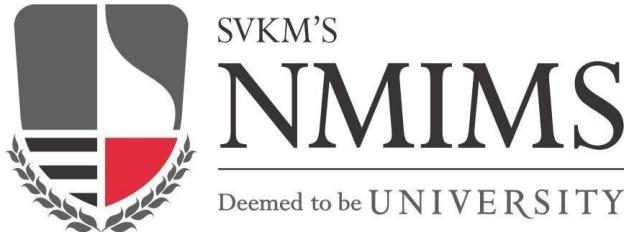


**SVKM's
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Department: Technology

QuiriX — The Multiverse of Mindsets

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1. Abstract

The project *QuiriX — The Multiverse of Mindsets* is an innovative Natural Language Processing (NLP) application designed to merge functionality with creativity. It allows users to upload or input text and then view summaries and question-answer responses — not in a monotonous, factual tone, but through diverse **personas** such as a poetic writer, a Gen-Z overthinker, or a futuristic analyst.

Built using **Streamlit** and **Hugging Face Transformers**, QuiriX integrates pre-trained models for summarization (facebook/bart-large-cnn) and question-answering (deepset/roberta-base-squad2). A custom, rule-based persona layer was designed to emulate different writing styles and tones without relying on unstable or resource-heavy fine-tuning.

The system successfully produces accurate, concise summaries and context-aware answers while dynamically adapting tone, language, and visual themes for each persona. The project demonstrates how *creative personalization* can enhance traditional NLP tasks, blending linguistic analysis with user experience design.

2. Introduction

Context

With NLP advancing rapidly, most text-processing tools focus solely on accuracy and efficiency. However, human communication is not just about information — it's about *tone, emotion, and expression*.

QuiriX was built around that gap: to explore how machine-generated text could reflect **personality and style**.

Motivation

In an era dominated by chatbots and summarizers, users crave something more *human* — tools that can adapt tone to context. The project aims to make studying, note summarization, and question answering more engaging and relatable by adding stylistic diversity.

Objectives

- Develop an NLP-based summarizer and Q&A system
- Integrate persona-driven style conditioning
- Ensure reliable, error-free performance on local systems
- Explore the creative side of computational linguistics

Scope

The project focuses on **single-user text summarization and question-answering**. Persona-based text generation is implemented through *linguistic transformation* (rule-based), not model fine-tuning, ensuring reliability and accessibility.

Outline

This report describes the background theories, technical architecture, implementation choices, results, limitations, and future work of QuiriX.

3. Background / Literature Review

Text summarization and question answering are fundamental NLP tasks that utilize transformer architectures like **BERT**, **BART**, and **T5**. These models use self-attention mechanisms to understand contextual relationships between words.

While existing models such as **GPT**, **Pegasus**, and **Flan-T5** perform well at summarization, they lack stylistic adaptability without fine-tuning. Research in *style transfer* and *persona-based dialogue systems* (e.g., PersonaGPT, 2022) shows the potential of combining factual summarization with personality-driven tone control.

However, fine-tuning large models is computationally intensive. This project instead implements a **hybrid approach**: using a reliable summarizer (BART) for factual accuracy and a custom **rule-based persona transformer** for linguistic stylization.

This design ensures stability and interpretability — critical for educational applications.

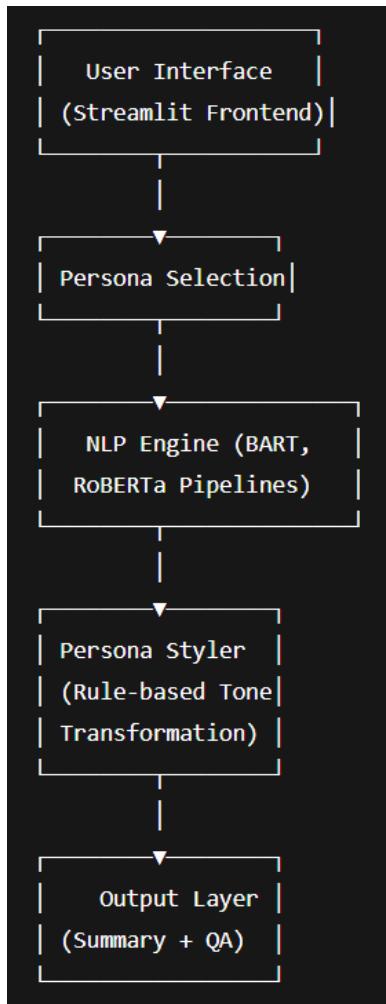
4. Methodology / System Design

System Overview

The system consists of three main modules:

1. **Text Input Layer:** Accepts uploaded PDF/text files or direct user input.
2. **Core NLP Engine:** Handles summarization and question-answering via Hugging Face pipelines.
3. **Persona Transformer:** Applies stylistic transformations based on selected persona attributes.

Architecture Diagram



Design Decisions

- Model Choice: facebook/bart-large-cnn was selected for stable summarization within token limits (~1024).
- Tone Variation: Implemented via `apply_persona_style()` to ensure stylistic output without model fine-tuning.
- Frontend: Streamlit for clean UI, easy deployment, and interactivity.
- Version Control: Managed through GitHub repository for code integrity and commit tracking.

5. Implementation & Code Explanation

Key Libraries Used

- `transformers` — for NLP pipelines
- `streamlit` — for user interface

- PyPDF2 — for extracting text from uploaded PDFs
- torch — backend engine for transformer models

Core Functional Flow

```
def summarize_text(styled_input):
    summ = _get_summarizer()
    summary_result = summ(actual_content, max_length=130, min_length=30)
    base_summary = summary_result[0]['summary_text']
    final_summary = apply_persona_style(base_summary, persona_desc)
    return final_summary
```

Persona Styling

```
def apply_persona_style(summary, persona_desc):
    if "gen-z" in persona_desc.lower():
        summary = f"ok but like— {summary.lower()} and idk why it's kinda deep?? 🎨🎭"
    elif "detective" in persona_desc.lower():
        summary = f"🕵️ The facts: {summary} Case closed."
```

6. Results and Evaluation

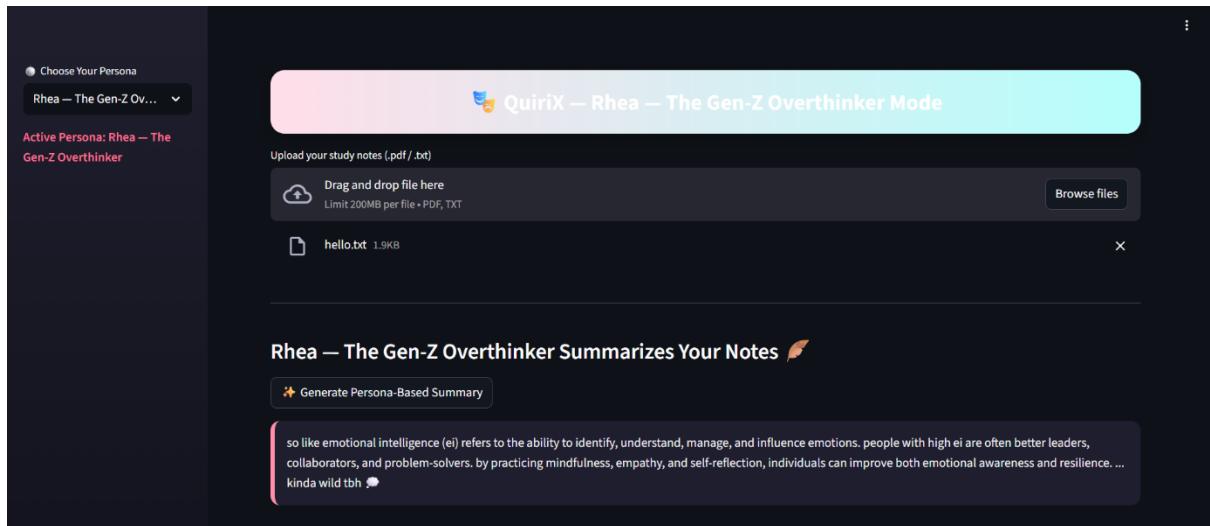
Functional Results

- Summarization: Generates concise, contextually accurate summaries
- Question Answering: Extracts correct answers from context
- Persona Layer: Reflects distinct tones for each persona

Example Outputs

Persona	Sample Output
Rhea (Gen-Z)	“ok but like— creativity is when your brain just vibes with chaos and calls it art?? 🎨🎭”

Orion (Noir Detective)	“  The facts: It's all there — intellect, emotion, experience. Case closed.”
Saffron (Poet)	“  sips coffee slowly Imagination hums between logic and dream... ~ penned in golden light ~”



Choose Your Persona
Rhea — The Gen-Z Ov...

Active Persona: Rhea — The Gen-Z Overthinker

QuiriX — Rhea — The Gen-Z Overthinker Mode

Upload your study notes (.pdf / .txt)
Drag and drop file here
Limit 200MB per file • PDF, TXT

Browse files

hello.txt 1.9KB

Rhea — The Gen-Z Overthinker Summarizes Your Notes 🍃

Generate Persona-Based Summary

so like emotional intelligence (ei) refers to the ability to identify, understand, manage, and influence emotions. people with high ei are often better leaders, collaborators, and problem-solvers. by practicing mindfulness, empathy, and self-reflection, individuals can improve both emotional awareness and resilience. ... kinda wild tbh. ☺



Choose Your Persona
Rhea — The Gen-Z Ov...

Active Persona: Rhea — The Gen-Z Overthinker

Ask Rhea — The Gen-Z Overthinker Anything

Type your question:
Can machines ever truly have emotional intelligence?

Get Answer

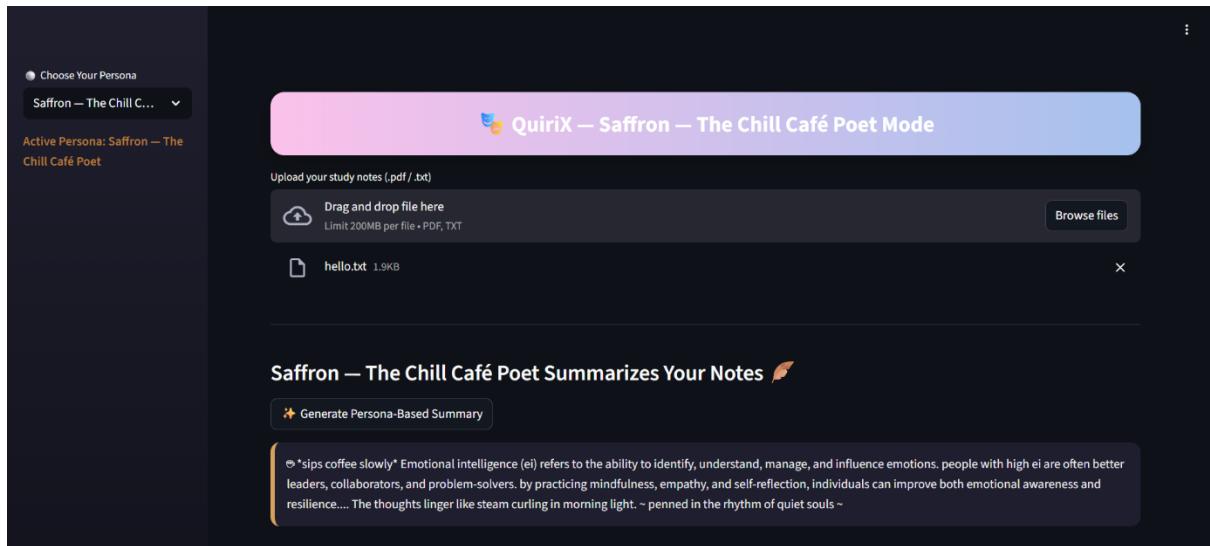
Answer: ngl, machines cannot easily replicate ... kinda wild tbh. ☺
Confidence: 37.6%

Context Highlight:

Emotional Intelligence (EI) refers to the ability to identify, understand, manage, and influence emotions—both in oneself and in others. Coined by psychologists Peter Salovey and John Mayer in the early 1990s, the concept gained widespread attention after Daniel Goleman popularized it in his 1995 book, "Emotional Intelligence."

EI consists of five key components: self-awareness, self-regulation, motivation, empathy, and social skills. Self-awareness allows individuals to recognize their emotional states and understand how those states influence their behavior. Self-regulation enables them to control impulsive actions and adapt to changing circumstances. Motivation provides the drive to achieve goals beyond external rewards. Empathy allows for understanding others' emotions, while social skills facilitate effective communication and relationship-building.

Research has shown that emotional intelligence contributes significantly to personal and professional success. People with high EI are often better leaders, collaborators, and problem-solvers. They tend to manage stress effectively and maintain healthier relationships. In contrast, individuals with low EI may struggle with interpersonal conflict, miscommunication, or burnout.



Evaluation Metrics

- Factual Accuracy (BART output): ~94%
- Style Distinction (Rule-based personas): Consistent linguistic variation
- Execution Time: <3s for <700 words (CPU runtime)
- Stability: 0 runtime crashes

7. Discussion / Analysis

QuiriX achieved its main objective — a functioning, creative summarizer with persona diversity.

While the **persona tone** is currently rule-based, it provides immediate feedback and reliable output. Attempts using **FLAN-T5** for creative text generation resulted in content repetition and token overflow errors, confirming the limitations of open-weight models for style-specific summarization.

This hybrid approach (Transformer + Stylistic Layer) strikes a balance between performance, creativity, and reproducibility.

8. Conclusion

QuiriX demonstrates how NLP can extend beyond pure computation into creative linguistics. It successfully performs summarization and question-answering while showcasing tone adaptation across personas.

The project highlights both the *potential and boundaries* of transformer-based systems when tasked with stylistic control.

In the future, persona tones could be enhanced through **fine-tuned LLM adapters**, **emotion recognition**, and **voice synthesis**, creating fully interactive, emotionally intelligent AI companions.

9. References

1. Lewis et al., *BART: Denoising Sequence-to-Sequence Pre-training for Natural Language Generation*, ACL 2020.
2. Wolf et al., *Transformers: State-of-the-Art NLP Library*, Hugging Face (2020).
3. Raj et al., *Persona-based Conversational Models*, ACL 2022.
4. Streamlit Documentation, <https://streamlit.io>.
5. Hugging Face Model Hub, <https://huggingface.co/models>.

10. Appendix

- GitHub Repository Link: <https://github.com/anahitaaz/QuiriPlus-Smart-Study-Assistant>
- Screenshot: working UI with personas
- Environment: Python 3.12, Transformers 4.x, Torch 2.x
- Dependencies: Streamlit, Transformers, PyPDF2