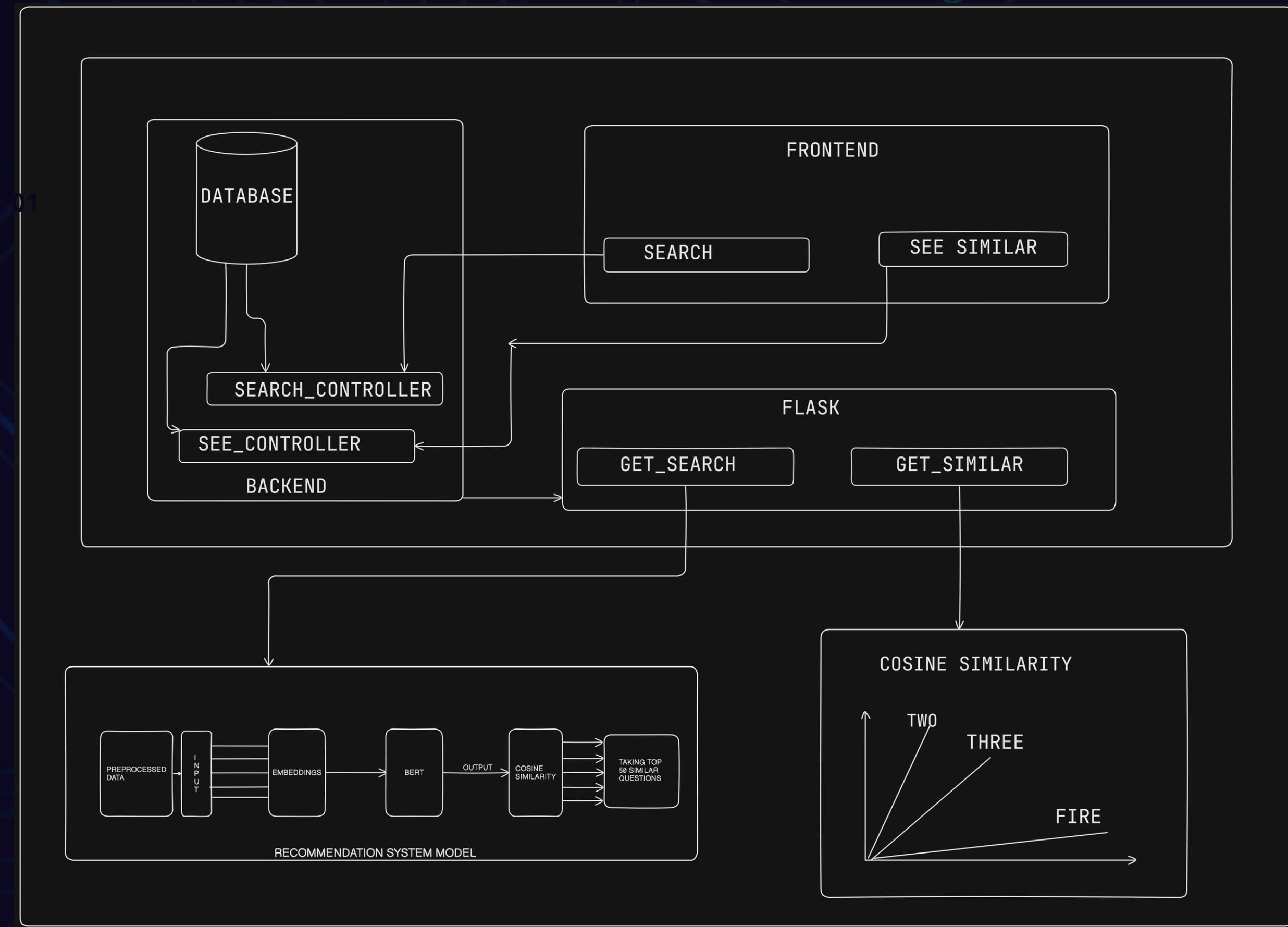
Currently, there are various recommendation websites, however the technology of recommendation has not been applied to the domain of DSA content recommendation. Hence, the use of recommendation has been unexplored in the domain of Data Structure and algorithm content. Through our idea, We solve the above stated problem by providing a hybrid-approach which uses architecture for Content-based and Collaborative filtering for both Item-based and User-based recommendation.

Discussing on the recommendation side, We have, also focused on Collaborative filtering. Current solutions typically use 2 different ways for Collaborative filtering: memory-based and model-based.

A Considerable amount of work has, also been done in the case of using neural networks for recommendation through different architectures by mega companies like Google, Facebook and more. However, this is majorly done on various products which are used by general public in day-to-day life. This type of work does not coincide with our problem statement. Furthermore, Recommendation is very recently being applied to different domains through advanced algorithms such as Actor-Critic and Proximal Policy Optimization. However, We could not find any work where recommendation techniques are used for the domain of question-answering which provides a novelty to our solution.

At last, many of other recommendation approaches done in this field, do not provide a full end-to-end solution for this task, which we have created during our project.

ARCHITECTURE



RESULTS

Our web-based platform leverages an innovative recommendation system to enhance users' learning experience in solving Data Structures and Algorithms (DSA) problems. Key features include:

- **Similar Question Recommendations:** For every question, users are presented with intelligently curated recommendations of similar problems. This feature is designed to help users deepen their understanding and improve their problem-solving skills within a specific topic.
- **Advanced Search Functionality:** Users can search for specific keywords or strings, and the platform provides a refined list of related questions. These results are ranked based on multiple factors such as the number of submissions, upvotes, tags, difficulty levels, and other relevant attributes, enabling users to efficiently discover the most relevant problems.
- **User-Specific Recommendations:** Our platform incorporates a neural network-based recommendation system that personalizes the user experience. For each user, the system assigns scores to questions, identifying and recommending those most aligned with their skill level, preferences, and learning trajectory. This tailored approach ensures optimal engagement and targeted skill development.

This approach not only streamlines learning but also fosters skill enhancement through targeted problem exploration and practice. Notably, such a comprehensive and intelligent recommendation approach is unique, as no similar platform currently exists on the internet.

CONTRIBUTIONS

Uday Bhardwaj- NRN for user to user recommendation, Flask backend

Suraj Gaikwad- Bag of word approach, Website frontend, Sentiment Analysis

Sumit Kumar Pathak- Bag of word approach, Website backend, Data scraping

Shaikh Arbaz- Self-attention embedding (BERT), Data logging

Sushil Raj- Self-attention embedding , Data scraping

REFRENCES

1. <https://medium.com/@corymaklin/memory-based-collaborative-filtering-user-based-42b2679c6fb5>

THANK YOU