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Edutech Tools - An Ai Tool Web Application

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Abstract

EduTech Tools is an innovative internet-based educational assistant designed to streamline mastering using superior NLP era. Built on Flask, it integrates AI-pushed offerings for transforming uncooked textual content into primarily based definitely getting to know substances. The device employs T5-primarily based query technology, permitting educators to create various, context-conscious questions results, assisting in evaluation and comprehension. Additionally, BART summarization condenses prolonged texts into easy, concise summaries to prevent information overload. YAKE-based totally key-phrase extraction identifies maximum important topics and performs actual-time net queries via DuckDuckGo Search, retrieving multiple-desire questions and similarly assets for better information. A man or woman-first-rate interface affords committed routes for Q&A era, MCQ topic seek, and summarization, making sure seamless functionality. With sturdy mistakes managing and logging mechanisms, EduTech Tools operates smoothly, supplying a scalable and interactive method to digital learning. This project exemplifies how current-day AI can be harnessed efficaciously to create personalized, available academic useful resource for university children and educators alike.

Keywords:-AI-Powered Learning, Educational NLP, Automated Question Generation, Text Summarization, Keyword Extraction, Flask-Based Web Deployment, MCQ Retrieval, DuckDuckGo Search Integration, Interactive Learning Support, Digital Education Tools.

Introduction

The digital transformations of educational facilities has introduced opportunities for improving how knowledge is delivered, consumed, and assessed. With the massive growth of online learning platforms, digital textbooks, and open educational resources, students and educators are provided with a vast amount of information that can often be difficult to process efficiently. In such an rich-information environment, there is an increase in need for intelligent educational tools that can be assisting in filtering, organizing, presenting content in a meaningful and personalized manner. The combination of Artificial Intelligence (AI) and Natural Language Processing (NLP) into educational technologies has emerged as a promising duo in solutionin addressing these- challenges.

This paper introduces EduTech Tools, a web-based AI educational assistant designed to automate and enhance several key learning functions. The system enables users to input raw text and receive a range of educational outputs including concise summaries, context-aware questions and answers, keywords, and personalized course recommendations. These capabilities are achieved through the integration of NLP models such as BART for summarization, T5 for question generation, and YAKE for extracting key word. The platform also leverages web search APIs to retrieve external learning resources based on the extracted keywords, thus extending its applications beyond static content analysis.

The architecture of EduTech Tools is built using the Flask web framework, ensuring less weight and scalable deployment. The backend handles various API requests while maintaining secure user authentication. The frontend is developed with HTML, CSS, and JavaScript, providing users with an intuitive and interactive interface accessible across multiple devices. Has Dedicated modules for Q&A generating, content summarizing, MCQ link generation, and course recommendations are implemented through clean RESTful API endpoints.

The main impulse of this work is the integration of multiple NLP models into a simple platform that addresses real-world educational needs. The system not only supports students in understanding and reviewing complex material but also assists educators in generating learning materials and assessments with minimal effort

In this paper, we present the design, implementation, and evaluation of EduTech Tools, demonstrates how modern AI techniques can be effectively used to improve learning efficiency, accessibility, and utility. The results indicate that intelligence automation in education can significantly improves the evolving demands of digital learners and educators alike.

LITERATURE REVIEW

Existing Systems

The training technology place has additionally visible tremendous increase, with most systems imparting digital analyzing offerings. The conventional fashions together with Learning Management Systems (LMS) including Moodle, Blackboard, and Google Classroom permit educators to shape coursework, percentage materials, and song student common overall performance. These fashions do not rely a great deal on computerized content material introduction and absence AI-powered automation for customized gaining knowledge of research.

Smart tutoring with the aid of explaining and answering questions posed via college students via AI-powered gaining knowledge of assistants together with ChatGPT and Khan Academy AI has been added. However, the ones are usually content material fabric fabric-centric and do now not dynamically assemble installed gaining knowledge of additives from clients' input textual content. Quizlet and SMMRY are gear that offer self sufficientabilities but fail to combine a couple of AI-powered abilities right right into a unmarried end-to-end device.

Also, key-word discovery and extraction device like Google Scholar facilitate research but aren't interactive, actual-time retrieval of pertinent reading fabric close to person enter. Existing Edutech systems usually excel at summarizing, query generation, or beneficial useful resource searching however not an end-to-stop AI-based totally clearly answer

Technological Advancements and Proposed System

With the short pace of technology improvement, which includes AI, cloud era, and NLP, training has have become extra agile and accessible. Legacy systems aren't computerized and no longer covered, and curation of content is completed manually. EduTech Tools, which may be created the use of Flask, leverages AI to optimize gaining knowledge of thru the automation of text summarization, question creation, and aid identity. Working on models like BART, T5, and YAKE, it maximizes educational performance without sacrificing personalized mastering experiences. This proposed system addresses shortcomings of gift Edutech structures, offering an interactive AI-solution

METHODOLOGY

A. Requirement Analysis

The task focused on integrating AI-powered getting to know guide, in conjunction with Q&A technology, summarization of content material cloth, quiz tracking, and route recommendation. Requirements had been amassed from newbies and teachers to emphasise more on usability, scalability, and personalization for better analyzing effects.

B. System Design

EduTech Tools is an software this is modular in nature and has a Flask-primarily based totally backend, REST API issuer integration, and responsive frontend that is coded the usage of HTML, CSS, and JavaScript. AI fashions gather man or woman queries for query technology, content cloth fabric summarization, and direction tips, all of which might be nicely included.

C. Database Setup

The backend makes use of session tracking indoors Flask to hold man or woman development, together with formerly solved Q&A, summaries, and path suggestions. The gadget additionally optimizes database queries for efficient retrieval of content material cloth, protecting the safety and customer privacy.

D. Backend Development using Flask

The backend exposes REST API endpoints for generating Q&A, summarizing, producing links, and recommending guides, bearing in thoughts easy request coping with. Flask handles natural language inputs, invokes the AI fashions, and presents set up outputs to make the interaction clean for clients.

E. Frontend Development

The EduTech Tools frontend is customer-fine and interactive, coded with HTML, CSS, and JavaScript to guide a responsive man or woman interface. It consists of Q&A era, content cloth summarizing, quiz monitoring, and path advice, with help for analyzing on any device. The minimalistic UI optimizes purchaser interplay with AI-enabled instructional assist through installed opinions for clients. With cellular responsiveness, it optimizes pc, tablet, and get in touch with use for smooth exploration of content fabric. Its minimalist format optimizes academic strategies, minimizing cognitive

load and maximizing overall performance for every college college students and teachers. The system helps dynamic studying with immediate feedback.

F. LLM and Prompt Engineering

The system makes use of modern-day AI fashions together with T5 for question era and BART for summarization to provide entire educational assistance. YAKE is applied for powerful key-word extraction to decide key subject matters for prolonged content material material retrieval. For utmost accuracy, the use of activate engineering is implemented to track answers from AI models, schooling the device to provide context-specific, context-sensitive solutions which may be constant with scholarly cloth. Properly written prompts growth coherence, flexibility, and accuracy, making AI-created content material cloth worth of tutorial standards at the same time as optimizing scholar engagement and statistics.

CONCLUSION

EduTech Tools employs contemporary AI models which incorporates T5 for machine gaining knowledge of-primarily based question era and BART for summarizing content material material to offer the last processing of examine cloth. Keyword extraction with YAKE lets in pick out the most vital subjects, enabling correct retrieval of the take a look at cloth. To decorate the accuracy of AI, activate engineering refines answers via asking the system to offer context-touchy, based, and academically sound answers. This makes AI-generated content cloth cloth coherent, relevant, and relevant to college university students' studying necessities. The synergistic impact of LLM automation and nicely-crafted activates complements learning via interplay, personalization, and information-driven gaining knowledge of.

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