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Personalized Learning Path Generator

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A B S T R A C T :

The Personalized Learning Path Generator is a web-based application designed to provide users with a customized learning experience. It helps learners follow a structured learning sequence tailored to their skills, interests, and goals. Developed using the MERN stack (MongoDB, Express.js, React.js, Node.js), the system collects user details, evaluates their skill level, and generates a personalized learning path containing topics, courses, and resources in the proper order. The system also includes progress tracking and adaptive recommendations that adjust based on learner performance. Administrators can manage and update courses, ensuring that the system remains dynamic and up to date. This project promotes self-paced, effective, and personalized education using modern web technologies.

Keywords: Personalized learning, Learning path, MERN stack, Adaptive learning, Web application, Skill assessment, Progress tracking

1. Main text

1. Education in the modern era demands adaptability and personalization. Traditional one-size-fits-all learning methods often fail to meet the diverse needs of learners. The *Personalized Learning Path Generator* provides a technology-driven solution that builds customized learning sequences according to each user's skill level, interest, and objective.
2. This application combines machine learning logic with web-based interaction to design an individualized learning path. Once a user registers, the system collects their educational background and subject preferences. A short skill assessment is used to evaluate the learner's current knowledge. Based on the results, the system dynamically creates a roadmap of topics and materials that best suit their pace and goals.
3. Learners can track their progress, revisit previous modules, and receive updated recommendations as they complete more topics. This ensures continuous engagement and growth. The backend, powered by Node.js and Express.js, handles the logic and data transfer between the frontend and database. MongoDB stores course data, user details, and progress records, while React.js is used to create an interactive, responsive interface.

Nomenclature

A – Assessment score
B – Course module
C – Completion percentage

1.1. Structure

The project follows the MERN stack structure:

- **MongoDB:** To store user data, topics, and progress.
- **Express.js and Node.js:** To handle APIs and user authentication.
- **React.js:** To provide a dynamic and responsive user interface.

It Includes:
• User registration and profile setup
• Skill assessment and analysis
• Personalized learning path creation
• Progress tracking and adaptive recommendations

1.2. Tables

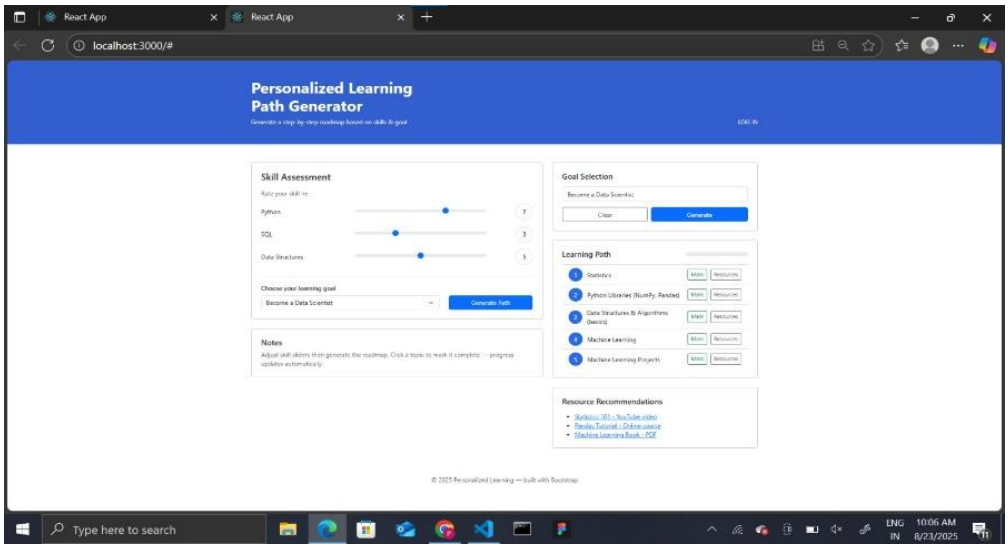
Table 1 - System Modules and Description

Module	Description
User Module	Handles user registration, login, and profile
Admin Module	Manages course content and user data

Module	Description
Learning Path Module	Generates and displays personalized sequences
Progress Module	Tracks completion and suggests improvements

2. Illustrations

Fig. 1 – System architecture of Personalized Learning Path Generator



It Illustrates the home page of our project..

3. Equations

4. Equations and formulae can be typed in MathType if needed.
For example:
(L = f(U, S, P))
where *L* represents the learning path, *U* is user input, *S* is skill score, and *P* is progress.

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