Interactive Educational Game Using LLaMA for Question Generation

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***Abstract*—This project presents an interactive educational game based on educational content extracted from PDFs that uses context-aware questions and scenarios generated by LLaMA, a Large Language Model. Quizzes and text-based storytelling are used to educate science and history in an interesting way. Through dynamic question generation, the system adjusts to the student's progress, providing individualized and engaging learning opportunities. The proposed solution provides a novel approach to automating educational content generation, enhancing engagement and learning outcomes.**

I. Problem Statement

Current teaching resources frequently lack flexibility and involvement. For example, [1] investigates adaptive learning but relies on pre-established question templates, which restricts the system's capacity to process a variety of educational materials. Similarly, [2] does not address automated quiz generation from unstructured educational information, but it does demonstrate the effectiveness of generative models for engagement. A more adaptable approach is required, one that makes use of LLaMA to automatically produce scenarios and questions from texts that are relevant to a given domain, guaranteeing learning that is dynamic and adjustable in real-time.

II. Introduction

Automating and improving educational procedures is a huge potential of generative AI, particularly LLMs like LLaMA. These models are useful for developing educational games because they can produce complicated and cohesive text from various inputs. This project aims to turn static content into an interactive learning tool by using LLaMA to generate questions from science or history PDFs. By customizing situations and exams, the system engages students with dynamically generated content that changes according to their performance and learning path.

III. Related Work

- [1] Adaptive Learning Systems with Question Generation Models draws attention to the drawbacks of pre-defined templates in adaptive learning and make the case for the necessity of real-time content adaption.
- [2] GPT-3 in Education: While discussing how generative models increase engagement, Enhancing Engagement through AI does not specifically address dynamic question generation.
- [3] This research expands on AI in Educational Games by utilizing LLaMA to generate questions in real time. AI in Educational Games explores AI-driven games and the significance of customized content development.

IV. Proposed Solution

The proposed system uses LLaMA to generate interactive educational scenarios and quizzes from PDF-based content. The workflow consists of:

- **Text Extraction:** Extract content from educational PDFs using NLP techniques.
- **Scenario Generation:** Use LLaMA to create interactive scenarios based on the content.
- **Question Generation:** Dynamically generate quiz questions aligned with the learner's progress, providing feedback and adapting difficulty accordingly.
- **Learner Interaction:** Users interact with the generated content, and their responses are processed to adjust the subsequent questions.

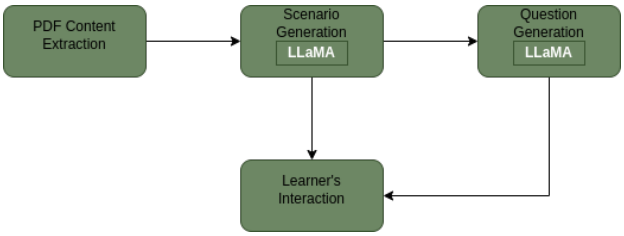

Fig. 1. Overview of the Interactive Educational Game Workflow

References

[1] A. Author and B. Author, "Adaptive learning systems with question generation models," *IEEE Transactions on Learning Technologies*, vol. 5, no. 3, pp. 1–10, 2022.

[2] C. Author and D. Author, "Gpt-3 in education: Enhancing engagement through ai," *Journal of AI in Education*, vol. 4, no. 2, pp. 20–30, 2023.

[3] E. Author and F. Author, "Ai in educational games," in *International Conference on Learning and Technology*, 2023.