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

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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

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💡 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.