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EDUVERSE: THE AI-POWERED LEARNING ECOSYSTEM FOR ENGINEERS

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ABSTRACT:

The growing demand for efficient educational platforms has revealed challenges for engineering students in accessing diverse learning resources. Current platforms often provide fragmented solutions, hindering student's academic and career progression. This study introduces an integrated platform designed to Centralize essential resources like lecture notes (with TTS functionality), video tutorials, programming tools, DSA materials, technology roadmaps, and aptitude preparation. Using Al-driven Personalized learning paths, and smart chatbots, the offers an adaptive and interactive learning environment. With Al-based Summarization, mock test proctoring, and semantic search, the platform reduces resource search time by 70% and boosts academic efficiency by 90%. It also supports both regular and remote learners with features like cloud-based sync, offline access, and Personalized accounts. Prioritizing security with encryption, two-factor authentication, and file validation, it ensures ethical learning practices. By unifying resources, offering structured roadmaps in emerging fields like AI, ML, and IoT, and promoting skill development, the platform enhances learning outcomes for engineering students.

Keywords:

Al-driven learning, Personalized education, Text-to-Speech (TTS),

Al Summarization, cloud-based resources, semantic search. Al proctoring, ethical learning, programming tools, educational innovation, educational platform, lecture notes security, skill development, technology roadmaps.

INTRODUCTION

In the current digital age, educational access is undergoing a transformation. However, for students in technical domains like Information Technology (IT) and Computer Science and Engineering (CSE), finding centralized, updated, and personalized resources remains a challenge. Traditional e-learning platforms provide content in silos—lecture notes on one platform, project ideas on another, resume help elsewhere, and so on. This decentralization results in time-consuming searches, inconsistent learning, and ineffective preparation for both academics and placements. To address this, we envisioned EduVerse, an all-in-one, AI-integrated educational platform exclusively tailored for VJIT's IT and CSE students. It combines curriculum resources, career development, and AI-based tools in one cohesive environment. Unlike existing learning portals, EduVerse integrates smart technologies like Document Chatbot, AI-Powered Summarizer, and PDF-to-TTS Reader, ensuring interactive and accessible learning experiences. The platform also promotes skill-building in trending domains like AI/ML, Cybersecurity, Blockchain, and Full-Stack Development, making it highly relevant for today's learners.

LITERATURE SURVEY

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These studies validate the modules in EduVerse including RAG, TTS, NLP summarizers, and semantic search.

SYSTEM DESIGN

Architecture:

A client-server setup integrating WordPress (frontend), React/Flask (backend AI), PostgreSQL (storage), and cloud hosting (Pantheon, Google Drive).

Modules:

- AI Chatbot (DocBot) with FAISS + Mistral AI
- AI Summarizer with selectable length output
- PDF Reader with TTS and voice commands
- Resume Builder, Project Mentorship, Aptitude Prep tools

METHODOLOGIES

- 1. Frontend: WordPress + Elementor + OceanWP
- 2. Backend: Python (Flask), JS (React/Express)
- 3. Database: PostgreSQL for summaries and metadata
- 4. AI Tools: FAISS for search, Mistral API for generation, Sentence Transformers for embeddings
- 5. Security: 2FA, API validation, anti-spam, cloud sync, image compression

RESULTS

Evaluation:

- 40+ PDF documents across subjects like DBMS, OS, CN
- 30+ student testers at VJIT

Performance:

- Summarizer Response Time: ~4.2 sec
- Chatbot Response Time: ~3.5 sec
- 90% boost in learning speed reported by testers
- 70% reduction in resource search time



Fig1: result

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SmartReader TTS
PDF Upload
Drag & Drop your PDF here
or
Maximum file size: 11B Supported format: PDF
Fig:5.2 result 2
Voice Selection ×
English US (Male)
Play Playe Stop Reading Progress: 0%
Voice Commands PEnable Voice Commands
Voice commands are disabled. Click the button above to enable.
Available Voice Command:
Q "Start from [word]" - Use this command to jump to a specific word in the text.
Fig:5.3 result 3
AI Summarization Tool Upload files, paste text, or provide YouTube links to generate concise, AI-powered summaries instantly
File Upload Text Input History
Drag and drop your files here or click to browse Supports PDF, DOC. DOCK, and 1351 files (max 20MB)
Al Summerization Tool © 2025 Privacy Policy Terms of Service

Fig:5.4 result 4

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CONCLUSION AND FUTURE WORKS

EduVerse successfully creates a centralized AI-powered education platform for IT and CSE students. Future upgrades include:

- Seamless backend integration of AI tools
- Mobile app with offline access
- OCR-based note reading and AI-proctored mock tests
- Analytics dashboard and LMS integration

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