RUTA

Project Proposal

Introduction:

This project aims to develop a Machine Learning (ML) model that helps computer science students receive personalized course recommendations. The goal is to guide students toward courses that align with their skills, interests, and career goals, improving their learning paths and future job opportunities.

Problem Statement:

In the rapidly evolving field of computer science, students often struggle with identifying the foundational gaps in their knowledge, particularly when transitioning to more specialized fields such as web development, Flutter, Backend, machine learning, or data science. Traditional educational systems tend to offer generalized curricula that may not address individual weaknesses in core computer science principles like algorithms, data structures, or programming basics.

As a result, students may waste valuable time on areas where they are already proficient or, conversely, miss out on essential concepts they need to build a strong foundation for their desired career paths. This lack of personalized guidance leads to frustration, decreased motivation, and inefficiencies in learning.

Proposed Solution: An AI-powered system that generates personalized learning roadmaps for students by assessing their proficiency in key computer science fundamentals and aligning their learning journey with their chosen career track (e.g., web development, Flutter, data science). By conducting an assessment, the AI will identify gaps in students' basic skills and create a customized roadmap that addresses these deficiencies, gradually advancing to more specialized topics.

Objective: To provide students with a dynamic, personalized learning experience that bridges their knowledge gaps, accelerates their growth, and guides them toward mastery in their specific field of interest in computer science.

Goals:

1. Personalized Recommendations: Provide tailored Road map suggestions based on individual student data.

2. Enhanced Learning Experience: Guide students toward Road map that match their skill levels and foster their growth.

3. Market Relevance: Recommend Road map aligned with current market trends, especially in technology and IT fields.

4. Continuous Learning: Motivate students to enhance their skills by suggesting Road map that increase their job prospects.

Related Work:

Knowledge-Based Recommender System Using Artificial Intelligence for Smart Education on World Scientific:

Artificial intelligence can open modern opportunities and potentials for smart education. Smart learning purposes at providing holistic learning to learners utilizing modern technologies to fully prepare them for a fast-evolving world where adaptability is vital. With the advancement of technologies and within modern society, smart education will pose several challenges, like educational structures, pedagogical theory, educational ideology, technology leadership, and teachers' learning leadership. Therefore, in this paper, an Intelligent Knowledge-based recommender system (IKRS) has been proposed using artificial intelligence for smart education. The recommendation is generated by the genetic algorithm and K-nearest neighbor algorithm (KNN) utilizing the optimized weight attributes vectors that signify the learner's opinions. The experimental results show that the suggested IKRS model enhances student-teacher interaction, student involvement level, learning quality and predicts students' learning style compared to other existing methods.
Link: https://www.worldscientific.com/doi/abs/10.1142/S0219265921430313

An AI-based open recommender system for personalized labor market driven education:
Attaining those skills that match labor market demand is getting increasingly complicated, not in

the last place in engineering education, as prerequisite knowledge, skills, and abilities are evolving dynamically through an uncontrollable and seemingly unpredictable process. Anticipating and addressing such dynamism is a fundamental challenge to twenty-first century education. The burgeoning availability of data, not only on the demand side but also on the supply side (in the form of open educational resources) coupled with smart technologies, may provide a fertile ground for addressing this challenge.
Link: https://www.sciencedirect.com/science/article/pii/S1474034621002573