**AI-Powered Public Speaking Training & Writing Analysis Platform:**

**Introduction:**

A Flask-based web application improves public speaking and writing using AI techniques . It is a combination of speech recognition, natural language processing (NLP), and machine learning to give real-time feedback and well -structured exercises.

**Methodology:**

**1. AI-Powered Public Speaking Training**

**Exercises:**

* **Rapid Fire Analogies**: Assesses response time, fluency, and relevancy using the Gemini API and web speech recognizing model and ai generated choices). (For Rapid Analogies API key should be more the v1beta ).
* **Triple Step:** AI monitors topic adherence and distraction handling.
* **Conductor:** Analyzes vocal variety and energy levels using web speech recognition model.

**2. Analysis and Speech Recognition:**

* **Model Used:** vosk-model-small-en-us-0.15u (lightweight, offline AutomaticSpeechRecognition model).
* **Processing:** Uses librosa module for audio analysis, extracting pace, volume, pitch, and clarity.
* **Speech Features & Feedback**:
  + **Pace**: Speech duration analysis suggests speed adjustments.
  + **Volume**: Energy calculation advises speaking louder/softer using pydub,textblob and vosk.
  + **Pitch**: Frequency tracking identifies the pitch of voice and variations.
  + **Clarity:** Silence is also detected to check fluency.

**3. Evaluation of writing enhanced by AI:**

* **Grammar & Coherence:** Corrects grammar using LanguageTool & SpaCy NLP.
* **Sentiment & Tone Analysis:** TextBlob and VADER are used to categorize sentiment.The Gemini API assesses readability and logical flow.
* **Essay Evaluation:** Checks structure, transitions, and logical consistency.and summarizes feedback for improvement.

**Findings & AI Enhancements:**

* **AI Scoring Optimization:** Fine-tuning Gemini prompts that improves responses consistentcy.
* **Enhanced User Engagement:** Real-time AI feedback boosts learning efficiency.
* **Interactive UI**: Live visualization improves user experience.

**Conclusion and Recommendations:**

This AI-powered platform successfully integrates speech processing, LLM-based analysis, and adaptive feedback to enhance both public speaking and writing skills. Future improvements include real-time fluency scoring, AI-driven speech assessments, and expanded NLP-based text evaluation. To enhance the platform, optimizing speech recognition with noise reduction and confidence-based corrections will improve Vosk’s accuracy. AI scoring can be refined by fine-tuning Gemini API prompts and introducing adaptive difficulty. Gamification elements will improve engagement, while new training modules like speech generation and AI-powered debate simulators will further develop public speaking and writing skills.