MedhaBee - Inclusive Education Platform

Team: Status_Code 418

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Introduction

Learning should be open to all, accessible to all, despite their circumstances. MedhaBee is for anyone who has the will to learn. Factors such as language, dialect, lack of tech literacy should not be a factor in learning. You should only have the curiosity to learn. MedhaBee lets you access this innate curiosity and learn by asking questions for anything you want to learn. An integrated chatbot responds to all your queries. There is a voice command integrated with this chatbot that lets you ask your questions directly in your language (we have implemented Bangla and English). The user can also listen to the response instead of reading through it.

Problem Addressed

MedhaBee targets two specific challenges outlined in the problem statement:

- **Language and Literacy Gaps**: In Bangladesh, most scientific resources are in English, which is not the primary language for the majority of the population. This creates a barrier for Bangla-speaking learners. Additionally, varying literacy levels make it difficult for users to comprehend complex scientific terminology, necessitating simplified content and multilingual support.
- **Inclusivity for All**: Individuals with disabilities, such as visual, auditory are often excluded from educational platforms due to a lack of accessibility features. Solutions like screen reader compatibility and voice navigation are essential to ensure equal access to scientific content.

Solution Description

- **AI-Powered Translation and Simplification**: Using the Gemini API, MedhaBee translates complex scientific content into Bangla and English, offering simplified or advanced explanations based on user needs. This ensures accessibility for learners with varying literacy levels.
- **Multimedia Learning**: A video library fetches science-related content from YouTube, organized into categories like Biology, Physics, Chemistry, and Medicine, with a simplified mode for beginners.
- **Interactive Daily Content**: Curated "Did You Know?" facts are tailored to user-selected categories, with quizzes to reinforce learning and promote critical thinking.
- **Accessibility Features**: The platform includes screen reader optimization, voice navigation ensuring usability for users with disabilities. User can ask questions in his local dialects and can listen to the answer.

Key Features

- **AI-Powered Chatbot**:
    - Integrated with the Gemini API, supporting English and Bangla queries.
    - Offers Simplify/Advance modes to tailor responses to user literacy levels.
    - Includes **Text-to-Speech (TTS)** for audio output, with **Speech-to-Text (STT)** for voice input, enhancing accessibility.
- **Video Player Interface**:
    - Fetches YouTube videos categorized by science topics (Biology, Physics, Chemistry, Medicine).
- **Curated Daily Content**:
    - "Did You Know?" facts are tailored to user-selected categories (e.g., Physics, Biology), with a quiz after every 10 facts to reinforce learning.
    - Low-bandwidth design ensures accessibility in rural areas, as implemented in the FactsPage component with category filtering and navigation controls.
- **Accessibility Features**:
    - Screen reader optimization with ARIA labels and alt-text for visuals.
    - Voice navigation (e.g., "Hey MedhaBee, simplify this") for hands-free control.

Technology Stack

MedhaBee is built with modern, scalable technologies to ensure robust functionality and accessibility:

- **Frontend**: Next JS and Tailwind CSS.
- **Backend**: Fast API and MongoDB Atlas
- **APIs**:
    - Gemini API.
    - YouTube API.
    - Azure Speech API

Impact and Future Scope

- **Impact**: By offering content in Bangla and English with simplified explanations, MedhaBee makes learning accessible to non-English speakers and low-literacy users. Accessibility features like screen reader support and voice navigation ensure that users with visual, auditory, or motor impairments can engage fully, promoting equal opportunities. Curated facts and quizzes foster critical thinking, helping users distinguish credible science from misinformation, a key need in combating pseudoscience.
- **Future Scope**: Our next target is to implement offline-first capabilities to serve areas with no internet connectivity, enhancing accessibility. We can develop a mobile app to increase user engagement and accessibility on smartphones.