

PeerConnect: Optimizing Peer Tutoring with Predictive Analytics and Intelligent Matching

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Abstract

PeerConnect is an advanced mobile application designed to enhance academic support and peer-led learning by connecting students with compatible tutors based on their strengths, learning needs, and performance data. Addressing the challenges students face in finding effective academic assistance, the platform leverages predictive analytics and intelligent matching algorithms to recommend the most suitable tutors, optimize session scheduling, and monitor student progress, creating a personalized and data-driven learning experience.

The application incorporates features such as user registration, detailed tutor profiles with performance statistics, progress tracking dashboards, session scheduling with conflict detection, and AI-driven recommendations for study materials and tutors. Built as an iOS application using Swift with a Python-powered backend and MySQL database, PeerConnect prioritizes accessibility, user experience, and responsive design, making it suitable for students across diverse academic disciplines.

By integrating mathematical concepts such as weighted scoring, regression analysis, graph-based network modeling, and predictive probability, PeerConnect not only strengthens the peer tutoring process but also provides measurable insights into student performance and learning outcomes. The platform fosters a culture of collaborative learning, academic improvement, and knowledge sharing, offering a structured, reliable, and scalable alternative to informal or traditional tutoring services.

PeerConnect ultimately aims to enhance student academic performance, engagement, and retention by providing a robust, technology-driven peer support system. Future development may expand AI-driven analytics, subject coverage, and integration with institutional learning management systems, highlighting the transformative potential of math-informed, data-driven educational technology in higher education.