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Generative AI and Learing: Using Retrieval-Augmented Generation (RAG) for C++ Tutoring

By utilizing advancements from the field of AI, we hope to develop a tutor app that addresses the questions of introductory-level C++ programming students (such as those in CSC108 at Quinsigamond Community College), while creating a framework to expand into other academic areas. A Retrieval-Augmented Generation (RAG) approach will provide targeted feedback, dynamically generating context-specific responses by interfacing with a locally hosted AI.

Our goal is to minimize the risk of oversaturated or generic responses. We will use a C++ backend, coupled with web hosted JavaScript for the front end. The backend will process incoming questions from users, communicate with the AI model, and ensure that the answers generated are both concise and relevant. The front end will allow students to easily input their questions and view immediate feedback, which ultimately enhances the interactive learning experience. The JavaScript functionality will be custom-built, while the graphic design from a previous project will be used. Combined, these systems will create a user-friendly application that provides students with clear and direct responses to their specific queries.

Overall, the project aims to create a scalable and efficient tutoring tool that not only improves students’ understanding of C++ programming concepts, one that could be integrated into both educational platforms and directly into IDEs like Visual Studio Code. The desired outcome is an engaging, adaptive, and accessible learning environment that can be extended to additional subjects and environments in the future.