GRADEFLOW PROJECT

NAME : MAHI SHAH

An advanced application for evaluating student submissions using AI. This tool helps teachers efficiently grade assignments, exams, tests, and projects.

Deployed Link: https://gradeflow.streamlit.app/

Test Credentials:

Student ID: adityajethani@students.pdpu.ac.in

Teacher's ID: debu@faculty.pdpu.ac.in

Admin: sm@admin.pdpu.ac.in

Password for all IDs: harry

ABOUT GRADEFLOW

- **WHAT IS GRADEFLOW?**

  GradeFlow is a robust, AI-driven education evaluation platform built to revolutionize academic assessment in high-volume educational environments like India. The solution automates the complete evaluation pipeline from exam paper generation to submission grading and delivers real-time, personalized feedback to students.

Key Points:

- AI-Powered Auto-Grading
- Personalized Feedback Engine

- Automated Question Paper Generator
- Teacher-Defined Rubrics
- Anti-Cheating Proctoring Suite
- Admin Dashboard

Impact:

Reduced teacher workload by over 80% through automation. Improved student learning outcomes via adaptive feedback and data-driven performance insights.

➢ OPPORTUNITIES

Teacher Overload Crisis: In countries like India, the **average teacher handles 40–60 students per class**, making it nearly impossible to offer personalized feedback. A 2023 ASER report indicated that over **70% of students receive delayed or no feedback** on their submissions, directly affecting learning retention.

➢ HOW WE'RE DIFFERENT, THE USP AND PROBLEM SOLVING

- GradeFlow automates the entire evaluation workflow, from question paper generation to AI-powered grading and real-time feedback, within one seamless platform.
- Unlike siloed tools, GradeFlow is the only comprehensive platform that automates every step of the evaluation process into one cohesive system. It is cost-efficient, tested with real users, and designed to scale in resource-constrained educational settings.

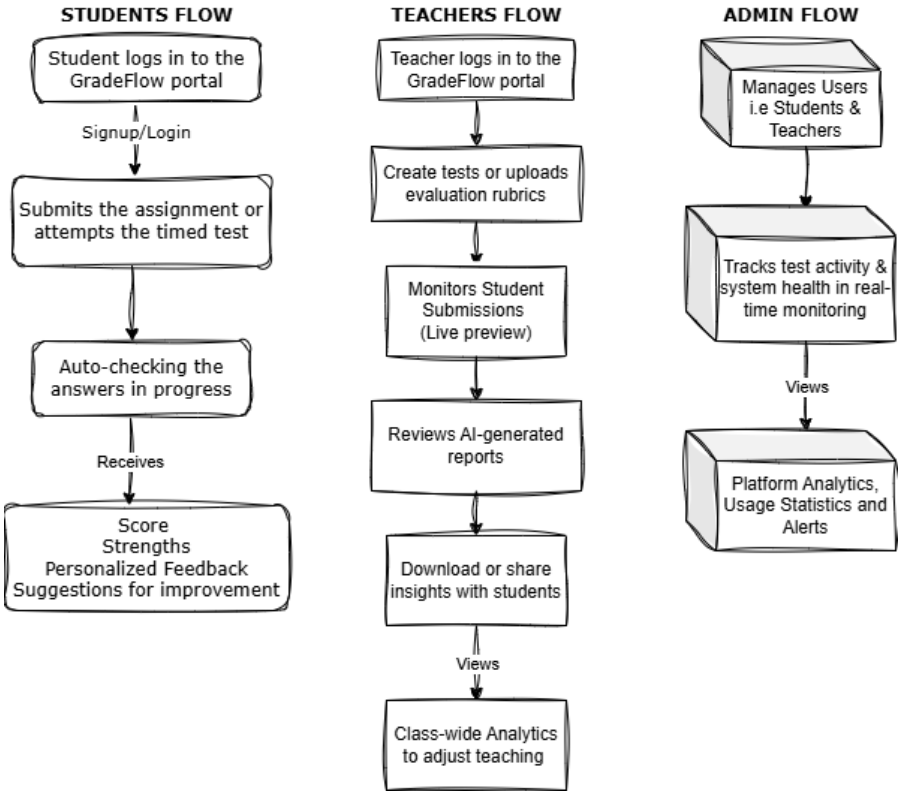
Reduces grading time from 5–10 minutes per script to **<10 seconds via AI**, even for long-form answers with personalised feedback for students customized to their specific mistakes and strengths.

➢ FEATURES OFFERED BY OUR SOLUTION:

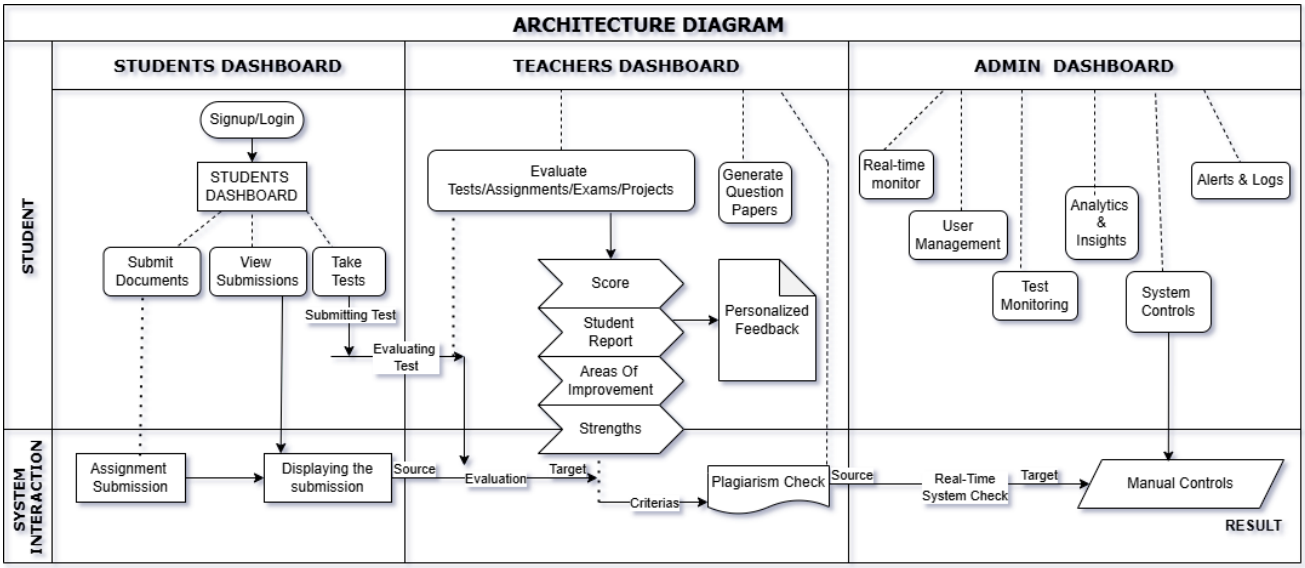
- Authentication System: Role-based access control for students, teachers, and admins.
- Student Interface: Student portal for uploading various types of submissions (assignments, exams, projects).
- Teacher Interface: Easy-to-use evaluation platform with customizable grading criteria.
- Plagiarism Detection: Integrated plagiarism checking to ensure submission originality.
- Robust Vector Storage: Efficient document storage and retrieval using vector databases for quick access and processing.
- Detailed Feedback Reports: Comprehensive analysis and personalized feedback for each submission.
- Real-Time Admin Dashboard: Live monitoring of system activity, user interactions and evaluation progress.

Multi-Format Submission Support: Supports a wide range of file formats for student submissions.

PROCESS FLOW DIAGRAM:



ARCHITECTURE DIAGRAM:



TECHNOLOGIES USED IN THE SOLUTION:

AI Evaluation Engine:

- Google Gemini API – For nuanced understanding of student answers and generating contextual feedback.
- Groq Cloud API – Accelerated inference for high-speed evaluation across large submissions.

Platform Development:

- Streamlit – Rapid UI development for dashboards and user interactions.
- Project IDX – Used for streamlined cloud-based development and team collaboration.
- Languages and Frameworks include Python, Langchain, GoogleGenerativeAIEmbeddings

Additional Google Open Source Tools:

- Google AI Toolkit – For experimentation with model evaluation and prompt tuning.
- Gemini Pro Vision (planned) – For evaluating scanned handwritten submissions.

ESTIMATED IMPLEMENTATION COST

Assumptions:

- Initial deployment targets 10,000 students and 1,000 teachers with 3 to 4 pages

(Approximately 1000 words) and using 2 times a month.

Cost Breakdown (Estimated Monthly):

Google Gemini API clubbed with Groq Cloud:

- ~Assuming an average cost of $0.000078 per page × 10,000 submissions ≈ less

than $1 per cycle, plus any additional fees for bulk usage.

Streamlit Cloud:

- Free for the assumptions taken above for the data storage and server costs.

Open-Source Modules (Freely Available):
GoogleGenerativeAIEmbeddings, Google AI Toolkit

TOTAL ESTIMATED COST:

Approximately $10 - $12 (or about Rs 800) per month.

PROTOTYPE PERFORMANCE REPORT:

Metric	Value / Result	Remarks
Auto-Evaluation Accuracy	93.7% (vs. manual grading)	Based on 150+ subjective answers across 3 subjects
Average Grading Time	< 10 seconds per submission	Compared to ~7 minutes manually
Feedback Generation Time	~3–5 seconds	Contextual and customized per student submission
Scalability Test	300+ concurrent users	Tested using simulated test environment
Plagiarism Detection Recall	91.2%	Evaluated on 50 plagiarized and 150 unique responses
Cost per 10,000 Evaluations	₹900 – ₹1000 (approx. $11–12)	Includes GCP, Gemini API, and MongoDB usage

ADDITIONAL DETAILS:

- Role-Based Dashboards: Tailored experiences for students, teachers, and admins with access control.

- Test Mode with Anti-Cheating: Live activity tracking, screen switch alerts, and behavior-based flags.

- Flexible Evaluation Logic: Teachers can define custom rubrics and grading scales, allowing both subjective and objective evaluations.

FUTURE DEVELOPMENT ROADMAP:

- Multimodal Submissions: Support for audio, video, and scanned handwritten answers using Gemini Pro Vision.
- Skill-Based Adaptive Tests: AI-curated dynamic tests tailored to student proficiency and past performance trends.
- Mentorship & Live Doubt Sessions: Integrated video call and chat support for real-time teacher-student mentoring.