Final Year Design Project Proposal

AI – Powered Smart Learning Assistant

“AiGen”

Submitted by

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Session

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Department of Information Technology

Govt. M.A.O Graduate College Lahore, Pakistan

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AiGen

(AI – Powered Smart Learning Assistant)

Abstract:

Students today face a big challenge while learning and preparing for exams — having too much study material and resources. Most of the time we ends up jumping between notes, YouTube lectures, and past papers just to prepare for exams, which often feels confusing and tiring. To solve this problem, **AiGen** will be designed as a smart study partner that helps students learn faster and more effectively using Artificial Intelligence. It brings together **five** helpful tools in one place:

- **Notes Summarizer** – quickly summarize your long notes and slides
- **Exam Preparation Tool** – to cover complete outline of a course for exam
- **Past Paper Solver** – solve previous past papers by uploading them
- **YouTube Video Summarizer** – summarizes long video lectures
- **Topic Explainer** – explains any tough or complex concept in simple words

AiGen will be built as a web app using Flask for the backend and HTML, CSS, and JavaScript for the frontend. It also uses SQLite to manage user login and sessions, while **LLMs** like Llama or OpenAI generate accurate and human-like explanations.

The project aims to deliver an AI-powered web assistant that helps students study smarter by automating summarization, explanation, and problem-solving — saving time and improving learning outcomes.

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1. INTRODUCTION

Background:

Recent studies show that AI is changing education by addressing the problems of traditional learning. In a study of 500 students, those using AI-based tools showed notable improvement in grades and consistency due to personalized feedback and adaptive content (Jian, 2023). Students found AI learning more engaging, while educators valued its analytics for identifying struggling learners and giving quick answers like **AI** tutors and chatbots makes learning more engaging. These findings highlight the growing need for smart, student-centered systems like **AiGen** make learning more personalized, efficient, and effective (Jian, 2023).

In real-world learning, students now face large amounts of study material—notes, slides, past papers, and videos — with limited time to review them all. This creates a strong need for AI tools that can summarize too much content and make study more efficient.
Research confirms that AI-supported personalization improves understanding and memory when designed responsibly.

Problem Statement:

In today's fast-moving academic environment, students often struggle to manage large amounts of study material — notes & slides, YouTube lectures, past papers, and online resources — especially when exams approach. According to research, students spend nearly **30–40%** of their study time just collecting and organizing resources instead of actual learning (Rane et al., 2023). Traditional learning methods requires a student to have a pen and paper and start from your first page of your reference book or watching long YouTube videos either they found effective or not and reviewing all collected study material, which is time-consuming and often ineffective.

Many students rely on multiple tools — ChatGPT for explanations, YouTube for lectures, and third-party summarizers for notes — leading to distraction and inconsistency. Most AI tools handle just one job or limited tasks. Therefore, **AiGen** combines five AI-powered tools (Notes Summarizer, Exam Prep Tool, Past Paper Solver, YouTube Summarizer, and Topic Explainer) into single unified platform for smoother, faster and effective learning.

Stakeholders & Interests:

University & College students: Need quick summaries, explanations, and prep tools for exams. The estimated potential among students are very large – Millions of students worldwide.

Teachers / Tutors: Can use AiGen to provide personalized help to students, saving time and improving classroom support. This market includes thousands of educators already adopting AI in teaching (Sanusi et al., 2024).

Online Learners: Students enrolled in short or professional courses are rapidly growing. With the rise of online learning, they increasingly need fast AI support to understand lessons more easily.

Educational Institutes: like schools, colleges, and universities are also potential customers, as they increasingly look for modern AI-based systems to improve student engagement and performance.

Objectives:

- To minimize overloaded study material among students
- To integrate multiple AI learning tools into one unified platform
- To save study time and enhance exam preparation efficiency
- To enhance accessibility and continuous learning support
- To ensure privacy, transparency, and ethical AI use

Scope:

- **AI-Powered Learning Tools:** AiGen contains five AI - Learning tools;
  - ❖ AI Notes Summarize
  - ❖ Exam Preparation Tool
  - ❖ Past Paper Solution
  - ❖ YouTube Video Summarizer
  - ❖ AI Topic Explainer

- **User Authentication System:** A login/register module using **SQLite** will manage users securely with session-based authentication.

- **Session-Based Data Management:** User interactions, chat histories, and generated data will be maintained temporarily during active sessions ensuring privacy and security.

- **Independent Tool Functionality**: Each tool will work independently in its own tab without interconnection, ensuring smooth usability and modular structure.

- **Web-Based Interface:** The application will be built using flask (Python) for the backend and HTML, CSS, and JavaScript for the frontend, providing a responsive, user-friendly web interface.

- **LLMs Integration:** The system will utilize **LLM** APIs (Gemini, OpenAI, or Llama) for natural language processing, text summarization, and intelligent response generation.

- **Target Audience:** The system is primarily intended for university and college students, especially those pursuing university and college, but can be beneficial for general learners as well.

2. LITERATURE REVIEW

Related Work:

Several AI tools exist today that students used for study and exam preparations, but most focus on a single task instead of providing a complete learning solution. Platforms like ChatGPT and Gemini help with general queries but lack structured academic support.
Tools such as **Scholarcy** summarize text documents, while **Eightify** and **Gling** summarize YouTube videos — yet none connect notes, videos, and past papers in one place (Lavanya, 2025).

Educational assistants like Khanmigo (Khan Academy) (Shetye, 2024) and tools like ChatGPT offer personalized help but are limited to specific resources (ChatGPT processed only 3 documents per day in a free tier account) and charged around 4-20$/month. Most existing tools also lack student's engagement with the tool — switching between apps, losing focus, and wasting time collecting scattered resources.

AiGen – AI-Based Smart Learning Assistant fills this gap by bringing all essential tools — summarization, topic explanation, past paper solving, and video summarization — into one AI-powered platform built specifically to make students' learning simpler, faster, and more effective.

Gap Analysis:

Most AI tools on only one task, like summarizing text or answering questions, but they don't cover all student needs in one place. Students still have to switch between different apps for notes, videos, and past papers, which wastes time and reduces focus.

Many existing tools also give general answers without following a course outline or academic context. On top of that, most advanced tools are paid or limited to certain platforms, making them hard to access for many students.

AiGen – AI-Based Smart Learning Assistant fills this gap by combining all essential learning tools — summarization, topic explanation, past paper solving, and video summarization
— into one simple, AI-powered platform that helps students study smarter and faster.

3. FYDP OVERVIEW

FYDP Title: _____

Name	Roll Number	Signature
CHOUDARY HUSSAIN ALI	22205 / 084593	

Table 1 Project Proposal Summary

Goals:
❖ Simplify and speed up learning using AI tools that save time and effort.
❖ Personalize study support to match each student's learning style and pace.
❖ Combine multiple study tools like summarization, past paper help, and topic explanations in one platform.
❖ Boost student confidence and performance through instant AI feedback and guidance.
❖ Protect user privacy and data by ensuring secure, temporary processing without storing personal information.
Objectives:
❖ Develop an AI-based web platform that integrates multiple smart learning tools in one place.
❖ Enable automatic summarization and explanation of notes, topics, and video lectures for quick understanding
❖ Provide instant past paper solutions and exam preparation support to help students study efficiently
❖ Ensure user data privacy and security by using temporary sessions and safe data handling.
Success Criteria:
❖ **Accurate AI Performance:** The system correctly summarizes, explains, and answers academic queries.
❖ **System Reliability:** The web app runs smoothly without crashes or long response times.
❖ **Improved Learning Efficiency:** Users show better understanding and faster revision compared to traditional methods.
❖ **Data Privacy:** User information and session data remain secure and are cleared after logout.

Assumptions:

- **Active Internet Connection:** Users have a stable internet connection to access AI tools and generate responses.
- **Quality Input Data:** Uploaded text, videos, or questions are clear enough for the AI to process accurately.
- **Availability of LLM APIs:** External LLM models (like Gemini or OpenAI) remain accessible through APIs for processing tasks.
- **Ethical Use:** Students will use the platform for learning purposes, not for plagiarism or cheating.

Risks & Obstacles:

- **Inaccurate AI Responses:** The AI may sometimes generate incorrect or incomplete explanations, affecting user trust.
- **Maintenance Challenges:** Regular updates are needed to keep the system aligned with AI model improvements and academic requirements.
- **API Dependency:** If external LLM services (like Gemini or OpenAI) face downtime, the system's performance may be affected.

Organization Address: Govt. M.A.O. Graduate College Lahore

Target end users: University & College students, Teachers, and Institutes

Suggested Project Supervisor: **Prof. Haseeb Azmat**

Approved By:

Date: 01 Nov, 2025

4. TOOLS & TECHNOLOGIES

Table 2 Tools Technologies and Libraries

	Tool	Version	Rationale
Tools , Technologies & Libraries	Python	3.11	Core programming language for backend logic
	Flask	3.0	Lightweight web framework for building the app backend
	Html	Latest	To structure the web pages and content layout
	CSS	Latest	For styling, colors, and responsive design.
	JavaScript	ES6+	Adds interactivity and handles frontend events
	SQLite or MySQL	Latest	Database for user login/registration.
	LLMs API	Latest	Provides AI-based content generation
	LangChain	0.2+	To manage AI prompts and memory more efficiently.
	EasyOCR / Tesseract OCR	Latest	Extracts text from images and scanned past papers
	VS Code	Latest	IDEs for development and debugging
	Git & GitHub	Latest	Version control and code collaboration.

5. DEVELOPER

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