

**A
PROJECT REPORT
ON
PROGRESS REPORT GENERATION WITH AUDIO FILE**

Submitted By

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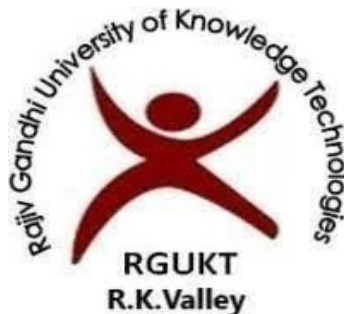
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AND TECHNOLOGIES
(AP IIIT)**

R.K Valley, Vempalli, Kadapa (Dist.)-516330

**DEPARTMENT OF COMPUTER SCIENCE
AND ENGINEERING**

2024-2025



Rajiv Gandhi University of Knowledge Technologies
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CERTIFICATE

This is to certify that the project report entitled “**PROGRESS REPORT GENERATION WITH AUDIO FILE**” being submitted by **CHINTAM GOPI [R200194] ,MOCHARLA VARSHA[R200352]** under my guidance and supervision and is submitted to DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING in partial fulfilment of requirements for the award of Bachelor of Technology in **Computer Science and Engineering** during the academic year 2024-2025 and it has been found worthy of acceptance according to the requirements of the University.

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DECLARATION

Hereby declare that this project work entitled **“PROGRESS REPORT GENERATION WITH AUDIO FILE ”** submitted to DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING is a genuine work carried out by our team under the guidance of **K. Vinod Kumar**. This project is submitted in partial fulfillment of the requirements for the award of the degree of BACHELOR OF TECHNOLOGY.

We have not submitted this work elsewhere for the award of any other degree or diploma other than specified above

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ACKNOWLEDGEMENT

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I would also like to extend our deepest gratitude and reverence to the Head of Department of Computer Science and Engineering **Dr CH. RATNAKUMARI** (Asst. Professor, ME, PhD) and also Director of RGUKT, RK Valley **Prof. A V S S Kumara Swami Guptha** for their constant support and encouragement. Last but not least I express our gratitude to our parents for their constant source of encouragement and inspiration for us to keep our morals high.

With our sincere Records

C.GOPI(R200194)

M.VARSHA(R200352)

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ABSTRACT

In recent years, private and corporate schools have rapidly adopted smart education tools, enhancing parent-teacher communication and automating progress tracking. However, rural and government schools continue to lag behind, often due to a lack of awareness or technical resources. This project aims to close that gap by introducing an AI-powered student progress report generation dashboard — an inclusive and intelligent system designed specifically for such institutions.

Teachers can upload simple CSV files containing student details, marks, attendance, and participation data. This information is passed to a state-of-the-art DeepSeek large language model (70B parameters) via OpenRouter API, which generates personalized, human-like performance summaries. These reports are not only informative but also explain a child's strengths, weaknesses, and learning outcomes in a natural tone.

To address literacy barriers among parents, the system integrates a speech synthesis module to convert each report into audio using TTS (Text-to-Speech). Both the report text and its audio version are then sent directly to parents via Telegram, with plans to extend support to WhatsApp using message handler APIs.

The project includes a chatbot assistant powered by a DeepSeek 32B model that learns dynamically from newly generated reports. Built on a Retrieval-Augmented Generation framework, the bot uses FAISS vector stores and Hugging Face Sentence Transformers to answer user queries interactively.

The chatbot provides intelligent, context-aware responses in real-time, helping parents and teachers with student performance and trend analysis. With a user-friendly Streamlit interface, it empowers institutions to raise educational standards and fosters transparent communication between schools and parents.

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CHAPTER – 1 INTRODUCTION

1.1 Background Importance

The integration of technology in education has led to major advancements in how student progress is tracked, reported, and communicated. Corporate and private educational institutions have embraced automated systems for generating detailed performance reports, communicating with parents, and providing intelligent feedback. However, this is not the case for most rural and government schools, where such innovations are either unknown or remain inaccessible due to a lack of awareness and technical resources.

1.2 Problem Statement

Despite the growing availability of AI and automation in education, there exists a significant gap in adoption between private and rural/government institutions.

Teachers in these schools continue to prepare reports manually, which is both time-consuming and often ineffective in terms of communication. Furthermore, parents with low literacy levels face difficulty understanding written reports, and there is no streamlined channel for personalized parent-teacher communication.

1.3 Nature-Inspired Optimization Algorithms

The aim of this project is to bridge the technological divide by creating an AI-powered system that helps rural and government schools generate, convert, and deliver personalized student progress reports efficiently. The system is designed to upgrade their reporting standards to match those of well-equipped institutions, ensuring accessibility and automation for all.

1.4 Objectives

- Automate the generation of student progress reports using a Large Language Model (LLM).
- Provide both textual and audio formats of reports to ensure accessibility.
- Deliver reports to parents via Telegram, with future extension to WhatsApp.
- Integrate a chatbot assistant that can answer queries using RAG-based architecture.
- Enable dynamic learning for the chatbot using newly generated report content.
- Build a user-friendly interface using Streamlit that supports background processing.
- Ensure scalability and ease of use for non-technical users like rural school teachers.

1.5 Scope of the Project

This project targets schools in underserved regions, including rural government institutions, where digital transformation is still in early stages. The system is designed to be lightweight, adaptable, and extensible. Though Telegram is used in the current phase, future integration with WhatsApp and multi-language audio synthesis is planned to further enhance reach and usability.

1.6 Methodology Overview

- Data is uploaded in CSV format.
- Processed using DeepSeek 70B LLM via OpenRouter API to generate detailed reports.
- Reports are converted to speech using TTS and delivered via Telegram Bot and through mail.
- A DeepSeek 32B model is used for a chatbot assistant trained using FAISS and Hugging Face Sentence Transformers.
- Streamlit UI manages tasks asynchronously with audio regeneration, mailing, and live chatbot interactions.

CHAPTER-2

LITERATURE REVIEW

2.1 Automated Student Progress Reporting

Over the past decade, schools and universities have experimented with automating the generation of student progress reports. Early systems typically relied on rule-based templates that filled in grades and attendance statistics, but produced rigid, impersonal feedback. More recent research has explored Natural Language Generation (NLG) approaches—using templates enhanced by simple grammar rules—to produce more varied narrative comments. However, these systems still struggled with context sensitivity and the ability to tailor feedback to individual student profiles.

2.2 Large Language Models for Educational Feedback

The advent of Transformer-based LLMs (e.g., GPT-3, T5) has enabled truly flexible text generation. Several studies have shown that fine-tuning pretrained LLMs on educational corpora can yield high-quality, personalized feedback. For instance, researchers at Stanford demonstrated that a T5 variant could summarize student essays and suggest targeted improvement areas. More recently, models with tens of billions of parameters have been applied to generate holistic progress narratives that mirror a human teacher’s tone and structure—exactly the capability leveraged by DeepSeek 70B in this project.

2.3 Speech Synthesis for Inclusive Communication

Text-to-Speech (TTS) technology—once limited to robotic voices—has matured into near-natural audio with systems like Google’s WaveNet and Tacotron. In educational contexts, TTS is especially valuable for reaching parents with low literacy or visual impairments.

Studies in rural education initiatives have shown that audio reports boost parental engagement and improve student outcomes when compared to text-only reports. Integrating TTS into an automated pipeline ensures every generated report can also be delivered as an accessible audio file.

2.4 Messaging Platforms for Report Delivery

Traditional parent-teacher communication channels—printed letters or SMS blasts—lack interactivity and personalization. WhatsApp and Telegram bots have recently been adopted in pilot studies to deliver grades, attendance alerts, and personalized messages at scale. Telegram, in particular, offers an open Bot API and rich media support, making it a popular choice for proof-of-concept educational notification systems. These bots handle subscription, authentication, and templated messaging, but few integrate full report generation and audio delivery as done in this project.

2.5 Retrieval-Augmented Chatbots in Education

Chatbots in education have evolved from scripted FAQ systems to dynamic, LLM-powered assistants. Retrieval-Augmented Generation (RAG) architectures combine a vector-based document store (e.g., FAISS embeddings) with an LLM: when a user asks a question, the system retrieves the most relevant report passages and conditions the LLM’s response on that context. Educational RAG bots can answer nuanced questions like “How did my child improve in math this semester?” by pulling directly from the generated reports. Research at MIT and Hugging Face has shown that RAG improves factual accuracy and relevance in domain-specific chatbots.

CHAPTER-3

System Architecture & Methodology

3.1 System Architecture Overview

The system is designed to automate the generation, speech conversion, and delivery of student progress reports, catering primarily to rural and government schools. The architecture integrates various AI technologies, message handling systems, and real-time feedback mechanisms to ensure smooth and scalable operation. The key components of the system include:

Data Ingestion Layer:

This layer handles the upload of CSV files containing student data (marks, attendance, etc.) via a user-friendly interface built using Streamlit.

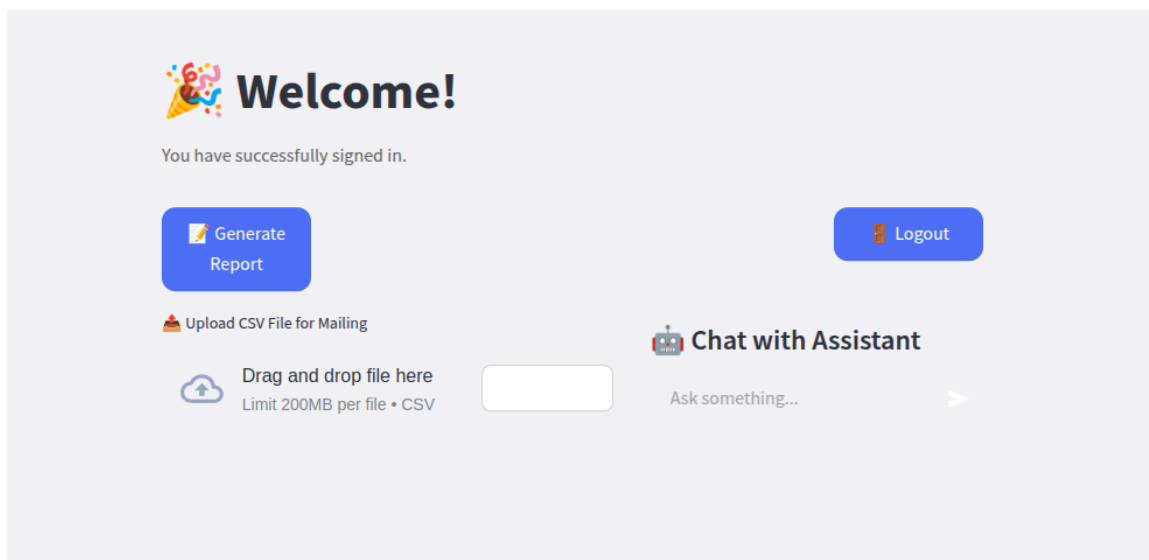


Fig 3.1.1 Data Ingestion UI

Processing Layer:

The core of the report generation system, this layer uses DeepSeek LLMs (70B parameters) to process and generate human-like student progress reports from the uploaded data. This layer also supports dynamic training for a 32B DeepSeek chatbot using the RAG architecture.

Text-to-Speech (TTS) Layer:

After generating the reports, the system converts the textual content into speech using technologies like gTTS or other TTS solutions, ensuring accessibility for illiterate parents.

Messaging Layer:

The system integrates the Telegram API to automatically send the generated reports (both text and audio) to parents. Future extensions for WhatsApp integration are planned.

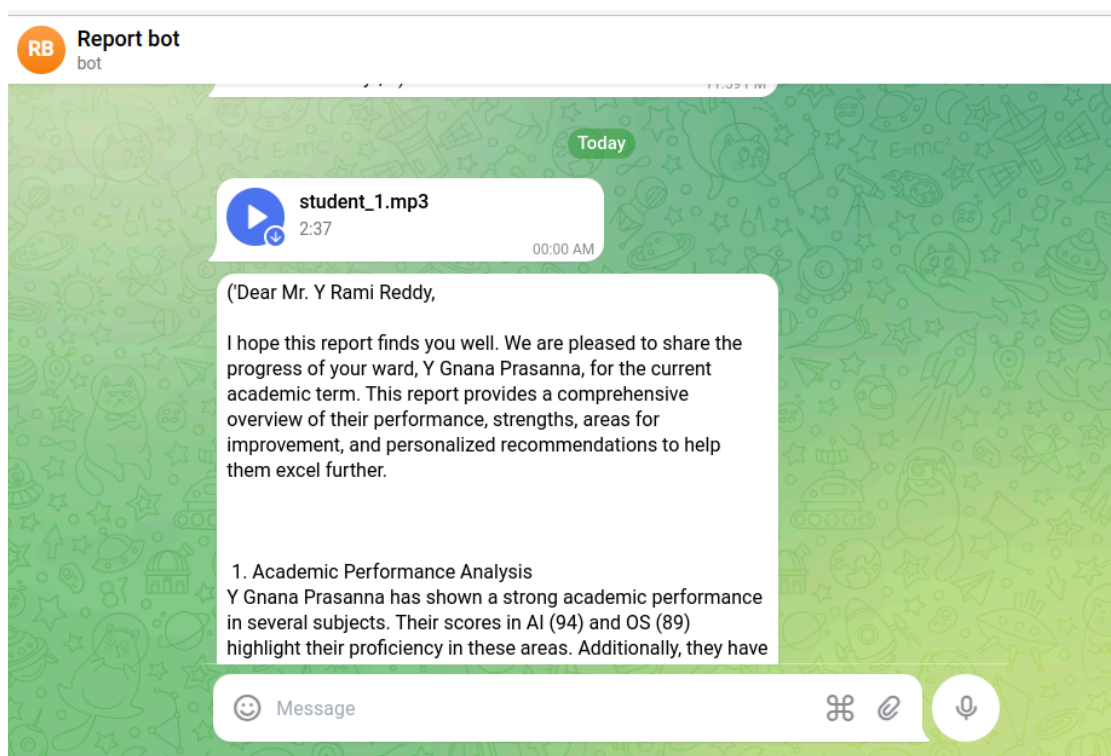


Fig 3.1.2 Telegram Bot

Feedback Layer:

Powered by FAISS and Hugging Face Sentence Transformers, this layer enables the chatbot to dynamically interact with users, offering real-time progress insights based on previously generated reports.

3.2 Methodology

The implementation of this system follows a modular design approach, ensuring that each component of the system works independently yet seamlessly. Below is a detailed breakdown of the methodology used:

3.2.1 Data Collection and Preprocessing

Input Format: Teachers upload student data in CSV format, which includes:

- Student name
- Marks
- Attendance records
- Extracurricular activities participation

Pre-processing:

The data is cleaned, validated, and structured using the Pandas library.

Missing or incorrect data points are flagged and handled using predefined logic to ensure accuracy and consistency.

fx Σ = S_No												
A	B	C	D	E	F	G	H	I	J	K	L	M
No	Name	Student_ID	Class	Section	AI	PSPC	OS	CNS	DSA	COA	Assignments	Attendance
1	C Gopi	R200194	E3	A	77	44	60	45	46	35	Completed 80%	75
2	K Sai Teja	R200108	E3	B	89	55	40	84	80	51	Completed 90%	60
3	M Gandhi	R200036	E3	A	75	72	66	83	37	41	Not completed	76
4	B Hema Sree	R200185	E3	A	95	96	66	68	77	41	Completed 55%	77
5	M Varsha	R200333	E3	C	99	79	59	45	72	68	Completed 65%	82
6	B Srujan	R200157	E3	D	100	62	72	88	51	78	Completed 70%	82
7	C Anil	R200196	E3	E	33	83	54	71	86	99	Completed 90%	93
8	V Rajendra	R200040	E3	E	67	58	63	38	80	52	Completed 40%	77
9	K Rakshitha	R200351	E3	C	55	61	38	43	56	52	nOt completed	98
10	Y Gnana Prasanna	R200747	E3	A	94	48	89	71	65	37	Not Submitted	72

Fig 3.2.1 CSV Data File

3.2.2 Report Generation

DeepSeek LLM:

The 70B parameter model is employed to process the cleaned data and generate the student progress reports. These reports are designed to be personalized, constructive, and written in an easily understandable language.

The report includes sections on academic performance, attendance, strengths, and areas for improvement.

3.2.3 Audio Conversion

DeepSeek LLM:

The generated reports are converted into speech using Google Text-to-Speech (gTTS) or other TTS engines.

The audio files are stored and made available for download or direct delivery to parents via the messaging platform (Telegram).

3.2.4 Messaging Integration

Telegram API:

The system is integrated with Telegram Bots that automatically send the reports (both text and audio) to parents' mobile devices.

A message handler listens for new interactions from parents, allowing for future conversational interactions and report-related queries.

3.2.5 Chatbot Functionality

Retrieval-Augmented Generation (RAG):

A chatbot assistant is dynamically trained on the generated reports. It uses FAISS to perform similarity-based retrieval of report data

and Hugging Face Sentence Transformers to match the user's questions with relevant report sections.

The chatbot can answer queries such as "What was my child's progress in math this semester?" or "What activities has my child participated in?" by retrieving information from the generated reports.

3.3 Implementation Details

The system is implemented using Python and Streamlit, ensuring scalability and a user-friendly interface. The backend is powered by several advanced AI technologies:

DeepSeek LLM via OpenRouter API: Used to generate the progress reports and power the chatbot.

gTTS (Google Text-to-Speech): Used to convert the reports into audio files.

FAISS: Handles semantic search for report data, ensuring relevant responses to user queries.

Hugging Face Sentence Transformers: Used for vector-based semantic search and improving the chatbot's accuracy.

3.3.1 System Flow

- Teacher uploads student data using the Streamlit UI.
- DeepSeek LLM processes the uploaded data and generates personalized reports.
- The reports are then converted to audio using the TTS system.
- Telegram Bot sends the reports (both text and audio) to parents automatically.
- Chatbot responds to user queries based on the generated reports.

3.3.2 Technologies Used

- DeepSeek LLM (70B/32B models)
- gTTS (Text-to-Speech)
- Telegram API
- FAISS
- Hugging Face Sentence Transformers

3.4 Future Enhancements

While the current system focuses primarily on Telegram-based report delivery, future iterations will aim to enhance functionality further:

WhatsApp Integration: To extend the communication channel to more parents.

Multi-language Support: Enabling reports and chatbot responses in various regional languages to cater to a larger audience.

Dynamic Chatbot Learning: The chatbot will continuously improve its responses as new reports are generated and fed into its learning system.

Improved Scalability: Through more advanced APIs and optimized backend performance for handling large datasets and user requests



```
10 sent = []
11 failed = []
12
13 try:
14     with open("parents.json", "r") as f:
15         parents = json.load(f)
16
17     for index, row in reports_df.iterrows():
18         mobile = str(row["Parent_Mobile"])
19         for number, chat_id in parents.items():
20             if number[-10:] == mobile:
21                 try:
22                     refining = re.sub(r"[*#-]", "", row["Generated_Report"])
23                     refining=refining.replace("\n", "\n")
24                     await bot.send_message(chat_id=chat_id, text=refining)
25                     #print(row["Generated_Report"])
26                     audio_path = os.path.join(audio_folder, f"student_{index}.mp3")
27                     if os.path.exists(audio_path):
28                         with open(audio_path, 'rb') as audio_file:
29                             await bot.send_audio(chat_id=chat_id, audio=audio_file)
30                     sent.append(mobile)
31                 except Exception as e:
32                     print(f"❌ Failed to send to {mobile}: {e}")
33                     failed.append(mobile)
34                 break
35 except Exception as e:
36     print(f"❌ Error loading parents.json:", e)
37
38 return sent, failed
```

CHAPTER-4

IMPLEMENTATION

This chapter describes the detailed implementation of each module in the Student Progress Report Dashboard, explaining how the system components developed in Chapter 3 were realized in code and deployed.

4.1 Streamlit User Interface

Layout

Header & Navigation: Custom CSS loaded via `utils.load_css()`, with a dashboard title and logout button.

Two-Column Main View:

Left Column: File uploader and control buttons (Generate Report, Convert to Speech, Regenerate Audio, Send Mails).

Right Column: “Chat with Assistant” panel powered by Streamlit’s `st.chat_input` and `st.chat_message`.

Session State Flags

Initialized at startup:

```
st.session_state.setdefault("file_uploaded", False)
```

```
st.session_state.setdefault("file_ready", False)
```

```
st.session_state.setdefault("audio_ready", False)
```

```
st.session_state.report_generated = False
```

```
# ...and so on
```

Toggle flags when buttons are pressed, driving the background task runner.

4.2 Report Generation Module

Entry Point: Triggered when the “Generate Report” button sets `run_report = True`.

```
def run_report_pipeline_bg():
    df = generate_reports("uploaded_dat.csv")
    # validate DataFrame columns
    df["Status"] = df["Status"].map({1:"Success", 0:"Fail"})
    df.to_csv("processed_reports.csv", index=False)
    st.session_state.reports_df = df
    st.session_state.file_ready = True
    st.session_state.report_generated = (df.Status=="Fail").any()
    st.session_state.bg_status = " Reports generated!"
generate_reports()
```

Preprocesses raw CSV, calls DeepSeek 70B via OpenRouter API,
refines output, returns a DataFrame with columns:

```
["StudentName","Marks","Attendance","Generated_Report","Status"]
```

Display: Immediately after completion, the UI shows:

```
if st.session_state.file_ready:
    st.dataframe(st.session_state.reports_df, use_container_width=True)
```

4.3 Audio Conversion Module

Trigger: “Convert to Speech” button when file_ready == True.

Function:

```
def run_audio_conversion_bg(failed_only=False):
    reports = st.session_state.reports_df["Generated_Report"]
    if failed_only:
        idxs = st.session_state.speech_failures
        reports = [reports[i] for i in idxs]
    result = convert_speech(reports, st.session_state.temp_audio_folder)
    st.session_state.audio_ready = True
    st.session_state.speech_failures = result.get("failed", [])
    st.session_state.bg_status = "🔊 Audio conversion complete."
convert_speech()
```

Iterates over report texts, uses gTTS to generate .mp3 files saved in a temp folder.

Returns a dictionary with "failed" indices for any conversion errors.

Download Links:

```
if st.session_state.audio_ready:
    for f in os.listdir(st.session_state.temp_audio_folder):
        st.download_button(f" {f}", open(path,"rb"), file_name=f)
```

4.4 Messaging Bot Integration

Parents Mapping

Stored in parents.json as { phone_number: chat_id }.

Updated via /start and contact-sharing handler in Telegram bot code.

Sending Reports:

```
for number, chat_id in parents.items():
    bot.send_message(chat_id, text=report_text)
    bot.send_audio( chat_id, audio=open(audio_path,"rb") )
```

Trigger: “Send Mails” (actually “Send Messages”) button sets run_mail = True, invokes:

```
def run_mailing_thread_bg():
    sent, failed = run_mailing("processed_reports.csv", audio_folder)
    st.session_state.bg_status = f" Sent to {len(sent)}; Failed: {len(failed)}"
run_mailing()
```

Reads the CSV, iterates rows, uses Telethon or python-telegram-bot to dispatch.

4.5 Chatbot Implementation

Architecture: Retrieval-Augmented Generation (RAG)

Vector Store: FAISS index built from all Generated_Report texts.

Embeddings: Sentence Transformers from Hugging Face to encode queries and documents.

Workflow:

User Query via `st.chat_input()`.

Retrieval: Encode query, search FAISS for top-k similar reports.

Generation: Pass retrieved contexts plus the query into DeepSeek 32B via OpenRouter.

Response: Display in chat panel and append to `st.session_state.chat_history`.

Code Snippet:

```
def run_chatbot_response(query):
    contexts = faiss_search( index, embed(query), k=3 )
    prompt = build_prompt(contexts, query)
    answer = query_openrouter(prompt)
    return answer
```

4.6 Data Storage & State Management

Uploaded & Processed Files:

`uploaded_dat.csv` and `processed_reports.csv` live in the working directory.

Temporary Audio Directory:

Created via `tempfile.TemporaryDirectory()`, path in `st.session_state.temp_audio_folder`.

Session State:

All flags and objects (`reports_df`, `chat_history`, `speech_failures`, etc.) are stored in `st.session_state` to survive reruns without reloading data.

CHAPTER-5

OUTPUT

Welcome to the Progress Report Generation App

Get Started

Choose an option below to begin:

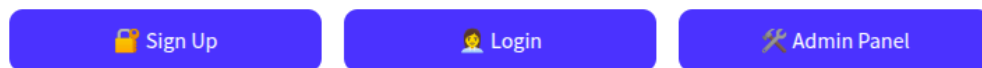
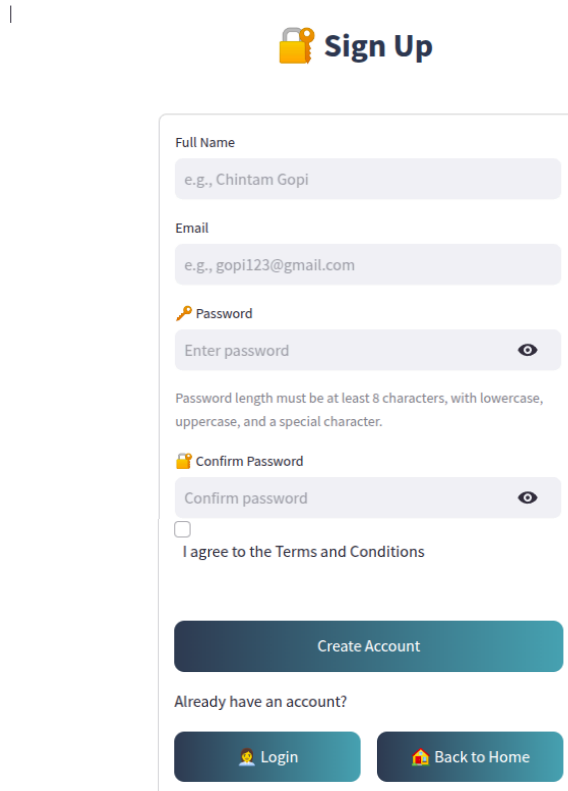





Figure 5.1 Streamlit UI





 Sign Up

Full Name
e.g., Chintam Gopi

Email
e.g., gopi123@gmail.com

 Password
Enter password 

Password length must be at least 8 characters, with lowercase, uppercase, and a special character.

 Confirm Password
Confirm password 

☐ I agree to the Terms and Conditions

Create Account

Already have an account?




 Login  Back to Home

Figure 5.2 Signup UI

Secure Login

Email 

Password 




Login

Back to Home

Figure 5.3 Login Page

Welcome!


You have successfully signed in.

 Upload CSV File for Mailing



Drag and drop file here
Limit 200MB per file • CSV

Browse files

 Generate Report

 Logout

Figure 5.4 Generate Report

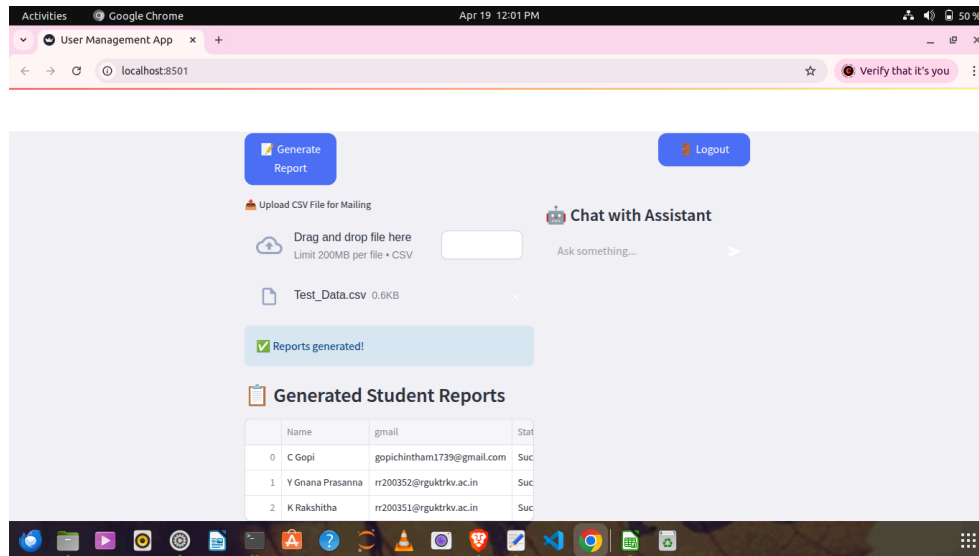


Figure 5.4 Generated Reports

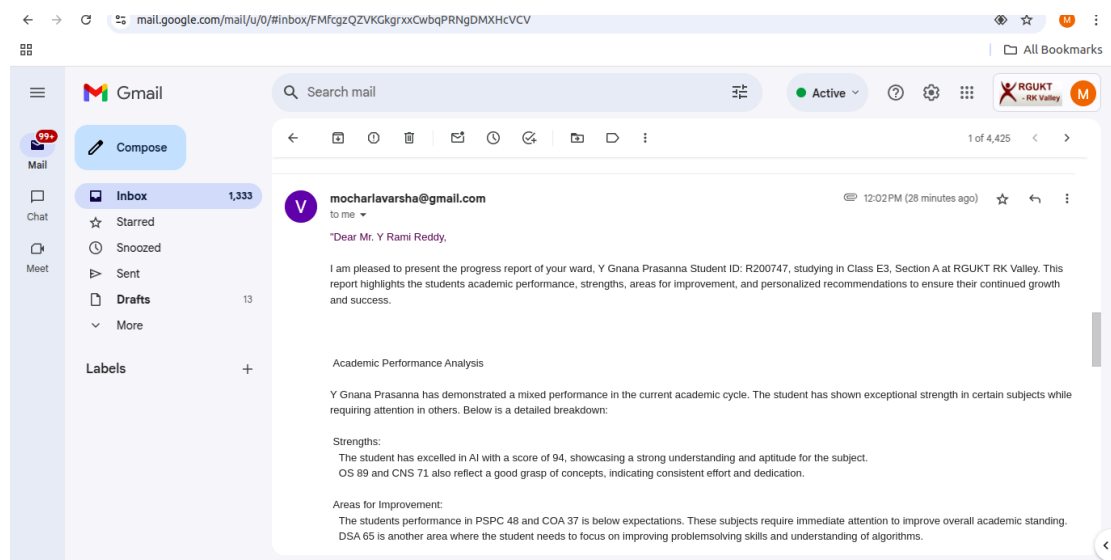


Figure 5.5 Reports in Mail

Conclusion

Y Gnaana Prasanna has the potential to excel in both academics and cocurricular activities with focused effort and dedication. While the student has shown remarkable strengths in certain areas, attention to weaker subjects and regular attendance will ensure overall improvement.

We, at RGUKT RK Valley, are committed to supporting your ward in overcoming challenges and achieving their academic and personal goals. Please feel free to reach out to us for any further assistance or clarification.

Wishing Y Gnaana Prasanna continued success in all endeavors.

One attachment • Scanned by Gmail

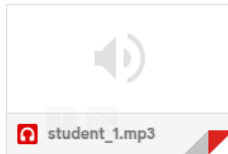


Figure 5.5 Reports in Mail with Audio File

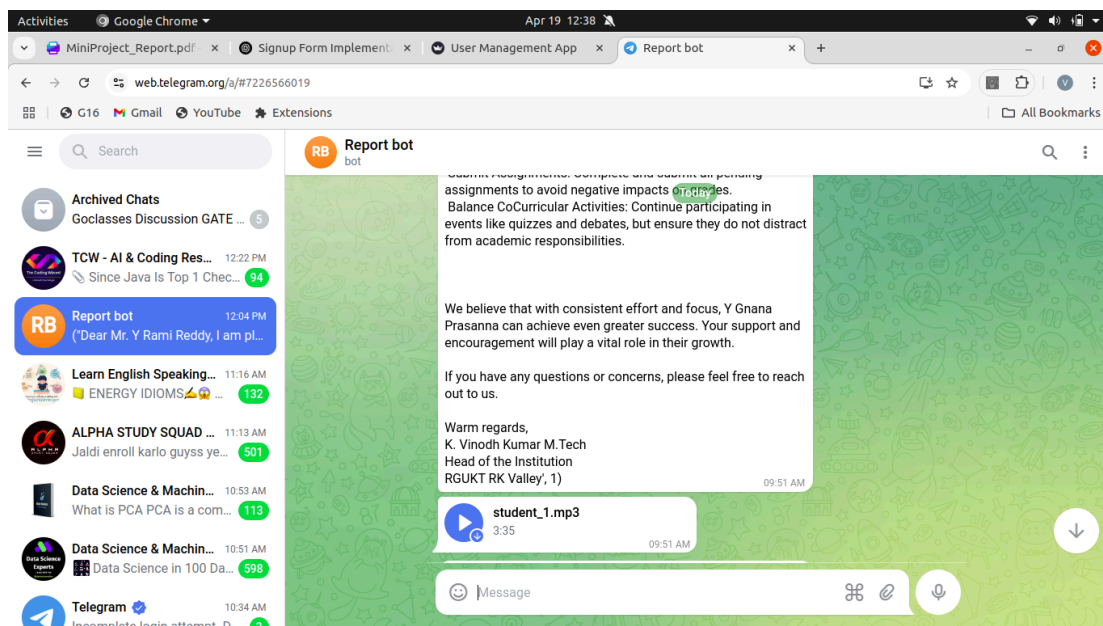


Figure 5.6 Reports in Mail with Audio File in Telegram

CHAPTER-6

RESULTS AND DISCUSSION

6.1 Results

The developed system successfully achieved its core objective of automating the generation and delivery of student progress reports in a format that is both accessible and parent-friendly. By integrating DeepSeek LLM for report generation, the system produced coherent and personalized feedback for each student based on academic records, attendance, and extracurricular participation. The reports were generated in a language and tone suitable for non-technical users, particularly parents in rural or under-resourced communities.

Text-based reports were seamlessly converted into audio using gTTS, ensuring that even illiterate or visually challenged parents could receive and understand the updates. The Telegram integration enabled efficient and direct communication, where parents who shared their contact details via the Telegram bot automatically received the reports in both text and audio formats. The system was able to correctly match the parent contact numbers from the dataset with the chat IDs collected via Telegram, streamlining the delivery process.

Additionally, the chatbot module powered by a Retrieval-Augmented Generation (RAG) framework and DeepSeek 32B LLM provided context-aware, meaningful answers to queries about student performance. This made the platform more interactive and useful for parents and teachers seeking real-time insights. Across the system's modules—from data ingestion to chatbot interaction—each component functioned reliably, demonstrating strong compatibility and integration within a single, user-friendly application.

6.2 Conclusion

The project has proven that AI-based automation can be a transformative tool for educational institutions, especially those in rural or government sectors that traditionally rely on manual reporting methods. The system not only reduces the workload of teachers by automating report generation and communication but also enhances parental engagement by delivering personalized and accessible feedback.

By leveraging language models for report generation, speech synthesis for audio output, and messaging platforms for report delivery, the system bridges the digital divide and promotes inclusivity. It demonstrates that advanced AI technologies, when thoughtfully integrated, can elevate the standards of communication and transparency in schools with limited resources.

The success of this system highlights its scalability and potential for adoption in broader educational contexts. It lays the foundation for future improvements such as multi-language support, integration with additional messaging platforms like WhatsApp, and real-time synchronization with institutional databases. Ultimately, this work reaffirms the role of AI in fostering smarter, more inclusive educational ecosystems that empower both educators and families.

CHAPTER-7

CONCLUSION AND FUTUTRE ENHANCEMENT

CONCLUSION

This project demonstrates the transformative potential of AI-driven automation in revolutionizing how educational institutions—particularly in rural or resource-constrained environments—manage student communication and reporting. By minimizing the manual effort traditionally required for progress reporting, the system significantly reduces the administrative burden on educators, freeing them to focus more on teaching and mentoring.

Through the thoughtful integration of natural language generation, text-to-speech capabilities, and automated communication via platforms like Telegram, the solution ensures that feedback reaches parents in a personalized, accessible format. This not only strengthens the bridge between school and home but also fosters greater inclusivity, making vital academic information available even to those with limited literacy or digital proficiency.

What sets this system apart is its potential to scale and evolve. Its modular design paves the way for future enhancements like multi-language support, WhatsApp integration, and real-time connectivity with school databases, making it adaptable to diverse educational settings. More than just a technological solution, this initiative represents a step toward a smarter, more connected, and inclusive educational ecosystem, where AI acts as an enabler of meaningful human collaboration.

FUTURE ENHANCEMENTS

While the current system focuses primarily on Telegram-based report delivery, upcoming versions aim to significantly broaden its communication capabilities. One of the key enhancements under development is WhatsApp integration, which will allow the platform to connect with parents through a more widely used and accessible channel. This addition ensures that important student updates and performance summaries reach a broader audience with minimal friction.

Another critical enhancement involves multi-language support. To cater to India's and the world's diverse linguistic population, the system will support report generation and chatbot responses in several regional languages. This not only promotes inclusivity but also ensures that all parents, regardless of language barriers, can understand and engage with their child's academic progress effortlessly.

In parallel, the chatbot module will evolve to incorporate dynamic learning capabilities. As new reports are generated and user interactions grow, the system will continuously update its knowledge base, resulting in smarter and more personalized responses. This adaptive learning mechanism will enhance the chatbot's ability to provide relevant, context-aware assistance to both educators and parents.

Scalability is also a top priority in future upgrades. The system will be redesigned with advanced APIs and backend performance optimizations, allowing it to process larger datasets and handle multiple user requests simultaneously without compromising speed or reliability. These upgrades will make the platform more robust and suitable for deployment in schools with large student populations.

REFERENCES:

- **TELEGRAM BOT**

LINK: <https://python-telegram-bot.org/>

- **CHATBOT**

LINK: <https://realpython.com/build-a-chatbot-python-chatterbot/>

- **API CALL**

LINK: <https://openrouter.ai/models>

- **Streamlit GUI**

LINK: <https://streamlit.io/>

- **Mail Sending Through Python**

LINK: <chatbot-python-chatterbot/https://mailtrap.io/blog/python-send-email/>