Team: TriNetics

**Voice-Controlled Agent Assistant Using Fine-Tuned TinyLLaMA in Jac**

**Summary**

This project builds upon the foundation of **Project 3 (Fine-Tuning TinyLLaMA for Jac MTLLM)** by taking it a step further — integrating **agentic voice control** into the Jac ecosystem. Our goal is to create a **voice-activated assistant agent** powered by the fine-tuned TinyLLaMA model, capable of understanding spoken user commands, processing them via Jac’s MTLLM infrastructure, and executing structured logic in real-time.

By combining speech recognition with structured Jac logic and an optimized LLM, we aim to demonstrate a **low-cost, privacy-friendly GenAI system** that can operate locally — a crucial step toward building intelligent edge assistants like JARVIS.

**Objectives**

* Extend the fine-tuned TinyLLaMA model to support **natural language voice input**
* Implement a **Jac-based voice agent** that receives audio input and executes tasks via by <llm> calls
* Demonstrate **structured reasoning** using typed outputs (e.g., object creation, command execution)
* Ensure local operation using only **open-source tools**, no cloud APIs

**Core Components**

**1. Voice-to-Text Pipeline**

* Use lightweight speech-to-text tools like speech\_recognition to convert spoken input into usable command text.

**2. Jac Agent Interface**

* A walker-based agent system that processes text commands using by <llm> calls with the fine-tuned TinyLLaMA backend.
* Commands will trigger structured logic like object creation, status reports, or triggering abilities.

**3. Structured Command Execution**

* Examples:
  + "Add a new user profile" → Returns a valid Jac User object
  + "What is the system status?" → Triggers a status-check walker
  + "Clear history" → Executes a data wipe ability

**4. Local Model Integration**

* Plug the fine-tuned TinyLLaMA into the Jac mtllm plugin system and ensure seamless response generation that adheres to Jac’s typing.

**🤖 Future Extensions**

* 🔁 Add **text-to-speech (TTS)** for full conversational loop
* 🧠 Introduce **memory** or multi-turn conversation handling
* 🌐 Integrate with local devices or APIs for IoT-style command execution

**💡 Why This Matters**

This project offers a **real-world use case** of the fine-tuned TinyLLaMA, proving that **agentic systems in Jac can be voice-controlled**, responsive, and capable of acting on structured data — all running locally. It bridges LLM power, agent logic, and human interaction, making it a prototype for privacy-focused GenAI assistants of the future.