Lecture 09: Autonomy Frameworks Overview

🎯 Learning Objectives

By the end of this lecture, you should be able to:

- Identify key frameworks for building autonomous LLM agents.
- Compare features of AutoGPT, BabyAGI, and OpenAgents.
- Understand the architectural patterns and trade-offs.
- Run a basic example from an open-source autonomy framework.

🧩 Key Concepts

What Are Autonomy Frameworks?

- Toolkits and architectures designed to turn LLMs into **goal-driven agents**.
- Provide built-in support for:
  - Goal decomposition
  - Memory management
  - Task planning
  - Tool invocation
  - Persistent loops

Popular Frameworks

1. AutoGPT

- CLI-based, open-source Python tool.
- Uses OpenAI models to take high-level goals and execute plans.
- Requires API keys, tool setup, and configuration files.

2. BabyAGI

- Lightweight task management loop.
- Maintains a task queue and context memory.
- Continuously re-prioritizes and expands tasks from a seed objective.

3. OpenAgents (OpenAI / LangChain / community forks)

- Modular, prompt-based agent systems.
- Supports multi-agent collaboration, tool orchestration, and agent roles.

Feature Comparison Table

```
| Feature              | AutoGPT | BabyAGI | OpenAgents |
|----------------------|---------|---------|------------|
| Goal Planning        | ☑       | ☑       | ☑          |
| Tool Use             | ☑       | ⚠ (basic) | ☑        |
| Task Prioritization  | ❌      | ☑       | ☑          |
| Memory Persistence   | ☑       | ☑       | ☑          |
| Setup Complexity     | 🔺 High | ☑ Low   | 🔺 Medium  |
```

🛠 Required Tools/Libraries

- Git + Python (for AutoGPT/BabyAGI)
- OpenAI API key
- (Optional) LangChain + LangGraph (for OpenAgents)

🔬 Hands-on Exercise: Run a Local AutoGPT Clone

Goal: Clone and run an open-source AutoGPT-style agent.

Step 1: Clone a minimal AutoGPT repo

```
git clone https://github.com/Torantulino/Auto-GPT.git
cd Auto-GPT
pip install -r requirements.txt
```

Step 2: Set your API keys

```
- Edit `.env` file or use environment variables:
    OPENAI_API_KEY=your_key_here
```

Step 3: Define a goal and run

```
python scripts/main.py
Goal: Research and summarize top 3 AI frameworks for developers.
```

Step 4: Observe Agent Behavior

```
- How does it break the goal into tasks?
- Does it use tools?
- Where does it store results or memory?
```

Bonus:

- Try BabyAGI (https://github.com/yoheinakajima/babyagi)
- Customize a tool in AutoGPT or create your own task loop
- Explore agent logs and reasoning traces to improve transparency

---