Sparkle.ai

Project Proposal

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Abstract

Sparkle AI is an education platform designed to simplify learning, make it more interesting, and more personalized for every learner. Rather than having learners type out long queries or navigate through generic content, Sparkle AI allows them to type in a straightforward way (for example: "I want to learn loops in coding") and then it generates a tailored learning pathway. This begins with a brief onboarding survey that queries about their preferences, such as whether they tend to learn through examples, pictures, brief summaries, or thorough explanations.

Once Sparkle AI gets to know the learner's learning style, its AI agents translate the request into clear steps, construct milestone-based lessons, and generate interactive SVG graphics so that ideas can be better understood. Learners are also allowed to upload their own study material, which goes through AI checks for quality and safety before being incorporated on the platform. The purpose of Sparkle AI is to enable students to learn quicker and more effectively by making the process as straightforward as possible and aligned with their learning style.

1. Introduction

Each student learns in a different way. Some like diagrams, others like step-by-step explanations or brief notes. But the majority of online learning platforms and AI tools treat them all the same. It is a time-wasting strategy and makes learning more frustrating, as students need to adjust to the tool rather than the tool adapting to them.

Sparkle AI is tailored to address this issue. Initially, the students respond to some questions to indicate how they prefer to study. Subsequently, when they enter a basic question (such as "I want to learn recursion"), Sparkle AI employs AI agents to narrow down the request and produce content that reflects their style. The learning content is structured into milestones and presented with interactive SVG diagrams so that ideas are more easily visualizable and memorable.

The platform also enables community learning, in which students can share their own content for others. An AI moderation mechanism ensures the material is safe and useful. Focusing on personalization, interactivity, and simplicity, Sparkle AI seeks to revolutionize the way students learn on their own.

2. Goals and Objectives

The goals and objective of Sparkle AI are as follows:

- To build a learner profile through a short question survey.
- To let students start learning with a single, simple question.
- To generate step-by-step learning paths with milestones.
- To create interactive SVG visuals that improve understanding.
- To make AI tools easier by removing the need for repeated questions.
- To build a shared library of content, checked by AI for quality.
- To give learners the power to define their own learning paths

3. Scope of the Project

The first version of Sparkle AI will focus on first year University Course Programming Fundamentals . The platform will create milestone-based content for topics such as variables, loops, conditions, functions, and recursion.

Future versions can be expanded to cover more courses and subjects. The scope for the current version includes:

- Learner onboarding and profile creation.
- Refining and simplifying learner questions.
- Generating milestone-based SVG visuals.
- Community uploads with AI moderation.
- simple dashboard for learners.

Advanced features such as real-time collaboration, gamification, and mobile app support can be added in later phases.

4. Initial Study and Work Done so Far

Researchers have tried different ways to make learning systems smarter and more helpful. For example, D'Mello and Graesser worked on tutoring systems that change based on both what students know and how they feel [1]. Their work shows that learning improves when the system adjusts to the learner's emotions and thinking style.

Ferdig [2] explain that AI in education has a lot of promise, but most tools today are not fully personalized. They usually g [1]ive correct answers, but the way they explain things is the same for everyone. This often forces students to put in extra effort to adapt to the system.

A practical example is Khan Academy's AI tutor "Khanmigo" [3]. While it can answer questions well, students still need to rephrase or adjust their questions many times to get the explanation they want. This shows that personalization is still missing.

S.Wang [4] looked into modern AI techniques like deep learning and reinforcement learning. Their work shows that these methods can help create systems that adapt better to each student's learning style and progress.

From these studies, we see that while many tools exist, most are either too generic or require too much effort from learners. Sparkle AI builds on this work by keeping things simple: students only need to give one input, and the system creates personalized, visual (SVG-based) content that matches their learning style.

5. References

[1] S. K. D'Mello and A. Graesser, "Designing emotionally and cognitively adaptive intelligent tutoring systems," *nternational Journal of Artificial Intelligence in Education,* 2012.

[2] R. E. Ferdig, "Artificial Intelligence in education: Promises and implications for teaching and learning," *TechTrends,* 2020.

[3] K. Young, "Khan Academy's Khanmigo: An AI Tutor Experiment," *EdSurge,* 27 April 2023.

[4] S. Wang, Z. Zhao and C. Xu, "Personalized learning with deep learning and reinforcement learning," *IEEE Access,* 2020.