

Elenkas: A Socratic-Based Learning Assistant

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Abstract: *Elenkas is an AI-powered Socratic tutoring system designed to enhance learning in Data Structures and Algorithms (DSA) and Big Data Analytics. Unlike traditional tutors that provide direct answers, Elenkas engages learners through strategic questioning, encouraging critical thinking and self-discovery. The system responds exclusively with Socratic prompts for array-based DSA problems, while ignoring unrelated queries. It features adaptive difficulty, adjusting the tone and complexity of questions based on user performance and learning mood. Integrated with the Judge0 CE API, Elenkas supports real-time code execution and Socratic debugging, promoting hands-on problem-solving. Leveraging Gemini 2.0 Flash as the core language model and Big Data analytics for behavioral insight, it delivers personalized learning experiences and recommends targeted practice problems. Experimental evaluations demonstrate improved conceptual retention, increased engagement, and higher problem-solving accuracy, positioning Elenkas as an innovative tool in AI-driven, inquiry-based education*

Keywords: Socratic Method, Artificial Intelligence (AI), Data Structures and Algorithms (DSA), Adaptive Learning, Code Execution, Educational Technology, Real-time Feedback, Gemini 2.0 Flash, Judge0 CE API, Personalized Learning

