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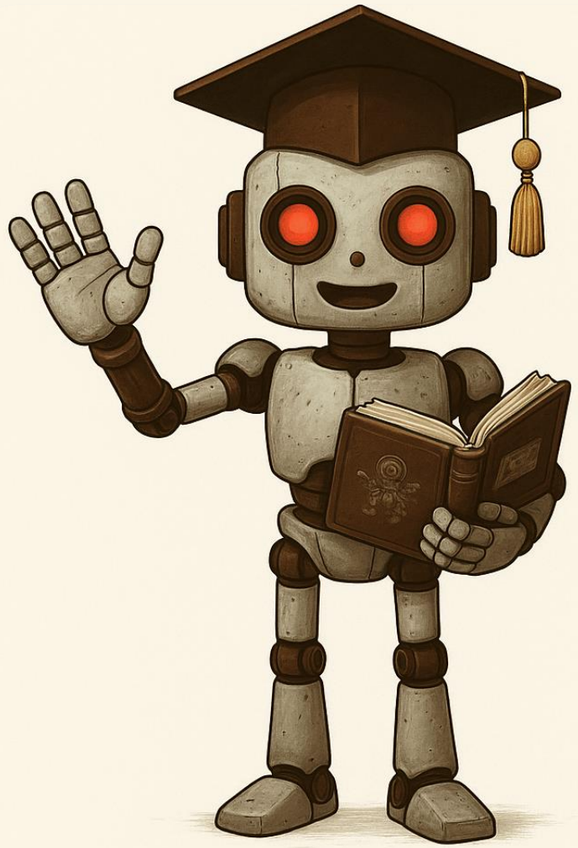
Dear Professors and Distinguished Guests,

Welcome to our graduation project.



April 28, 2025

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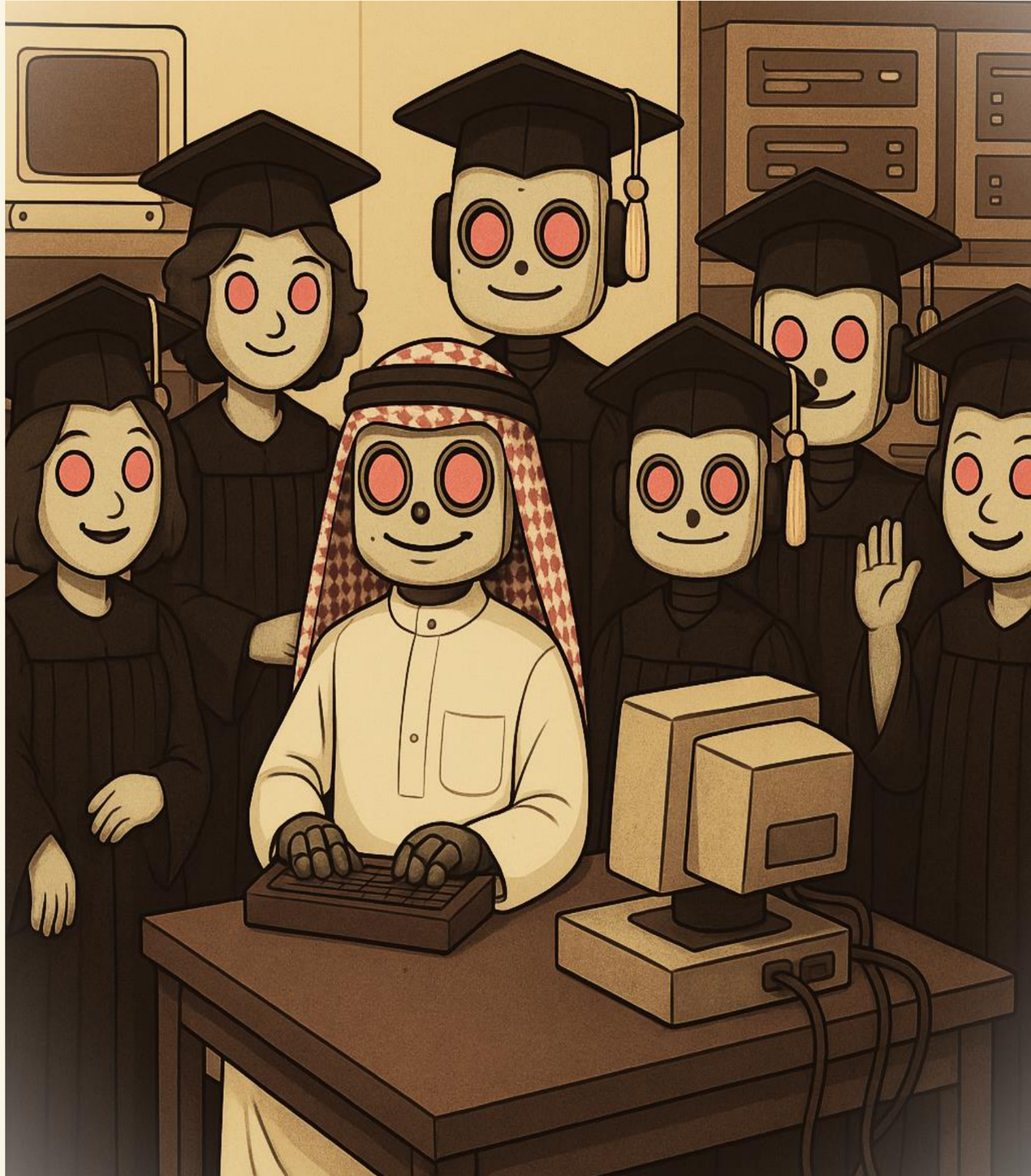

Acknowledgment

Advisor and Mentor

We extend our sincere appreciation to our advisor and mentor for their invaluable guidance, insightful feedback, and unwavering support throughout this research journey.

Colleagues and Peers

We are grateful to our colleagues and peers for their constructive discussions, collaboration, and shared enthusiasm for innovation.

AI Researchers

A special thanks to the developers and researchers in the field of artificial intelligence and natural language processing, whose groundbreaking work has laid the foundation for this study.

Family and Friends

We extend our heartfelt appreciation to our family and friends for their constant encouragement, patience, and belief in our capabilities.

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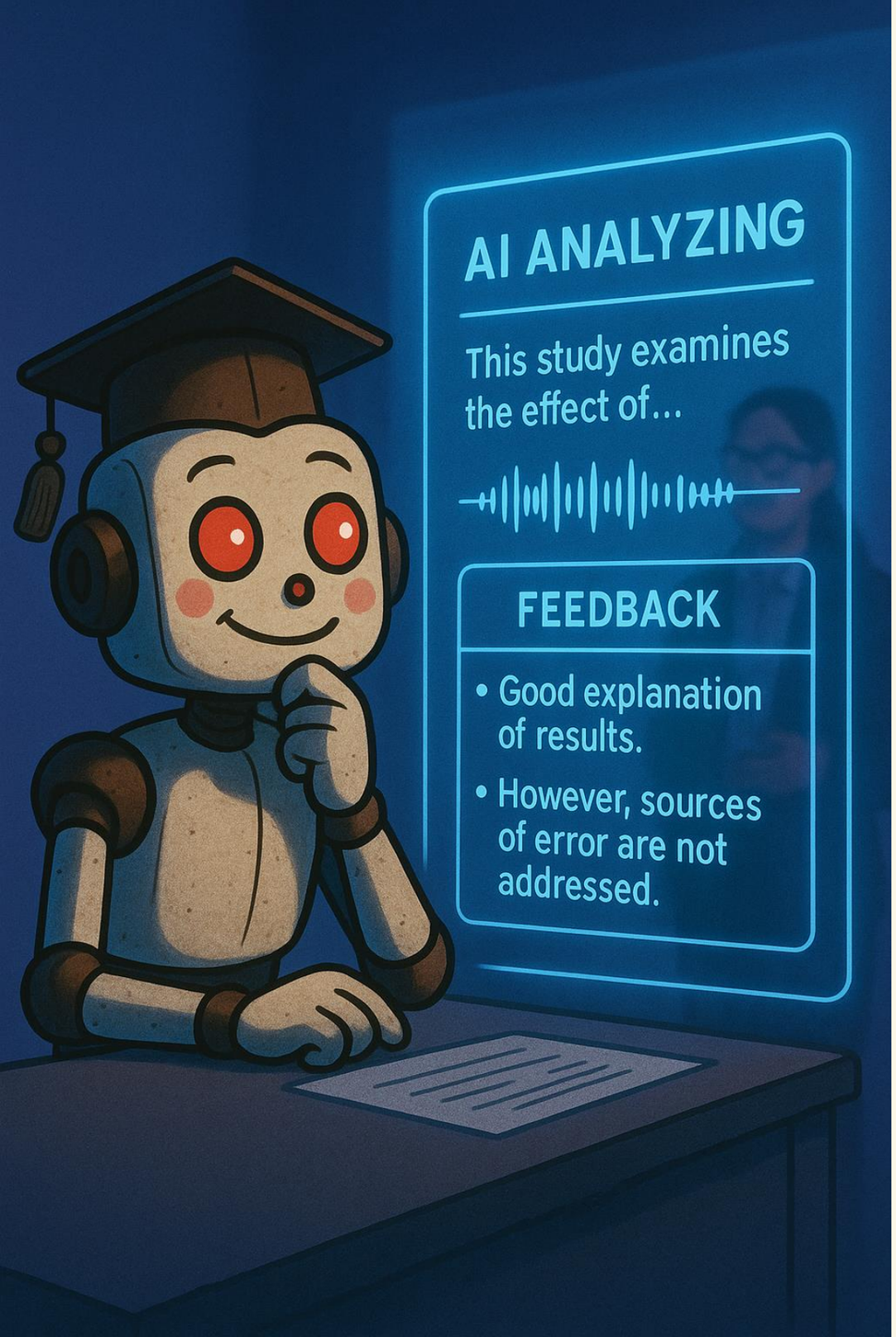

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AI-Driven Research Presentation Evaluation: Enhancing Academic Communication with Large Language Models

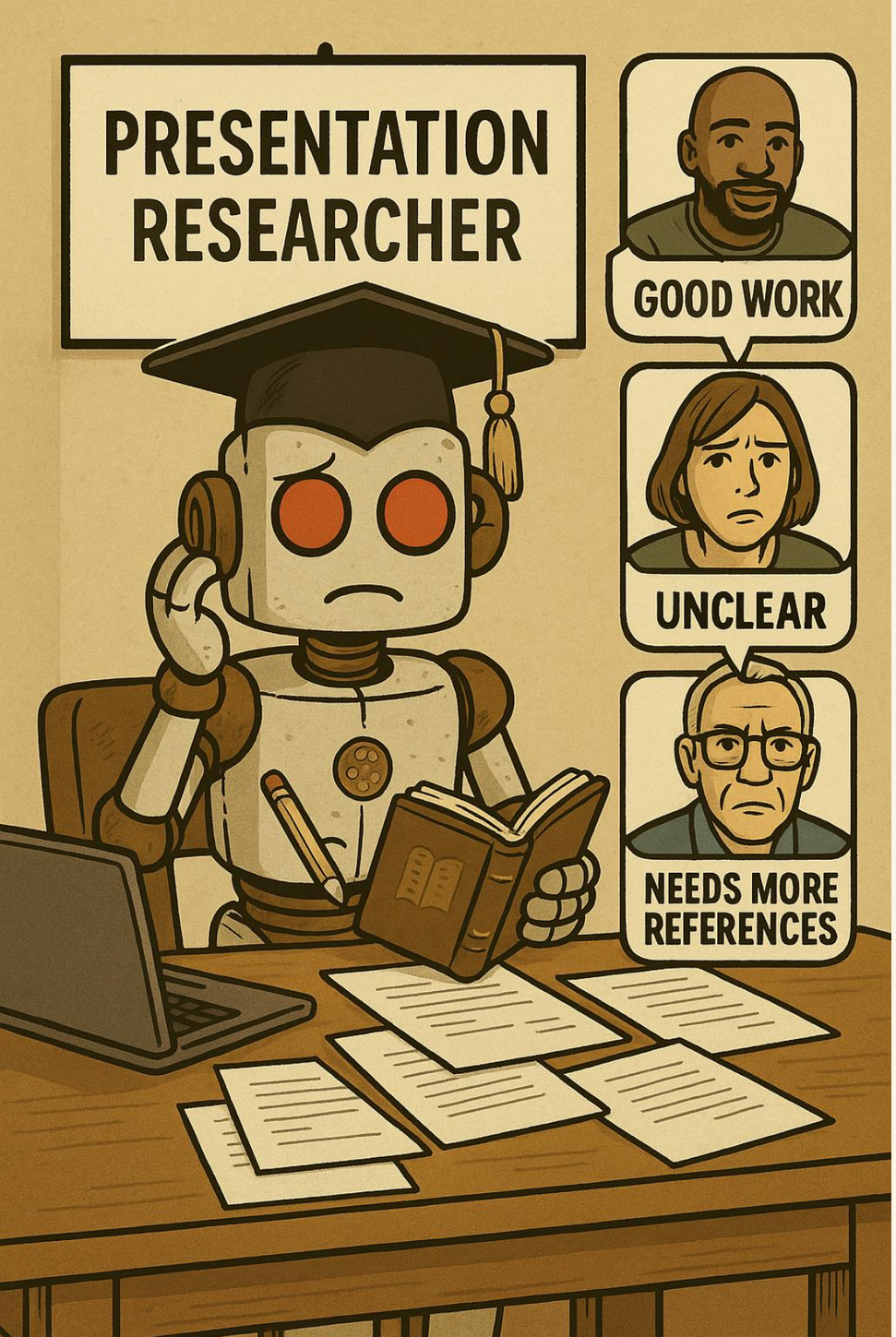
Effective communication of research findings is a cornerstone of academic success, yet many researchers face challenges in structuring, articulating, and refining their presentations to meet high scholarly standards. Traditional feedback mechanisms, often reliant on peer or advisor reviews, can be subjective, inconsistent, and time-consuming, limiting the iterative improvement process. This project introduces an AI-powered research presentation evaluation tool that leverages Large Language Models (LLMs) and natural language processing (NLP) to provide structured, data-driven assessments of academic presentations.

Introduction

Effective communication of research findings is a cornerstone of academic success, yet many researchers face challenges in structuring, articulating, and refining their presentations to meet high scholarly standards. Traditional feedback mechanisms, often reliant on peer or advisor reviews, can be subjective, inconsistent, and time-consuming, limiting the iterative improvement process.

To address these challenges, this project introduces an AI-powered research presentation evaluation tool that leverages Large Language Models (LLMs) and natural language processing (NLP) to provide structured, data-driven assessments of academic presentations.

The system automatically transcribes recorded presentations into text and applies advanced AI-driven analysis to evaluate logical coherence, argument strength, clarity, and audience engagement. Through real-time interactive feedback and intelligent search mechanisms, researchers receive actionable insights to enhance their content, structure, and delivery.



Challenges in Traditional Research Presentation

Lack of Structured Feedback

Researchers often rely on informal peer feedback, which can vary significantly in quality and depth

Time Constraints

Limited opportunities for expert review before presenting at conferences or defending work

Cognitive Bias

Traditional feedback is often subject to bias, inconsistency, and subjectivity

Increasing Complexity

Modern presentations include multimedia elements requiring comprehensive evaluation

Problem Statement

Presentation Challenges

Researchers-particularly early-career academics and graduate students-face significant challenges in structuring presentations, ensuring coherence, and adhering to scholarly standards.

Feedback Limitations

Traditional evaluation methods rely on peer reviews, advisor feedback, or self-assessment, which are often subjective, inconsistent, and time-consuming.

Gap in AI Tools

Existing AI-driven academic tools focus primarily on text-based research tasks, leaving a critical gap in the evaluation of spoken or recorded presentations.

Need for Innovation

Without a reliable, AI-driven evaluation tool, many scholars will continue to struggle with self-improvement, limiting their ability to effectively contribute to academic discourse.

Research Aim and Objectives

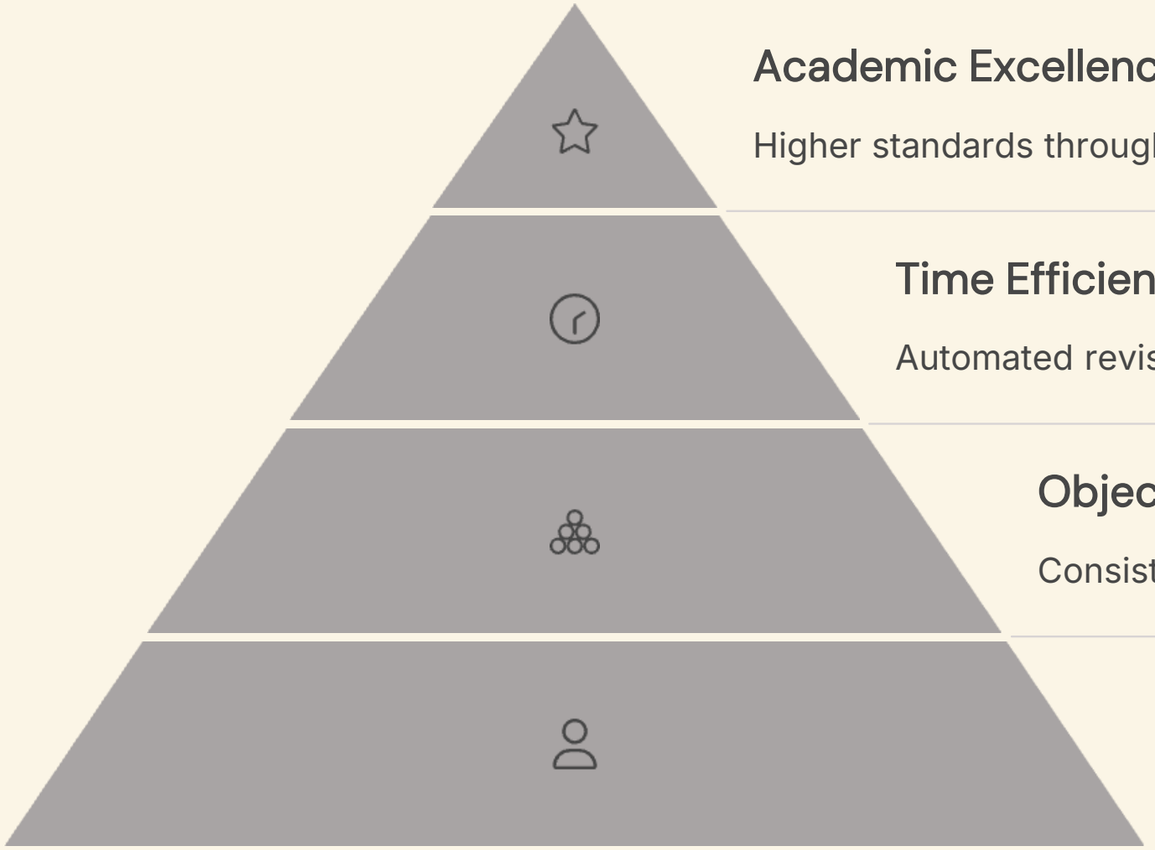
Research Aim

This research aims to develop an AI-powered research presentation evaluation system that utilizes Large Language Models (LLMs) and Natural Language Processing (NLP) to analyze, assess, and enhance the quality of academic presentations. The system seeks to provide structured, objective, and data-driven feedback, helping researchers refine their presentation content, structure, coherence, and argumentation while ensuring academic rigor.

Research Objectives

1. To investigate the common challenges researchers face in structuring, delivering, and evaluating academic presentations.
2. To design and implement an AI-driven system that converts recorded presentations into text, analyzes their content, and provides detailed assessments.
3. To develop an intelligent framework that evaluates research presentations based on factors such as clarity, coherence, logical flow, argument strength, and academic rigor.
4. To integrate AI-powered feedback mechanisms that provide actionable recommendations.
5. To explore the potential of using intelligent search mechanisms to suggest relevant references and data sources.
6. To compare AI-generated feedback with traditional human evaluation methods.
7. To identify and mitigate potential biases and ethical concerns in AI-driven research evaluation.
8. To ensure the system is user-friendly, accessible, and adaptable across different academic disciplines.

Broader Impact



Academic Excellence

Higher standards through AI-driven insights

Time Efficiency

Automated revision process saves valuable time

Objectivity

Consistent evaluation removing human bias

Democratized Access

Benefits researchers at all career stages

The AI-powered evaluation tool represents a paradigm shift in academic communication. It enables researchers to achieve higher standards of presentation excellence, optimize clarity and engagement, save time and effort, and ensure consistency and objectivity in evaluation.

Literature Review

AI in Academic Communication

Studies demonstrate effectiveness of AI in evaluating clarity, argument strength, and logical flow (Li et al., 2020)

1

Traditional Evaluation Challenges

Lack of structured feedback, time constraints, and bias in human evaluation (Jiang & Kumar, 2021)

2

NLP and Speech Analysis

Advancements in speech-to-text technologies enable automated assessment with high accuracy (Shen et al., 2019)

3

Ethical Considerations

Addressing bias through diverse training datasets and human-AI collaboration (Mitchell et al., 2020)

4

The literature indicates that AI-driven research presentation evaluation holds great potential for improving academic communication. AI and NLP technologies can provide objective, data-driven insights, addressing the limitations of traditional feedback mechanisms. However, ensuring fairness, ethical AI use, and interdisciplinary adaptability remains a key area for future research.

Background

Traditional Presentation Challenges

Researchers struggle with organization, logical flow, and meeting academic rigor expectations

AI and NLP Advancements

Large Language Models revolutionize text processing and understanding

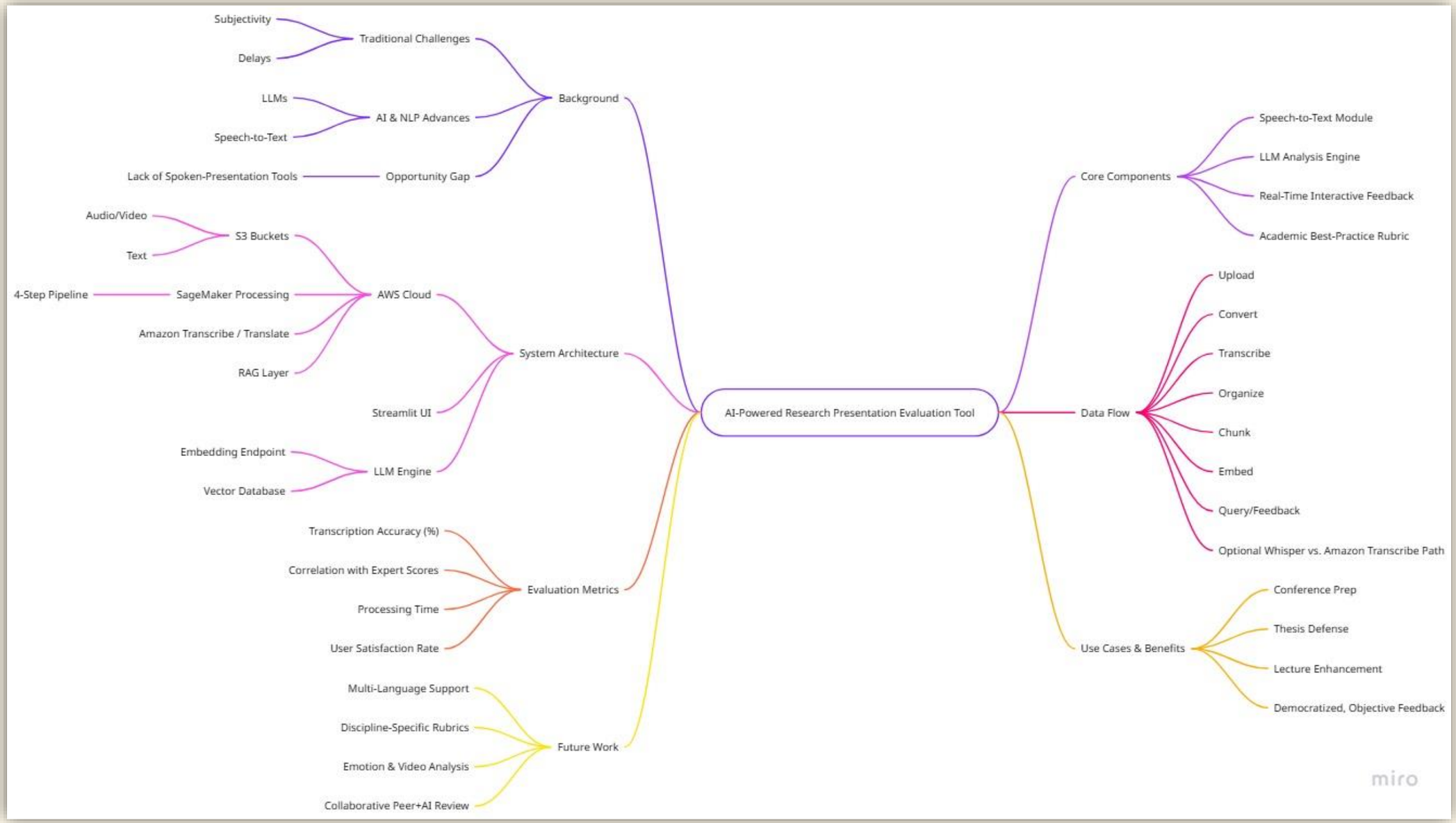
Integration Opportunity

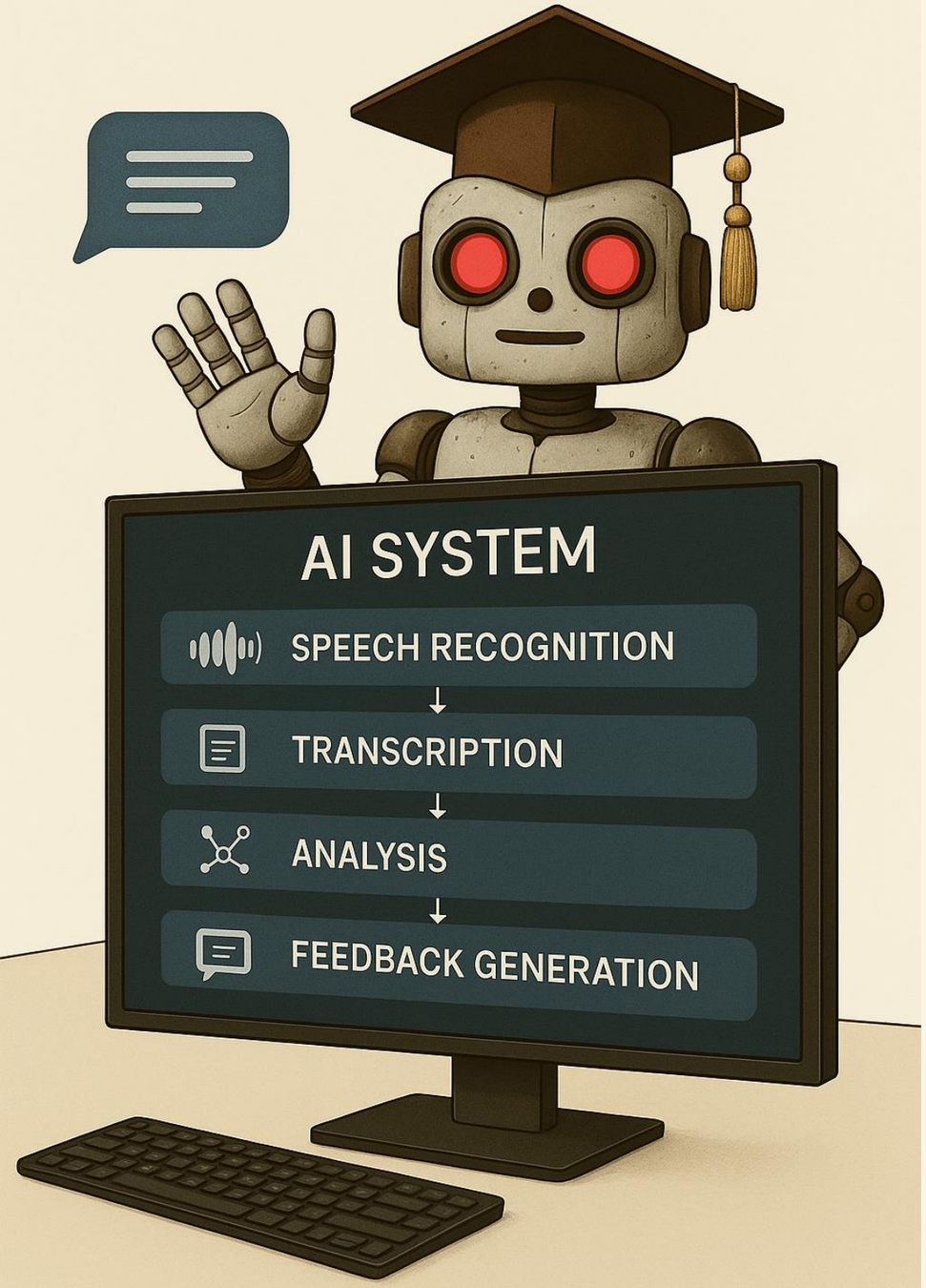
AI potential in evaluating spoken or recorded research presentations remains largely untapped

Bridging the Gap

This project develops an AI-powered system to analyze presentations and provide structured feedback

System Overview





The AI-Powered Research Presentation Evaluation Tool

Automated Speech-to-Text Transcription

Converts recorded presentations into text with high accuracy

LLM Integration for Deep Analysis

Analyzes structure, coherence, argument strength, and logical flow

Real-Time Interactive Query and Feedback

Allows researchers to ask questions about clarity, relevance, and persuasiveness

Evaluation Based on Academic Best Practices

Assesses research depth, logical progression, clarity, and audience engagement

Tool Architecture and Coding

Programming Environment

Python was chosen as the primary language, integrating state-of-the-art LLMs for NLP tasks

Speech-to-Text Module

Converts recorded presentations into text with high accuracy

Preprocessing Pipeline

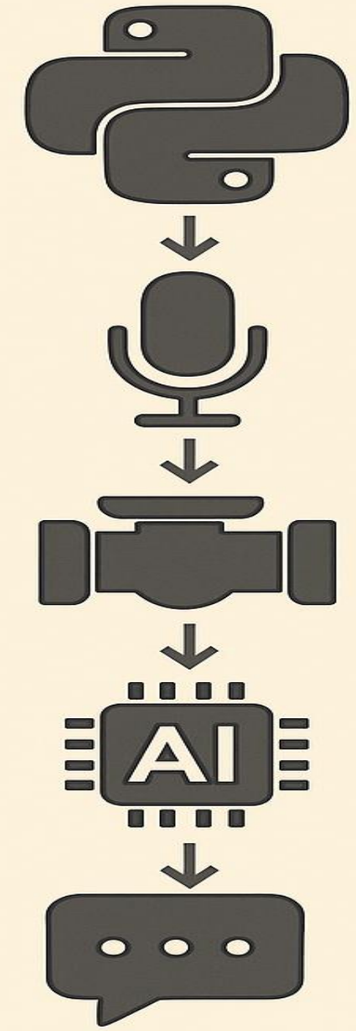
Normalizes transcriptions and extracts key linguistic features

LLM-based Analysis Engine

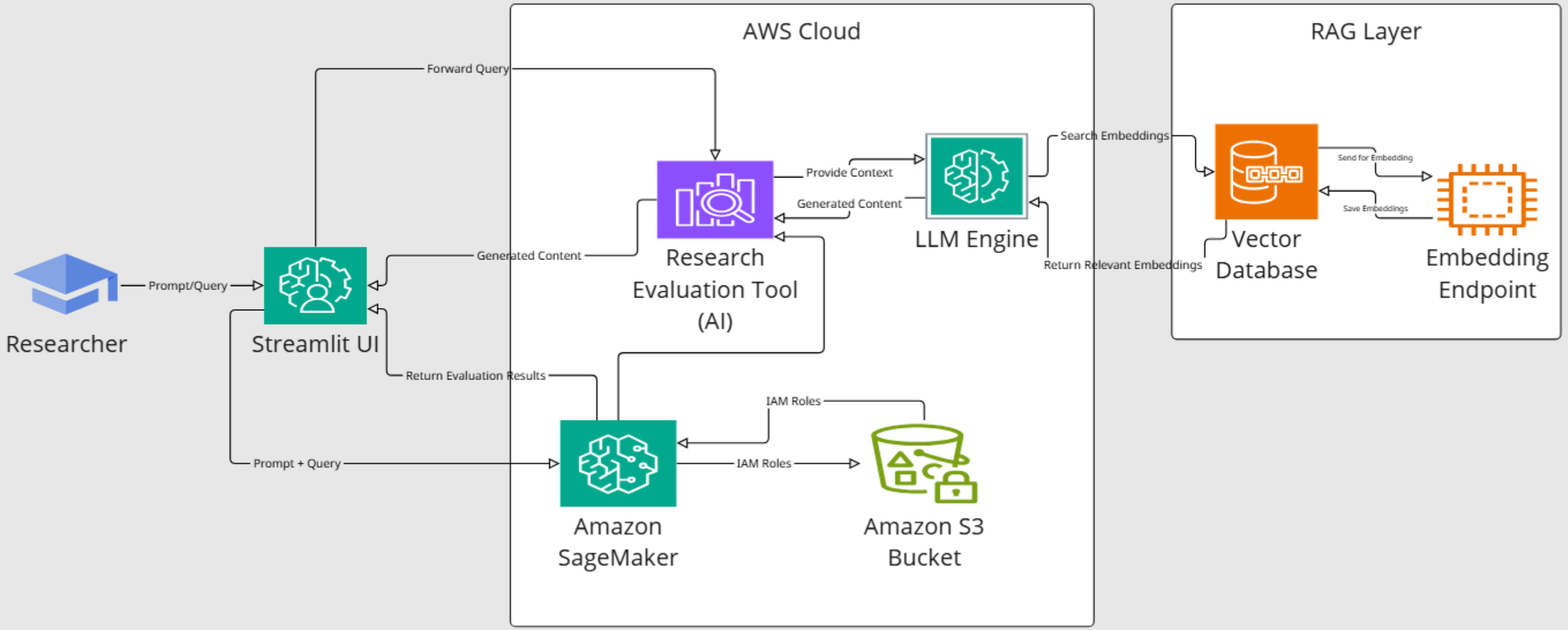
Assesses logical coherence, argument strength, clarity, and content quality

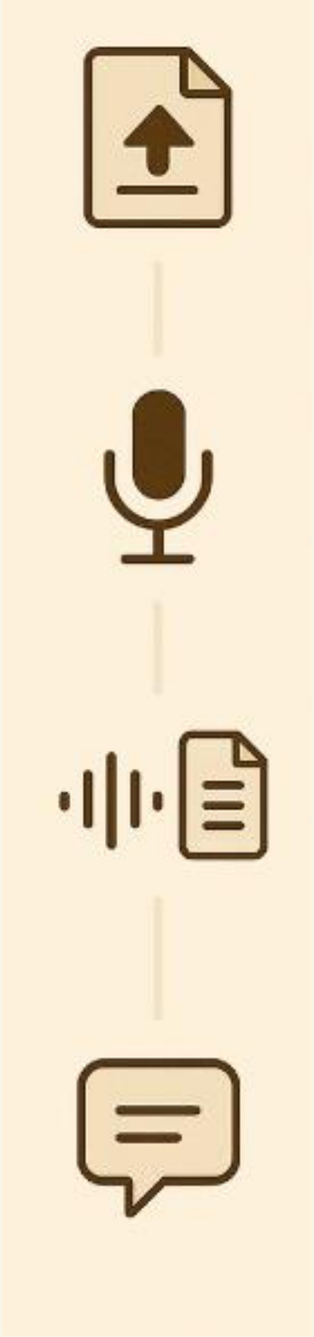
Interactive Query Interface

Allows users to request targeted feedback on specific aspects



Architectural Design of the Research Evaluation System





Presentation Upload and Processing

Upload Presentation

Users upload their audio/video presentation file through the intuitive drag-and-drop interface, supporting multiple formats including MP3, WAV, MP4, MOV, M4A, and MPEG4.

Extract Voice

The system automatically extracts the audio component from video files and prepares it for transcription processing.

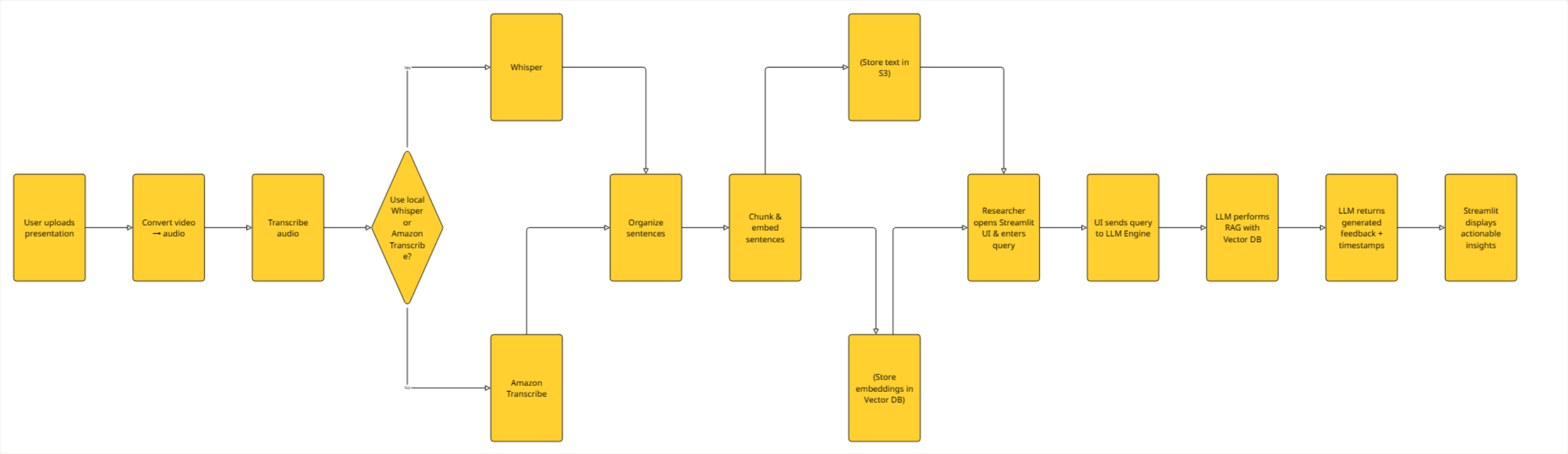
Process Voice and Convert to Text

The audio is processed through advanced speech-to-text algorithms, with status updates provided to the user throughout the transcription process.

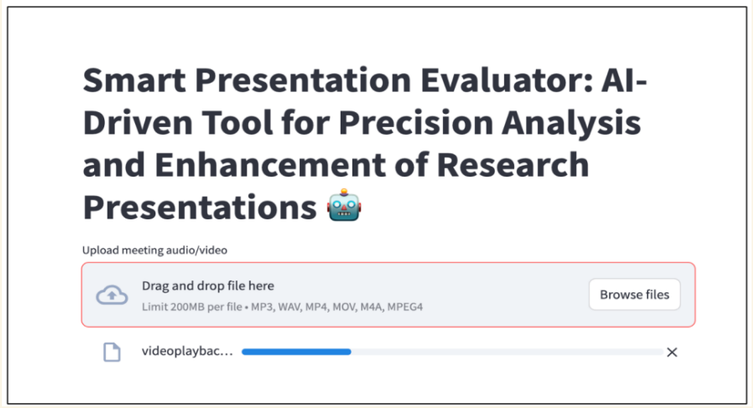
Prepare for Interaction

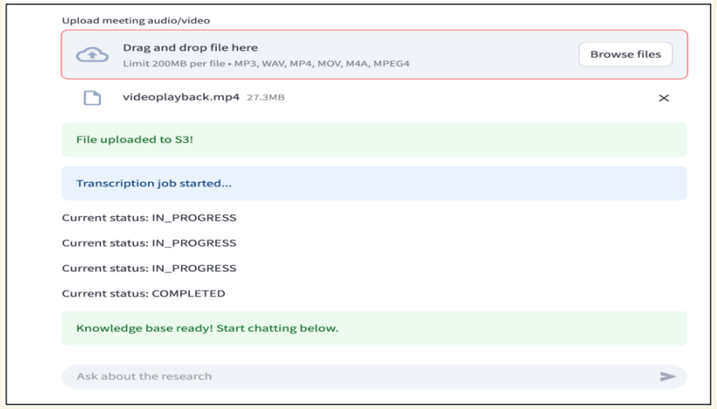
Once transcription is complete, the knowledge base is ready for user interaction through the chatbot interface.

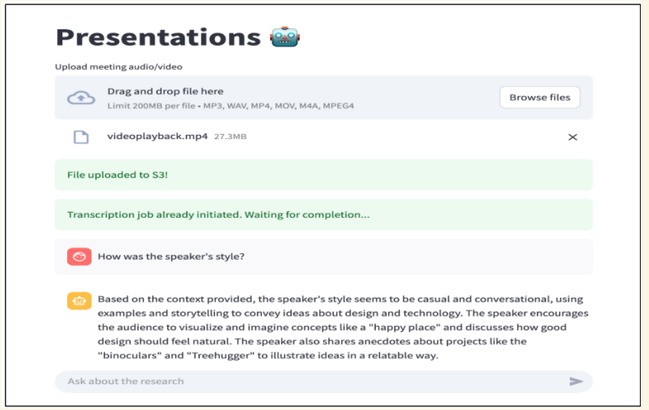
Research Presentation Processing and Feedback Workflow



User Interface and Cloud Deployment







Interface Design by Streamlit

The tool's interface was developed using Streamlit, ensuring an intuitive and accessible user experience with controls for embedding model, Bedrock model, and temperature settings.

Cloud Integration

The system was deployed on Amazon Web Services (AWS) with Amazon S3 for storage, AWS SageMaker for AI models, and IAM Roles for secure communication between components.

Multi-device Access

Cloud deployment enables researchers to access the tool from various devices and locations, facilitating collaboration and continuous improvement.

System Performance Evaluation

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94.3%

Transcription Accuracy

Word accuracy for clear recordings

2–3

Processing Time (minutes)

For a 30-minute presentation

0.87

Correlation with Experts

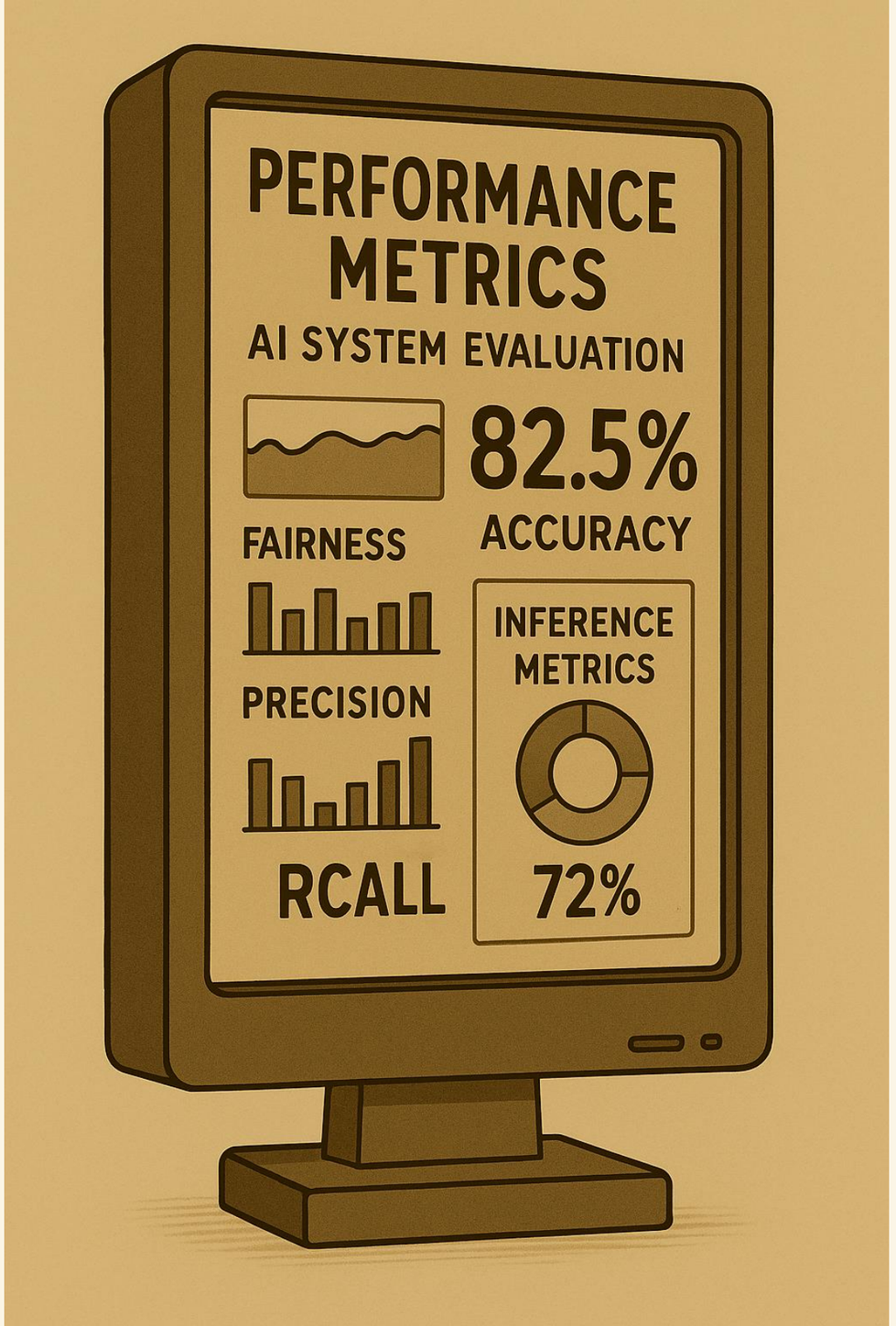
Strong alignment with human assessment

87%

User Satisfaction

Found feedback "helpful" or "very helpful"

Our system demonstrated excellent performance across key metrics. The high transcription accuracy ensures reliable text conversion for analysis, while the efficient processing time enables near real-time feedback. The strong correlation with expert assessments validates the AI system's evaluation capabilities, and the high user satisfaction rate confirms its practical value for researchers.



Conclusion and Implications

Addressing Traditional Limitations

The AI-powered evaluation tool successfully addresses the limitations of traditional presentation assessment methods by providing objective, data-driven insights in real time.

Complementary Approach

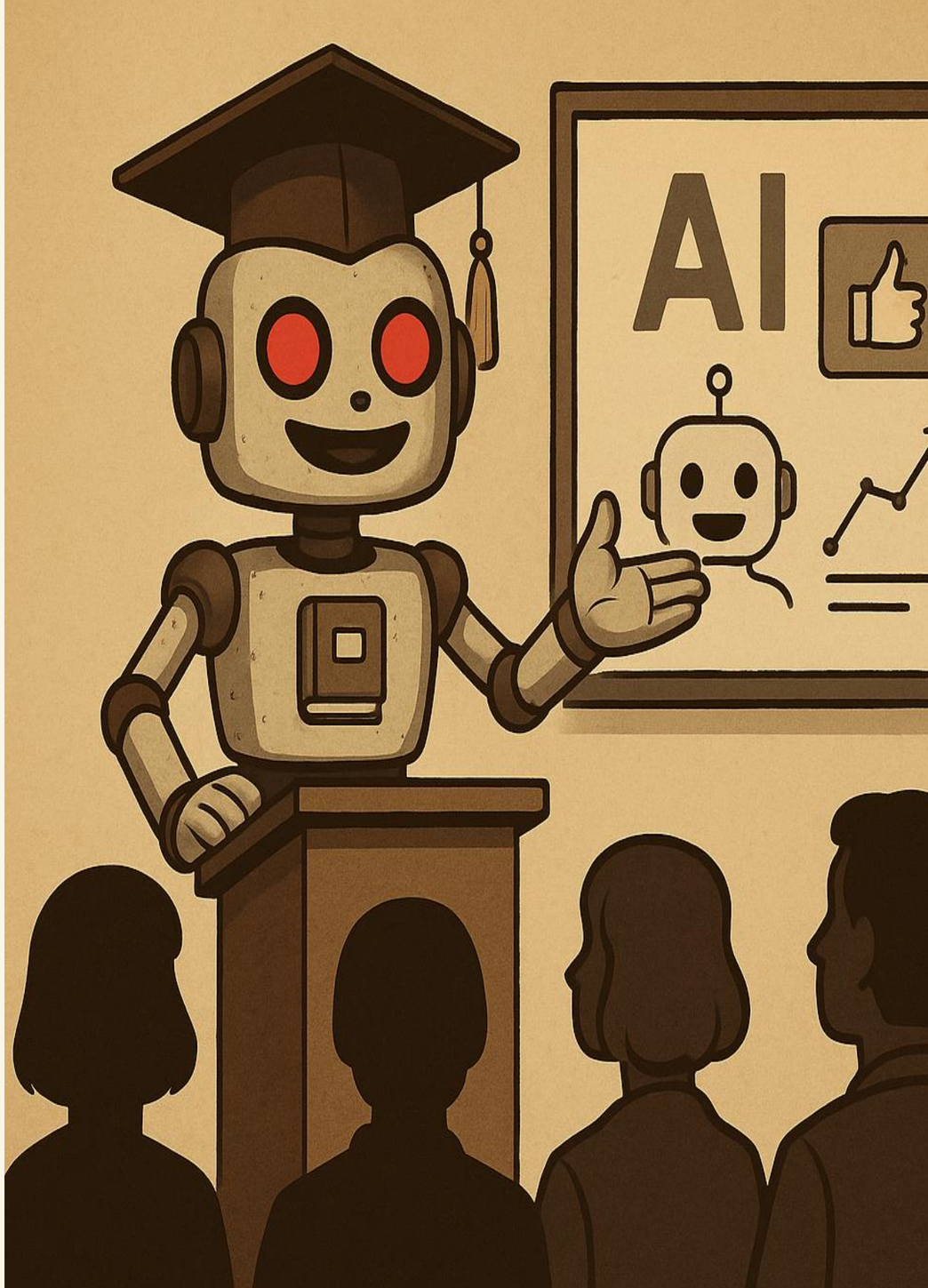
The high satisfaction rates and strong correlation with expert human evaluation suggest that AI-driven assessment works extremely well alongside traditional feedback methods.

Democratizing Access

The tool democratizes access to high-quality feedback, benefiting researchers across all career stages, from early-career academics to seasoned professionals.

Continuous Improvement

As we continue refining the system based on user input and performance data, we expect to see further improvements in accuracy, customization, and disciplinary adaptation.



Future Work

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User Session Management

Enable the tool to support user sessions and save those sessions in a database.

Sentiment Analysis

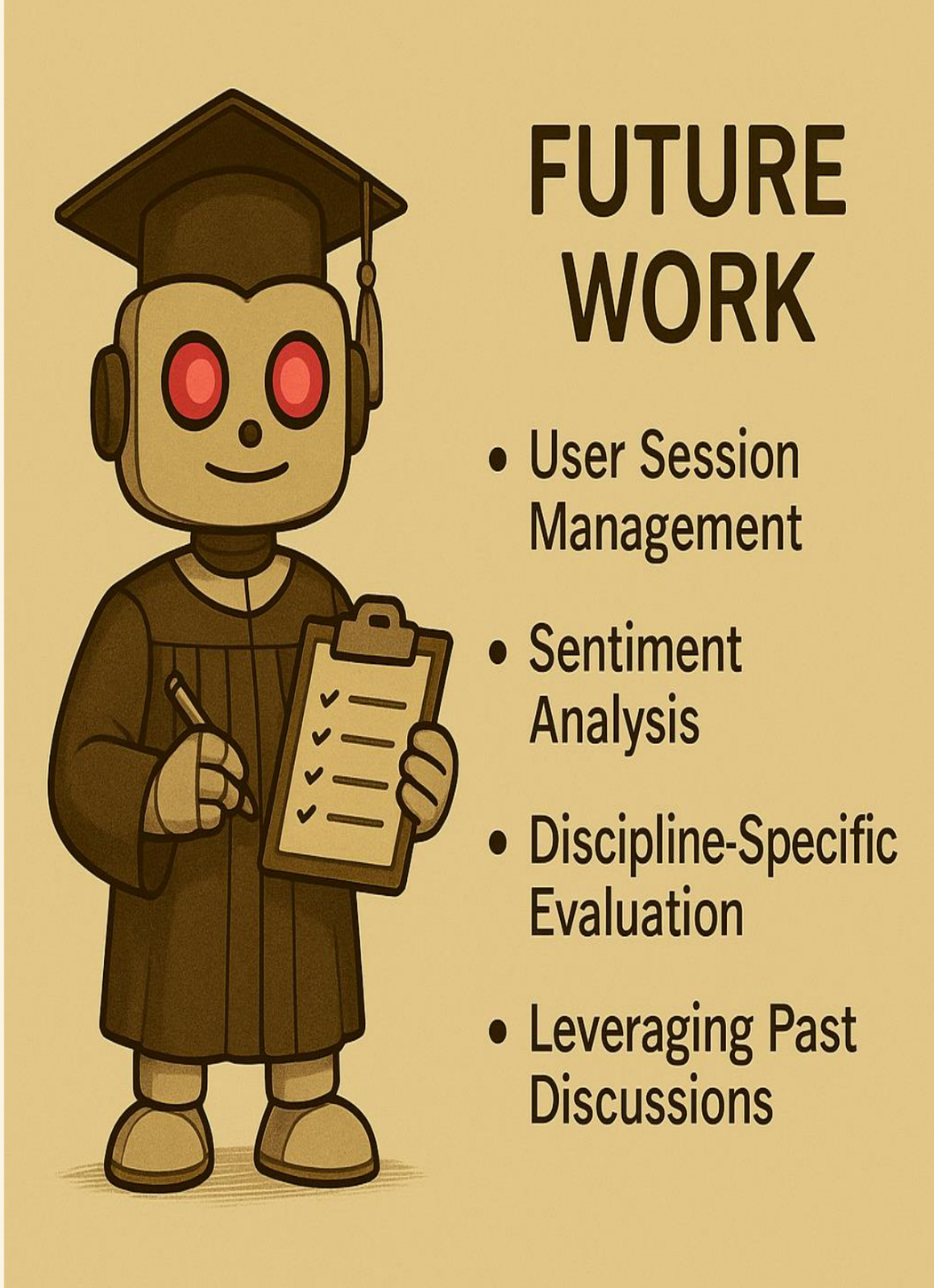
Adding video and audio emotion analysis capabilities

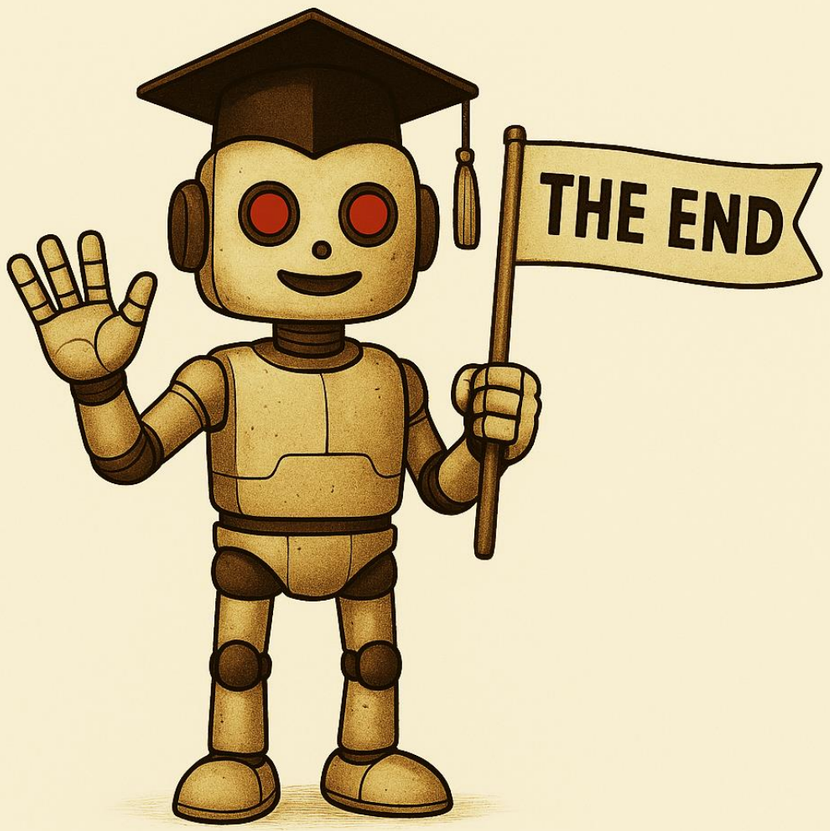
Discipline-Specific Evaluation

Implementing more detailed discipline-specific criteria

Leveraging Past Discussions

Utilize past discussions to improve the tool’s performance.





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Thank you for your attention.