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AI-Enhanced Student-Centric Learning Resources Catalogue and Management Portal with Integrated Chatbot Assistance

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Abstract: Due to the increasing availability of digital resources, it has become difficult for students to efficiently access and manage academic resources. The AI-Enhanced Student-Centric Learning Resources Catalogue and Management Portal with Integrated Chatbot Assistance is a centralized platform for organizing and accessing academic resources like lecture notes, PDFs materials, video links, previous question papers, important topics, online tests and syllabus copy. Ai powered Chatbot provides instant academic support to the students to clarify their doubts and guide them to find their relevant resources and recommend important topics based on their syllabus and exam patterns. The AI-enhanced student resources portal is a web based application we use angular framework for frontend, spring boot for backend technology, MySQL for database and REST APIs for AI integration. The online test module enables students to check their knowledge on the particular topic with automated evaluation. The system enhances student engagement, reduces dependency on multiple platforms to collect their relevant resources in higher education institutions.

Index Terms: Artificial Intelligence, Student-Centric Learning, Resource Management, Chatbot, Personalized Learning.

I. INTRODUCTION

Due to increasing growth of digital resource it is difficult to find out the exact resources such as notes, PDFs, video lectures, online assessments, important topics, previous question papers according to our syllabus for higher education students. While these materials offer accessibility and pliability, higher education students frequently faces problems in efficiently locating the related content, receiving continuous support for academic and managing study resources. Learning management systems mainly focus on delivering resources according to their syllabus, lacking intelligent mechanisms for personalization and real time assistance for the learners. As a result, students face information overload and reduced learning efficiency.

Most existing learning management systems are designed mainly for content storage and distribution. AI techniques such as natural language processing, machine learning and recommendation systems provide personalized learning experiences for the learners, adaptive tests, and intelligent user interactions. Integrating all these into one platform can significantly improve student engagement, academic performance and comprehension. AI powered chatbots can provide instant assistance to student doubts, provide guidance to learners through course content, and provide assistance to find out the efficient resources.

This paper proposes an AI-enhanced student-centric learning resources catalogue and management portal with integrated chatbot assistance is designed to address the problems faced by traditional systems. The proposed system offers a centralized platform for organizing and managing diverse academic resources while using AI- driven personalization and analytics to purpose learning paths to individual student needs. By integrating intelligent resource management with continuous chatbot assistance, the system aims to improve the overall efficiency of the student in modern educational environments.

II. LITERATURE REVIEW

Recent studies show the need for adaptive and inclusive digital learning resources due to increasing learners of higher studies. Ingave´ lez-Guerra et al. researched the automated adaptation of free educational resources by pointing learner

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priority, educational specific needs, and accessible dataset [3]. Their work tells that many existing educational systems lack proper availability features, particularly for notes and videos content. By applying AI approaches such as natural learning processing, deep learning and speech recognition this study shows that the learning resources are automatically converted into accessible form. However this proposed system does not provide any guidance assistance to the learners. In comparison, learning systems which provide assistance based Artificial intelligence technology have been inspected to help student interaction and personalized learning. The AILA body introduces an AI - driven chatbot that analyzes student learning paths to provide personalized guidance and study support [1]. The chatbot assistance improves student satisfaction and decreases interaction with instructors. Even with its effectiveness in learning support, the system does not provide the resources according to their syllabi and academic regulation.

Other research highlights the importance of trusting Artificial Intelligence in education institutes. AI- enhanced student centric learning resources catalogue and management portal it provides understandable explanation for decisions. This system shows that chatbot assistance improves learning confidence, involvement, and acceptance of AI systems. Chatbot assistance in learning systems has gained more popularity because of its ability to provide support within fraction seconds. From the analysis of these studies, the existing systems only provide personalization, availability and chatbot assistance separately. This reveals a certain gap for a single platform, AI- enhanced student centric learning resources catalogue and management portal that combines AI-based recommendations, availability of resources, and integrated chatbot assistance.

III. METHODOLOGY

The system AI - Enhanced Student - Centric Learning Resources Catalogue and Management portal with integrated chatbot assistance is a single platform that enables students to find out resources according to their syllabus and regulations. It offers notes, PDFs, video lectures, previous question papers and assistant tests. The methodology follows a systematic way with centralized resources management, chatbot assistance to guide students, personalized recommendations within a single framework.

A. Architecture Design

The System architecture mainly contains five layers: user interface layer, application layer, AI processing layer, data management layer, and the final layer that is API integration layer. In the user interface layer, it provides role based access for the students and faculty, which enables interaction with resources and chatbot assistance. The application layer mainly focuses on authentication, mapping the resources according to the syllabus. The AI processing layer implements natural processing models for recommendations and analyzing student interaction. The data management layer stores the user details, academic resources, and logs, while the integration layer enables communication with APIs.

B. Learning Resource Collection and Syllabus Mapping

The resources such as PDF materials, video links, previous question papers, lecture notes, and tests are stored in a centralized catalogue. This syllabus mapping delivers content accord- ing to the institutional academic regulations. This structured way improves student engagement and supports intelligent assistance.

C. AI Based Personalization and Recommendation

AI based personalization continuously monitors student engagement, resources usage patterns, test performance to support personalized learning to everyone. Machine learning algorithms continuously monitor student data to recommend resources. Based on the students' interaction, the system recommends relevant resources such as notes, PDFs and video lectures.

D. Integrated Chatbot Assistance

Chatbot provides assistance to the students to find out the resources, to clarify their subject doubts and provides real time academic support. The AI chatbot uses natural processing language to understand student problems related to subject,tests, and resources navigation. The chatbot also supports students by providing appropriate resources and assigning tests on their learning status, thereby reducing instructor workload and increasing student engagement.

E. Assessment and Learning Analytics

The system supports online tests with automated evaluation and instant feedback. Student performance data is analyzed to provide learning analytics, progress reports, unit wise performance and trends to improve their performance. These analytics assist both students and faculty in maintaining learning resources efficiently and focusing on areas which require additional support.

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Fig. 1: System architecture overview of the AI-Enhanced Student-Centric Learning Resources Portal

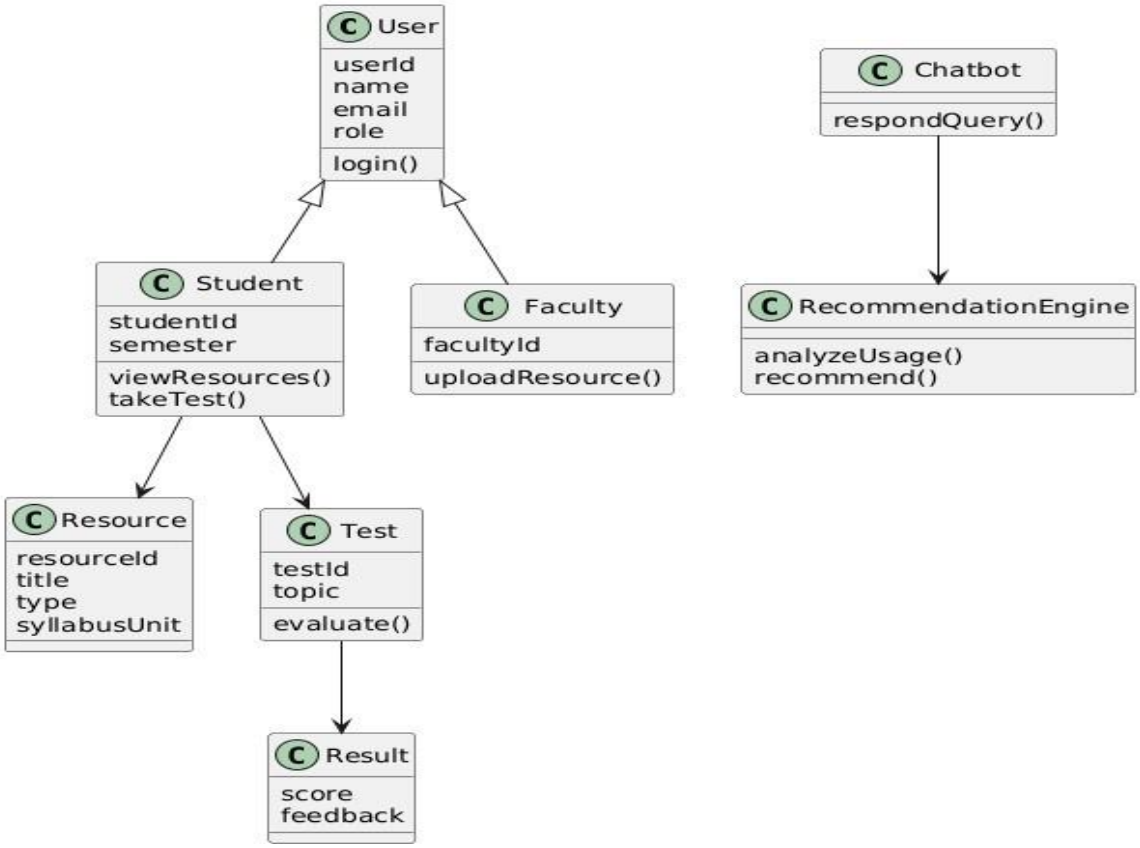

Fig. 2: AI-based personalization and recommendation system workflow

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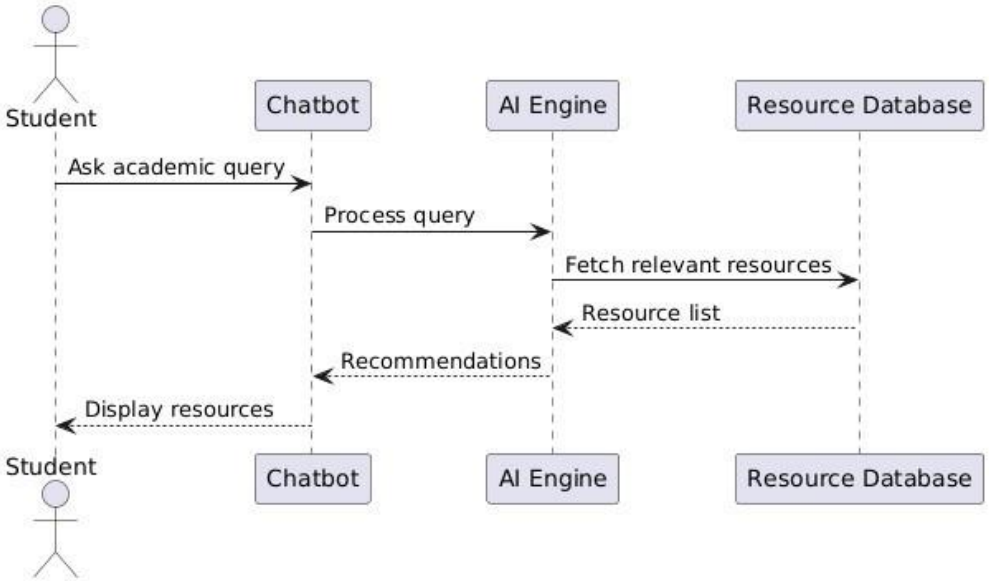

Fig. 3: Integrated chatbot assistance interface for student support

IV. RESULTS

The proposed system was tested to assess its efficiency regarding the dissemination of learning resources as per the academic syllabus. During the testing process, access was granted only to the notes, videos, links, and e-notes that corresponded to their regulation, semester, and syllabus. Thus, it ensured that all learning resources were pertinent to academically valid. The recommendation component based on AI successfully identified valuable study materials based on student engagement data, for example, most frequently browsed topics, and so forth. Without bringing any content outside the prescribed syllabus.

The result showed that the integrated chatbot performed well in answering immediate academic and navigational support. Students were able to easily access resources related to the syllabus. instant answers to familiar academic questions. In contrast to traditional learning scenarios, platforms; the proposed system will enable a reduction in the time required to search for relevant study materials and enhanced system usability. The users demonstrated improved efficiency in learning, better engagement, and heightened satisfaction, substantiating the efficacy of AI-based, syllabus-aligned.

V. DISCUSSION

The results of the proposed system prove that delivering strict learning resources throughput can learn in accord with the academic syllabus and institutional rules are significantly enhanced. Focus and relevance to the content. Only syllabus- mapped notes, videos, links, and The system minimizes con- fusion that is usually caused by unrelated material and helps students with the e-notes focus on necessary subjects. This step-by-step method favors effective learning and ensures. That means students interact only with academically approved content. Intimate integration of Artificial Intelligence further improves the effectiveness of the platform through features like chatbot assistance. The recommendation mechanism, based on AI technology, is able to personalize the resource suggestions according to the students' needs. activity within syllabus boundaries without the introduction of any non-curriculum content.

Moreover, the chatbot offers instant academic and navigational support, decreasing response time for student queries and reducing dependency on instructors for routine assistance. Put together, all these features demonstrate that a syllabus- driven, AI-enabled learning system is able to provide both personalization and control within academic settings on digital educational platforms.

VI. CONCLUSION

The following is an AI-powered and student-focused learning resources catalog and management portal that has the support of the chatbot in order to assist in the structured and syllabus-based digital learning. The proposed system is capable of managing learning contents such as notes, videos, links, and e-notes strictly as per prescribed academic

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syllabus and institutional rules, without changing or updating the content of the syllabus. By keeping the syllabus aligned, the System systemically ensures academic relevance and prevents ambiguities that result from unconnected learning resources. The combination of Artificial Intelligence and chatbots helps in better learning experience based on the ability to recommend learning materials to students based on activity instant aca- demic support. The AI-based recommendation system enables students to reduce the time spent searching for appropriate resources, while the chatbot helps in fast navigation and searching queries resolution. Experimental evidence indicates that the system improves efficiency of learning, raises student participation, and is a practical answer for carrying out intel- ligent, syllabus-driven learning platforms within educational institutions.

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