

Personalized Learning Path Recommender

Motivation: The Personalized Learning Path Recommender is driven by the recognition that each student's academic background and experiences can significantly impact their readiness for a particular course, and this readiness often varies from one student to another. Traditional educational approaches, with their one-size-fits-all nature, can sometimes miss these individual nuances, potentially leaving some students overwhelmed and others unchallenged. This system seeks to address this disparity by offering a tailored roadmap that acknowledges the diverse backgrounds students come from. Given a user specified subject, the Personalized Learning Path Recommender creates a learning topic tree by analyzing the user's performance in an AI generated exam. It identifies areas of proficiency, areas that need further development, and areas that require more exploration. In doing so, it aims to optimize educational outcomes, ensuring that students are both adequately prepared and actively engaged in their academic journey.

Simple User Guide:

- Enter the topic you wish to explore (ex. "large language models", "ChatGPT", etc.).
- Click "START EXAM" to generate the exam.
- Answer all questions, then click "Create Learning Topic Tree".
- Review your proficiency, areas for development, and topics needing exploration.

AI-Generated Exam: The Personalized Learning Path Recommender, powered by OpenAI's API, creates a concise exam consisting of 10 multiple-choice questions, each offering four possible answers. By assessing the user's responses, it functions similarly to a placement test, effectively gauging the user's knowledge level in the selected subject area.

Learning Topic Tree: The Learning Topic Tree is used to review one's proficiency in the desired topic. By displaying the subtopics that need more improvement or need more exploration, it can help one prepare for the topic. Furthermore, one can spend less time on subtopics that are categorized as strengths. This ultimately helps with efficiency when preparing for a course.

Each node in the topic tree is labeled as one of the following:

- Strengths: Topics that the learner presents high understanding
- Areas for Improvement: Topics that the learner finds challenging or confusing
- To Be Explored: Topics that the learner may have not explored

Recommender Performance Evaluation:

While the Personalized Learning Path Recommender generally performs well, it faces significant issues. The current model in use, gpt-3.5-turbo, has been known to generate occasionally inaccurate results, especially in questions involving mathematical calculations. A potential solution is to upgrade to a more robust model like gpt-4.0. Additionally, there's a challenge with the format of the output response. Improper formatting of OpenAI's responses can cause parsing difficulties, leading to errors.

Additional Notes: Some topics that have been tested to work include "large language models", "ChatGPT", and "neural networks".