

Final Year Project (Midterm)

July 2025-December 2025

PERSONALIZED AUTONOMOUS KNOWLEDGE UNIT(PAKU)

Supervisor: Dr. Anuradha Dhull
Dr. Srishti Sharma

Team Members:

Chahat Gupta	(22CSU205)
Yashika	(22CSU235)
Nikhil Gupta	(22CSU244)
Nischal Sharma	(22CSU211)

DEPARTMENT OF COMPUTER SCIENCE
AND TECHNOLOGY



DESCRIPTION OF THE BROAD TOPIC



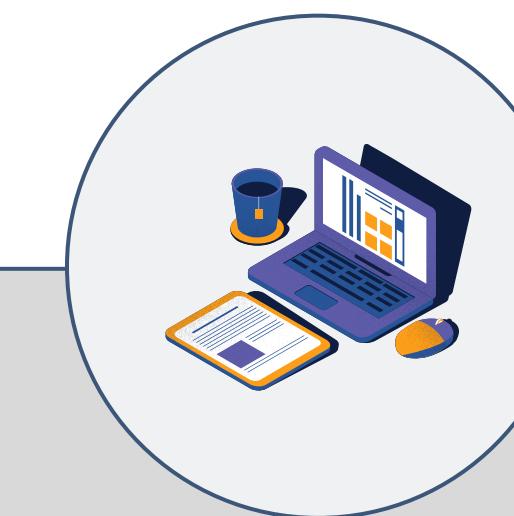
Core Concept

privacy-first AI that creates a user's complete digital clone—voice, face, and personality



Execution Environment

The entire system is designed for fully on-device execution without any reliance on cloud resources with distributed processing



Technology

Uses SLM for personality development and RAG for short term memory retrieval, with periodic finetuning using LORA



The Goal

optimized personal AI clone for teachers to assist in their specific workflows like meetings, exams, assignments, and student support

HACKATHON ACHIEVEMENT



Kalaसर्की

Features Sign Up

Create a Podcast

Transform your craft stories into engaging audio content. Our AI-powered podcast creator helps you script, record, and edit professional-quality podcasts about your traditional art. Share the history, techniques, and passion behind your work with a global audience.

Create Export

Podcast Configuration

Language & Dialect: Hindi

Podcast Length: Medium (5-12 min)

Format: Audio Only

Host Name: Priya

Content Creation

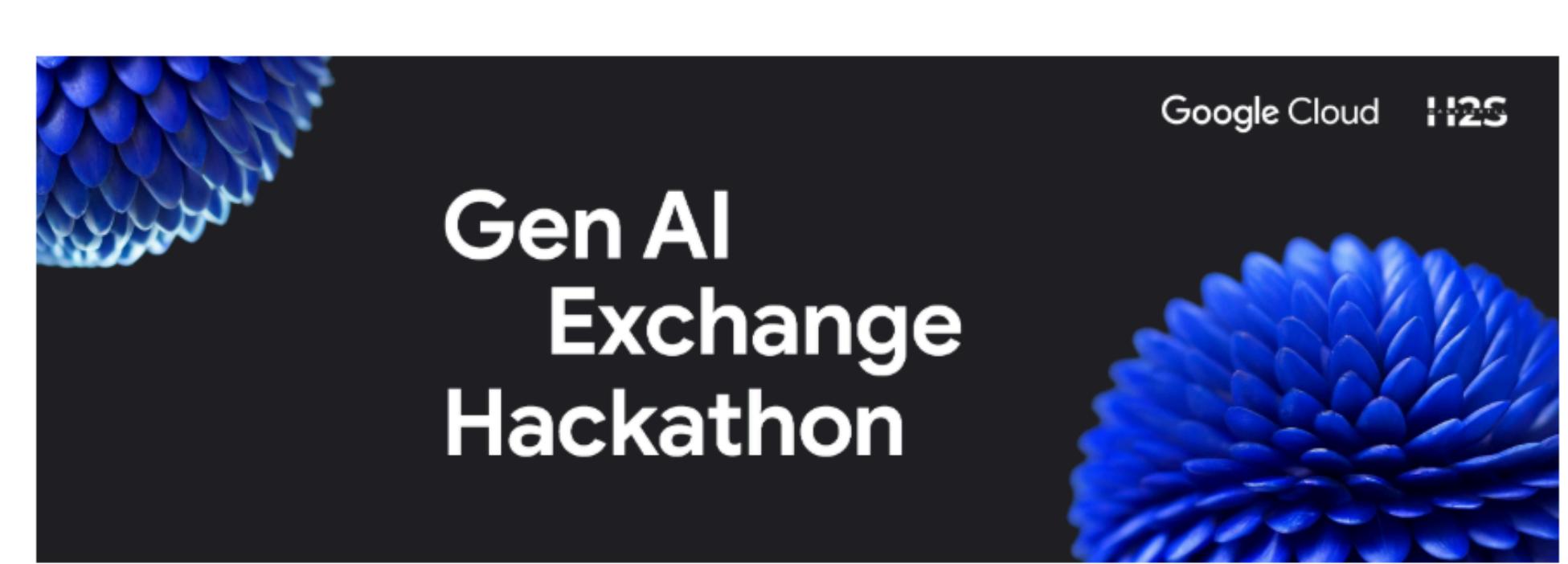
Auto-generate questions from stories

Main Topic/Theme: Describe the main theme or topic for your podcast...

Suggested Topics: Youth Engagement with Folk Art, History of traditional crafts, Tanjore Painting

Participant Name: Arjun

Your Stories (0): No stories uploaded yet. Upload your stories to automatically generate relevant questions.



Hey nischal sharma,
We have fantastic news! Congratulations on being shortlisted for the Prototype Refinement Phase of the Gen AI Exchange Hackathon. Your prototype demonstrated strong potential, and we are excited to see you advance your solution.

To help you seamlessly build, refine, and deploy your intelligent agent using the best of Google Cloud and Gemini, we are granting you \$1000 in Google Cloud Platform GCP credits.

Please follow the steps below carefully to claim your credits. Note that the process differs slightly for new and existing GCP users.

Important Pre-Requisite: Billing Account

New GCP users MUST set up a billing account first before redeeming the coupon code. Please follow the steps below in order.

FEASIBILITY STUDY



- Compact LLMs, speech & vision models run on laptops/phones.
- Distributed inference (phone ↔ laptop) possible at prototype level.



- Clear task division across team expertise.
- Modular, step-by-step integration reduces risk



- Uses open-source tools → minimal cost.
- Runs on personal devices → no extra hardware



- First AI clone tailored for teachers with multimodality.
- Distributed inference across devices is novel



- Reduces teacher workload, extends student support.
- On-device privacy builds trust for adoption.

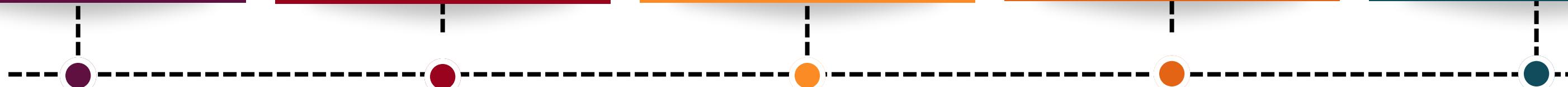
Technical Feasibility

Operational Feasibility

Economic Feasibility

Innovative Feasibility

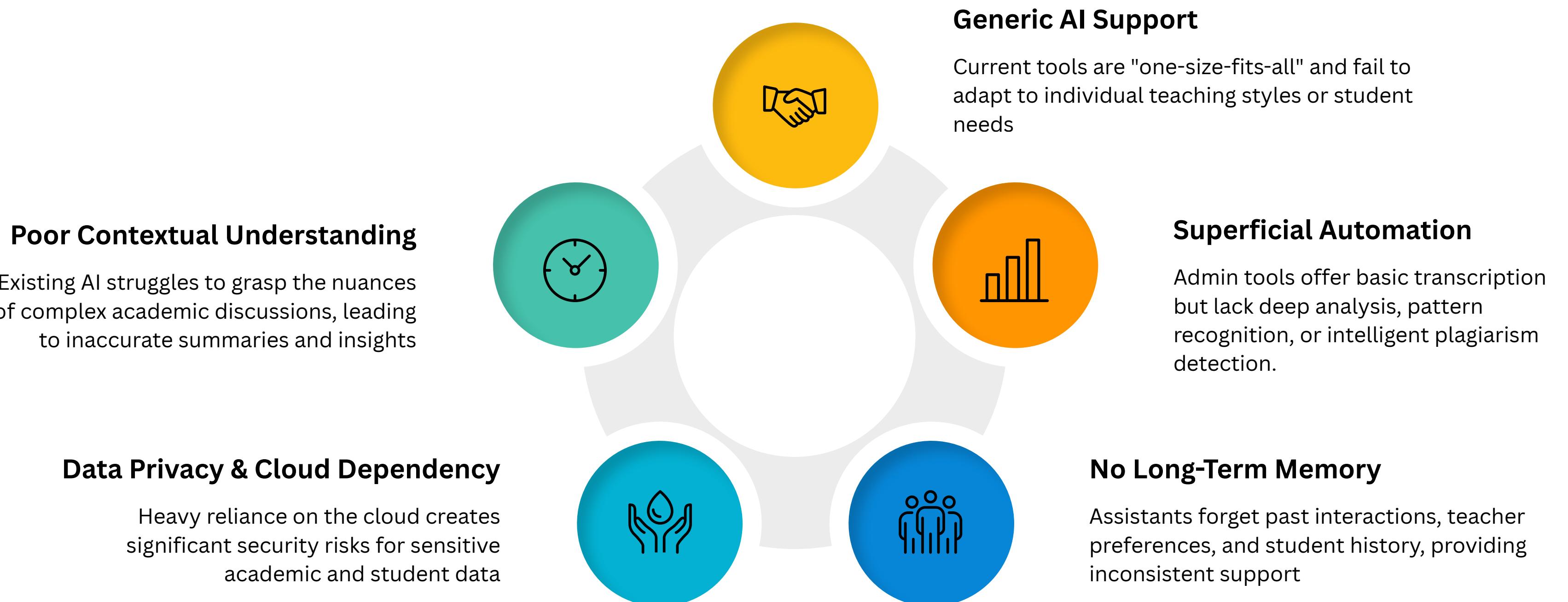
Social Feasibility



EXISTING SOLUTIONS/LITERATURE REVIEW

Tool / Solution	Core Feature (Detailed)	Limitation in Current Solutions	Demo Link
Google NotebookLM	Summarizes text, creates FAQs, answers from uploaded sources.	Cloud-only; not personalized; limited to generic documents.	Click Here
ElevenLabs	Realistic voice cloning from text prompts.	Cloud-based; no adaptive personality; text-to-speech only.	Click Here
Microsoft Copilot	Summarizes any document into short, actionable notes.	Over-generalized; not context-aware for user relationships or history.	Click Here
Google Gemini Live	Real-time, interruption-aware conversations with smooth topic switching.	Cloud-driven; doesn't mimic user's unique speaking style or timing.	Click Here
Meeting Bots (Otter, Fireflies)	Transcribe, analyze meetings; basic action item tracking.	No autonomous user voice/face; limited participation; data goes to cloud.	Click Here
Fireflies.ai	Records, transcribes, and extracts insights from meetings.	Provides insights but cannot represent user or act on behalf.	Click Here
Synthesia	Creates lip-synced video avatars from scripted text.	Scripted, not live; lacks decision-making; cloud-dependent.	Click Here
IndiqAI UltiMeet	Productivity measurement, engagement analytics, real-time transcription, auto-summaries, and voice biometrics for accountability.	Still cloud-based; cannot represent user autonomously; lacks distributed on-device inference.	Click Here

GAPS IN EXISTING SOLUTION/LITERATURE REVIEW

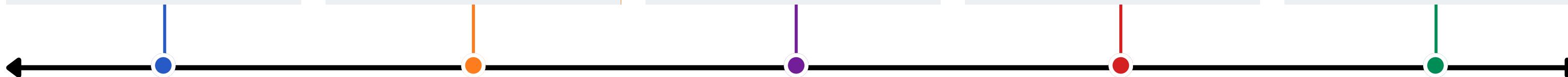
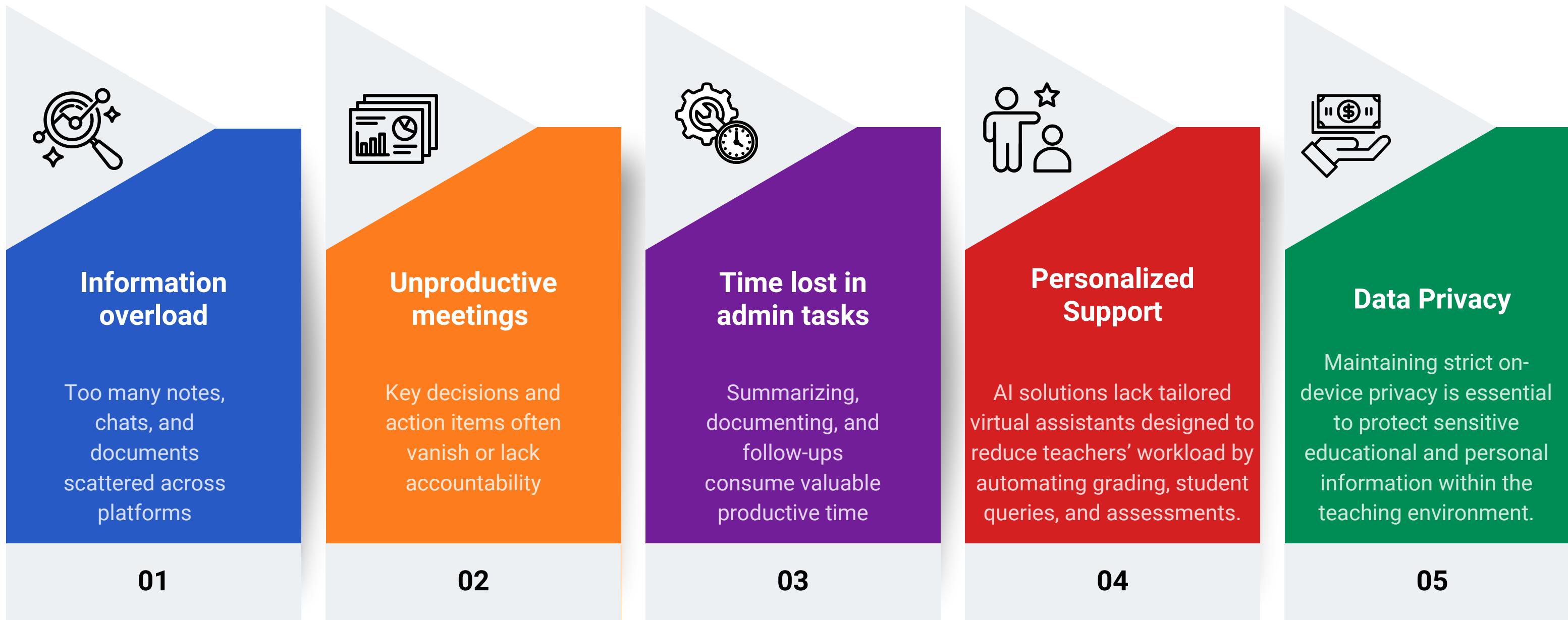


Onboarding Goals

Cycle through objectives for employee success



PROBLEM STATEMENT



OBJECTIVE

Assignment Review

Automates assignment/manual checking, flags patterns & plagiarism, and escalates only important submissions

Virtual Office Hours

Provides extended student support using your teaching style, past interactions, and course material



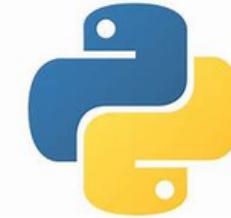
Admin Meeting Automation

Clone attends meetings, takes notes in your style, filters irrelevant details, and highlights only key decisions.

Viva & Oral Exams

Conducts viva in your questioning style, records insights, and summarizes results consistently

TOOLS/PLATFORM USED



Programming & Development



Machine Learning & Multimodal AI



Memory/Speech /Version Control



DESIGN METHODOLOGY

Step	Description	Key Action/Output
1. Requirement Analysis	Define functional needs for autonomous academic assistance	Functional/Privacy Requirements Defined
2. Architecture Planning	Design a modular, multilayered architecture for multimodal	Modular Architecture Blueprint
3. Data Collection (Local)	Securely collected voice/text samples to learn user tone and communication	Secure, Localized Personal Data Set
4. Model Selection	Integrated lightweight SLM, RAG, and diffusion models for efficient on-device processing	Optimized Model Stack Chosen
5. Personalization via LoRA	Applied LoRA fine-tuning to efficiently align the AI's response and behavior	Personalized AI Style/Tone
6. On-Device Optimization	Used quantization and optimization to ensure full offline operation without latency	Fully Optimized, Offline-Ready Models
7. Distributed Inference Setup	Implemented task division between the laptop (heavy tasks) and mobile (light tasks) for high efficiency	Low-Latency, Two-Device System
8. Comprehensive Testing	Evaluated voice similarity, response relevance, speed, and accuracy of the system	Performance Metrics/Test Results
9. Continuous Improvement	Adopted an iterative loop to refine LoRA tuning, RAG accuracy, and device integration	Refined System Configuration



OUTCOME

EduAssist PRO EDITION

X EduAssist

Auto-Lab Grader Pro
Comparative Analysis Engine (vs Ideal File)

DRIVE CONNECTED

1. Mandatory Reference Material

Empty Template File *

Ideal Solution (Kunal's File) *

3. Import Student Files

Google Drive Import Local Folder Upload

GOOGLE DRIVE LINK

2. Grading Rules

CLASS / SECTION

EXP. COUNT

nischal sharma
Developer

EduAssist PRO EDITION

X EduAssist

Assignment AI Grader
Semantic Text Analysis & Auto-Grading

DRIVE CONNECTED

1. Evaluation Settings

DIFFICULTY LEVEL

EASY MEDIUM HARD

DEADLINE

LATE PENALTY (%)

2. Import Submissions

Drive Local

Drive Folder ID / Link

QUESTION PAPER (PDF/TEXT)

Text-Only Check: This system uses OCR to convert handwritten/typed text to digital format. Grading is based on logical text similarity to the Question Paper.

nischal sharma
Developer

- Dashboard
- Calendar
- Assignment Checker
- Lab Manuals
- Meeting Assistant

Settings

PROTOTYPE ZONE

LIVE FEED: PORT 5056

COMMAND INPUT

Enter text to initialize LipSync...

WARNING: Model initialization may cause latency. Backend must be active in WSL.

nischal sharma
Developer

Sign Out

N



EduAssist



Good Morning, Professor.

Saturday, November 29



"Death is the easiest of all things after it, and the hardest of all things before it."

— ABU BAKR (R.A)

ATTENTION NEEDED

4

Classes to be rescheduled

QUICK NOTE

Type a reminder here...

GRADING UPDATE

100%

Lab manuals assessed

Today's Classes

Operating Systems

3rd Year CSE • 54 Students

Programming in Python

2nd Year • 60 Students

DBMS

3rd Year • 48 Students

Gurugram



12° C

3.6 km/h Wind

Humidity High

Today's Agenda

erg

09:00 • default

ijy

09:00 • default

hi

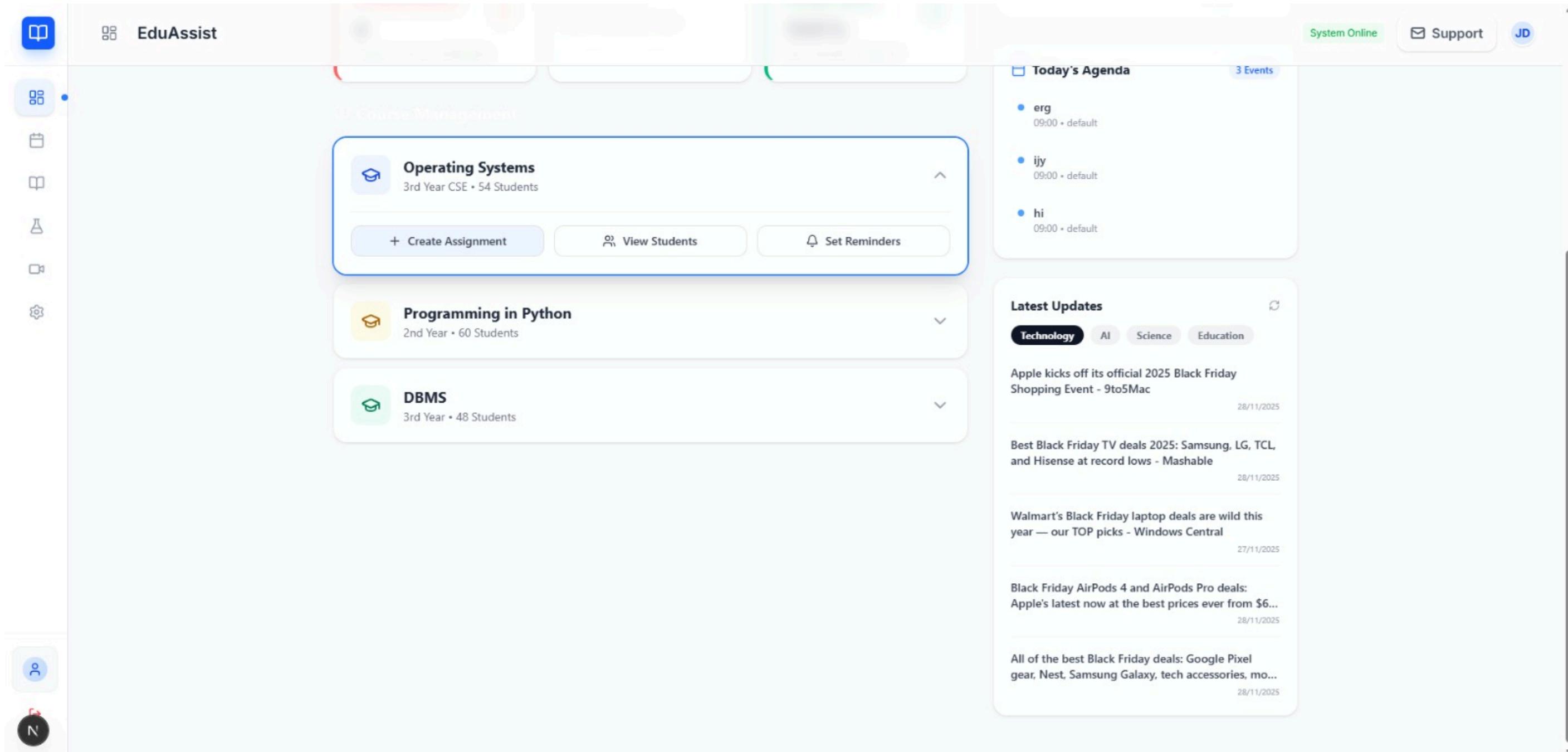
09:00 • default

Latest Updates

Technology AI Science Education

Apple kicks off its official 2025 Black Friday Shopping Event - 9to5Mac





The screenshot displays the EduAssist application interface. On the left, a sidebar contains icons for Home, Courses, Students, Assignments, Reminders, Support, and Logout. The main area shows three courses: Operating Systems (3rd Year CSE • 54 Students), Programming in Python (2nd Year • 60 Students), and DBMS (3rd Year • 48 Students). Each course card includes buttons for Create Assignment, View Students, and Set Reminders. To the right, a sidebar shows "Today's Agenda" with three events: erg, ijjy, and hi, all scheduled for 09:00. Below this is a "Latest Updates" section with articles from Technology, AI, Science, and Education categories. The first article is about Apple's Black Friday shopping event, the second about TV deals, the third about Walmart's laptop deals, and the fourth about AirPods 4 and Pro deals.

EduAssist

Operating Systems
3rd Year CSE • 54 Students

+ Create Assignment View Students Set Reminders

Programming in Python
2nd Year • 60 Students

DBMS
3rd Year • 48 Students

Today's Agenda 3 Events

- erg 09:00 • default
- ijy 09:00 • default
- hi 09:00 • default

Latest Updates

Technology AI Science Education

Apple kicks off its official 2025 Black Friday Shopping Event - 9to5Mac 28/11/2025

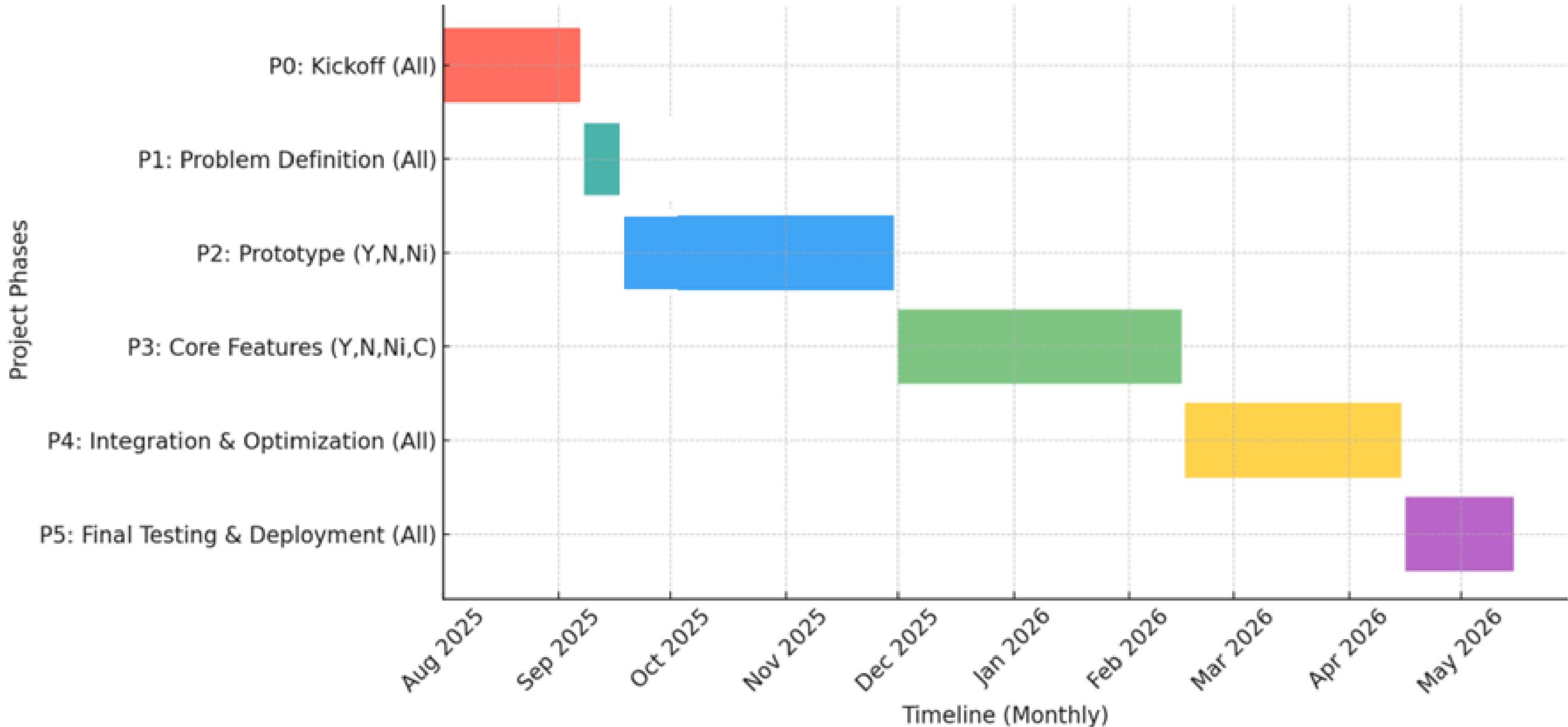
Best Black Friday TV deals 2025: Samsung, LG, TCL, and Hisense at record lows - Mashable 28/11/2025

Walmart's Black Friday laptop deals are wild this year — our TOP picks - Windows Central 27/11/2025

Black Friday AirPods 4 and AirPods Pro deals: Apple's latest now at the best prices ever from \$6... 28/11/2025

All of the best Black Friday deals: Google Pixel gear, Nest, Samsung Galaxy, tech accessories, mo... 28/11/2025

GANTT CHART



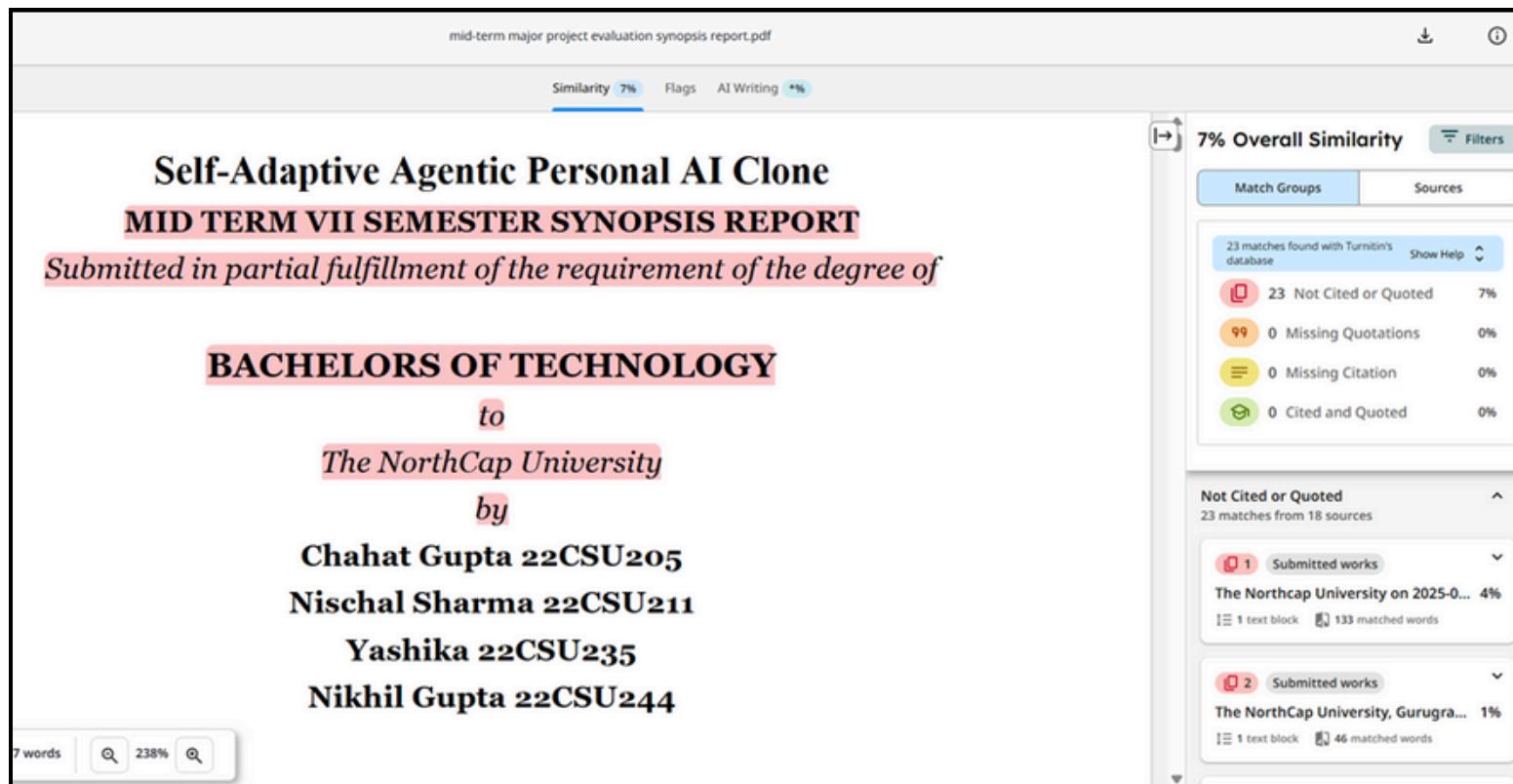
RESPONSIBILITY CHART

A: Accountable C: Consulted		R: Responsible I: Informed	Computer Vision & Edge Computing	Speech Processing & Deep Learning	NLP, OCR & AI Applications	Large Language Models & Knowledge Retrieval
Phase	Tasks	Person(s)	Nischal	Yashika	Nikhil	Chahat
Kick-off & Setup	Literature survey (voice, video, RAG, edge inference)		A, R	R	R	A, C
	Dataset collection & preprocessing		A, R	R	R	C
	Tool & framework selection		A, R	C	C	A, R
Model Development	Video Cloning Model (face + lip-sync)		A, R	C	I	C
	Audio Cloning Model (few-shot voice replication)		C	A, R	I	C
	Handwriting-to-Text (OCR + NLP pipeline)		C	I	A, R	C
	LLM Query Answering (RAG)		C	I	C	A, R
	Distributed Inference Module (multi-device partitioning)		A, R	C	C	A, C
Integration & Prototype	Step 1–2: Audio + Video cloning integration		A, R	A, R	I	C
	Step 3–4: Query answering + cloned modules		C	C	C	A, R
	Step 5–6: RAG creation & testing		C	I	C	A, R
	Step 7–8: Full integration + latency optimization		A, R	C	C	A, R
	Step 9: Training text-style cloning		I	C	A, R	A, R
	Step 10–12: System integration, auto data collection, reinforcement learning		A, R	C	C	A, R
	Unit testing of each model		A, R	A, R	A, R	A, R
Testing & Deployment	End-to-end workflow validation		A, R	C	C	A, R
	Performance evaluation (speed, accuracy, personalization)		A, R	A, R	A, R	A, R
	Documentation, report & final presentation		C	C	C	A, R

REFERENCES

- Singh, R., et al. (2023). Edge AI: A survey : [Link](#)
- Zhang, Z., et al. (2024). Mitigating Unauthorized Speech Synthesis for Voice Protection: <https://arxiv.org/abs/2410.20742>
- Moussa, H. G., et al. (2025). Distributed Learning and Inference Systems: <https://arxiv.org/abs/2501.05323>
- AWS Blog (2025). Distributed inference with collaborative AI agents: [AWS blog](#)
- Janbi, N., et al. (2023). Distributed AI taxonomy and review: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4347753
- Kurniawan & Pujiastuti (2023). Privacy-preserving ML in edge: <https://doi.org/10.35335/cit.Vol15.2023>
- Belcak, P., et al. (2025). Small Language Models are the Future of Agentic AI: <https://arxiv.org/abs/>
- Houssein, A. I., et al. (2024). Federated Learning in Edge Computing: <https://pubmed.ncbi.nlm.nih.gov/>

ANNEXURE I

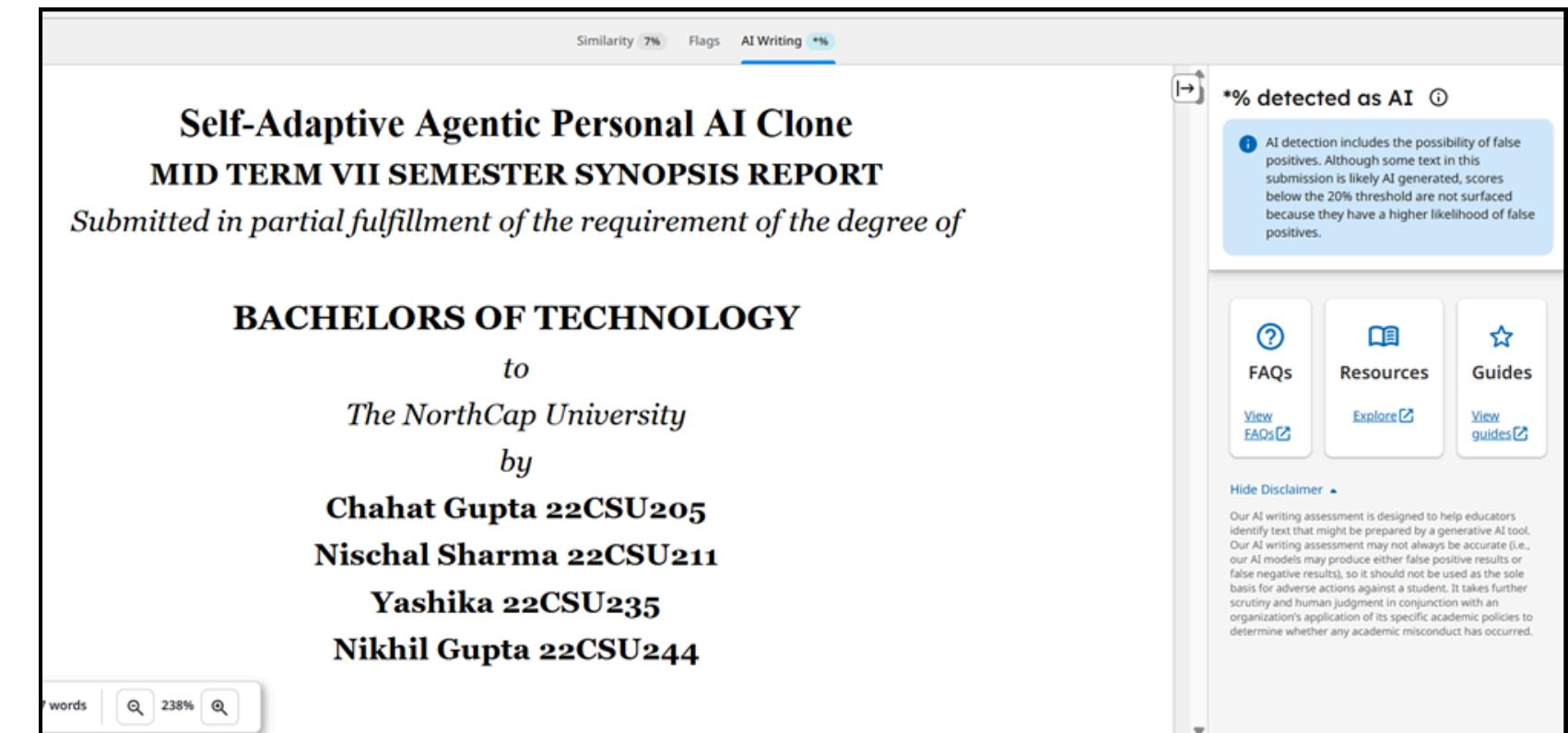


Self-Adaptive Agentic Personal AI Clone
MID TERM VII SEMESTER SYNOPSIS REPORT
Submitted in partial fulfillment of the requirement of the degree of

BACHELORS OF TECHNOLOGY
 to
The NorthCap University
 by
Chahat Gupta 22CSU205
Nischal Sharma 22CSU211
Yashika 22CSU235
Nikhil Gupta 22CSU244

7 words | 238% |

Similarity plagiarism Screenshot



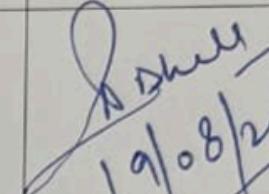
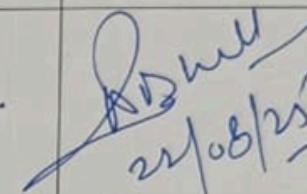
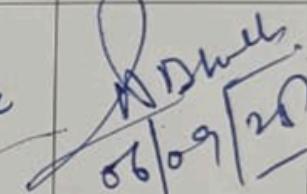
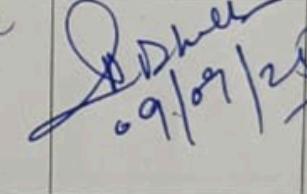
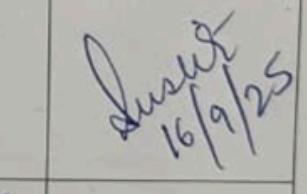
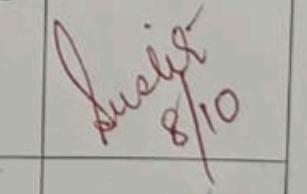
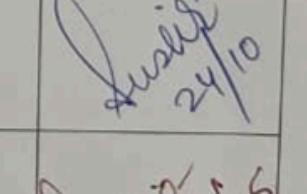
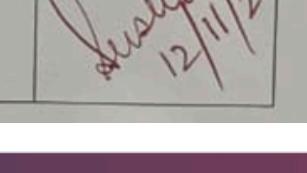
Self-Adaptive Agentic Personal AI Clone
MID TERM VII SEMESTER SYNOPSIS REPORT
Submitted in partial fulfillment of the requirement of the degree of

BACHELORS OF TECHNOLOGY
 to
The NorthCap University
 by
Chahat Gupta 22CSU205
Nischal Sharma 22CSU211
Yashika 22CSU235
Nikhil Gupta 22CSU244

7 words | 238% |

AI plagiarism Screenshot

ANNEXURE II

Supervisor's comments		Annexure
Week no.	Supervisor's Comment (about general project progress and individual contribution towards the project)	Supervisor's Signature with date
WEEK 1	19/8/25 - Initial Overview and idea proposal of the project	 19/8/25
WEEK 2	22/8/25 - Discussion on the possible modules to be integrated and use case. Finalisation of project title	 22/8/25
WEEK 3	6/9/25 - Discussion on participation in Hackathon and the idea proposal for the same	 6/9/25
WEEK 4	9/9/25 - Patent Draft Discussion and Review	 9/9/25
WEEK 5	16/9/25 - Patent Draft review, showcasing of model. Discussion on Hackathon Draft.	 16/9/25
WEEK 6	8/10/25 - Discussion on improvements to be made in the project.	 8/10
WEEK 7	24/10/25 - GenAI Hackathon discussion and showcasing the project/ prototype that was made	 24/10
WEEK 8	12/11/25 - Final submission of GenAI hackathon review	 12/11/25