



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** X **Month of publication:** October 2026

DOI: <https://doi.org/10.22214/ijraset.2026.85099>

www.ijraset.com

Call: ☎ 08813907089

E-mail ID: ijraset@gmail.com

AI-Powered Adaptive Learning and Smart Education Platform

Pranav Kohad¹, Rahul Tiwari²

Student, Department of Computer Science, G.H Rasoni Skill Tech University, Nagpur, Maharashtra, India

Abstract: Education is becoming increasingly digital, yet many students still face difficulties in understanding complex concepts, remembering long answers, identifying their learning gaps, and preparing effectively for examinations. This paper presents an AI-powered adaptive learning platform designed to provide personalized and interactive learning support. The system uses Artificial Intelligence to explain questions in detail, generate short exam-oriented answers and recall keywords, analyze students' performance, identify knowledge gaps, and recommend suitable learning tasks. The platform also provides 3D visualization for mathematical and geometric concepts, AI-assisted learning for languages such as Marathi and Sanskrit with Hindi and English explanations, AI-based viva examination, instant tests, PDF/notes-based learning, progress tracking, and gamification. The main aim is to make learning personalized, understandable, interactive, and focused on actual student improvement rather than simply providing answers.

Keywords: Adaptive Learning, Artificial Intelligence, Smart Education, Personalized Learning, 3D Visualization, Knowledge Gap Detection, AI Viva, Gamification, Bilingual Learning

I. INTRODUCTION

Education is becoming increasingly digital, but many students still face difficulties in understanding complex concepts, remembering long answers, identifying their learning gaps, and preparing effectively for examinations.

The proposed project is an AI-powered adaptive learning platform designed to provide personalized and interactive learning support to students. The system uses Artificial Intelligence to explain questions in detail, generate short exam-oriented answers and recall keywords, analyze students' performance, identify knowledge gaps, and recommend suitable learning tasks.

The platform also provides 3D visualization for mathematical and geometric concepts, AI-assisted learning for languages such as Marathi and Sanskrit with Hindi and English explanations, AI-based viva examination, instant tests, PDF/notes-based learning, progress tracking, and gamification. The main aim is to make learning personalized, understandable, interactive, and focused on actual student improvement rather than simply providing answers.

II. PROBLEM STATEMENT

Students often face difficulties in understanding complex concepts, recalling lengthy answers during examinations, identifying their weak areas, and maintaining a consistent learning routine.

Traditional learning platforms generally provide educational content or question-answer functionality but may not provide a complete personalized learning cycle that includes concept explanation, visualization, recall assistance, assessment, knowledge-gap detection, and personalized task recommendation.

Mathematical and geometric concepts can also be difficult to understand when they are presented only through text and 2D diagrams. Additionally, students learning languages such as Marathi and Sanskrit may require explanations in familiar languages such as Hindi or English.

Therefore, there is a need for an integrated AI-based adaptive learning **platform** that can understand individual student needs, provide personalized explanations and visualizations, evaluate learning progress, detect knowledge gaps, and recommend appropriate learning activities.

III. JUSTIFICATION FOR SELECTING THE TITLE

The title "AI-Powered Adaptive Learning and Smart Education Platform" has been selected because the proposed system uses Artificial Intelligence to provide personalized learning assistance to students.

The term "AI-Powered" represents the use of Artificial Intelligence for question answering, explanations, knowledge-gap detection, AI viva, testing, and language assistance.

The term “Adaptive Learning” represents the system's ability to analyze student performance and recommend suitable learning tasks according to individual strengths and weaknesses.

The term “Smart Education Platform” represents the integration of multiple educational features such as 3D mathematical visualization, PDF-based learning, progress tracking, gamification, instant tests, and personalized learning assistance within a single platform.

IV. OBJECTIVES OF THE PROJECT

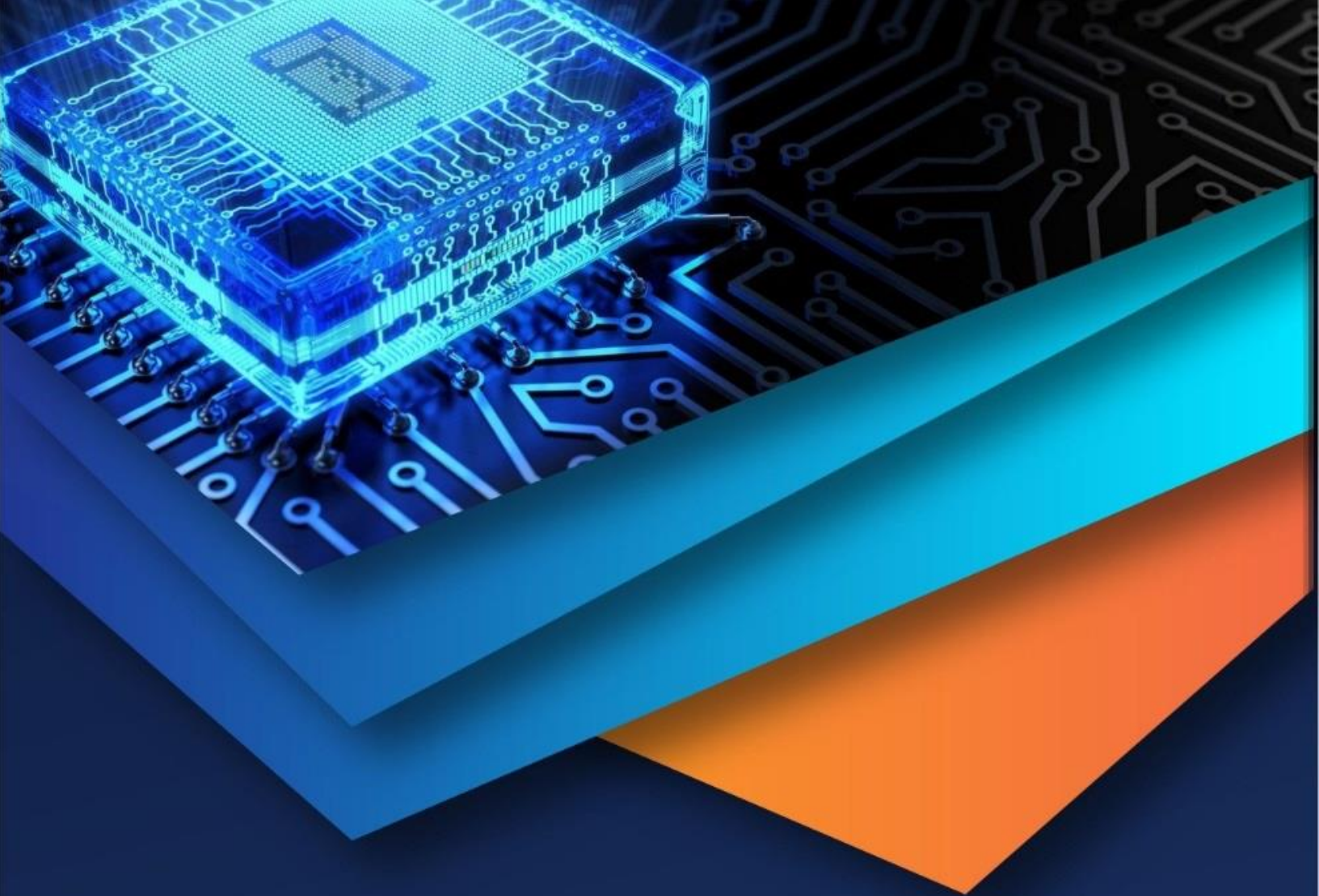
The primary objectives of the proposed platform are as follows:

- 1) To develop an AI-powered platform that provides personalized learning assistance to students.
- 2) To provide detailed explanations, short exam-oriented answers, and important keywords to improve understanding and recall.
- 3) To provide interactive 3D visualization for mathematical, geometric, and other complex concepts to improve conceptual understanding.
- 4) To identify students' knowledge gaps based on their learning and assessment performance.
- 5) To generate personalized daily learning tasks according to the student's progress and areas of weakness.
- 6) To provide instant tests and AI-based viva examinations for continuous assessment.
- 7) To enable students to learn from their own notes and PDF documents according to a specific syllabus or topic.
- 8) To provide bilingual AI assistance for learning languages such as Marathi and Sanskrit using Hindi and English explanations.
- 9) To motivate students through progress tracking, learning streaks, and gamification.
- 10) To create a unified learning environment that focuses on understanding, practice, recall, assessment, and continuous improvement.

V. EXPECTED RESULTS

The proposed system is expected to provide:

- 1) Personalized AI-based learning assistance according to individual student requirements.
- 2) Detailed conceptual explanations along with short exam-oriented answers and recall keywords.
- 3) Improved understanding of mathematical and geometric concepts through interactive 3D visualization.
- 4) Identification of individual knowledge gaps through continuous assessment and performance analysis.
- 5) Personalized daily learning tasks based on the student's strengths and weaknesses.
- 6) Instant topic-wise and chapter-wise tests for continuous practice.
- 7) AI-based viva examination to improve examination and oral-answer preparation.
- 8) Learning assistance from uploaded notes and PDF documents for syllabus-specific preparation.
- 9) Bilingual support for learning languages such as Marathi and Sanskrit through Hindi and English explanations.
- 10) Progress tracking and gamification features to encourage consistent learning habits.
- 11) A unified platform that helps students move through the complete learning cycle: Learn ☐ Understand ☐ Practice ☐ Recall ☐ Assess ☐ Improve.



10.22214/IJRASET



45.98



IMPACT FACTOR:
7.129



IMPACT FACTOR:
7.429



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24*7 Support on Whatsapp)