

## Multi-Agent Research Pipeline Documentation

### 1. Overview

This project demonstrates how to build a modular, scalable AI research assistant using LangGraph, OpenAI LLMs, Tavily Search, and state-based agent design.

### 2. Components

Planner Agent: Breaks the topic into three research sub-questions.

Searcher Agent: Uses Tavily Search API to fetch information and summarize results.

Writer Agent: Produces a cohesive, structured research summary.

### 3. System Architecture

User Topic → Planner Agent → Searcher Agent → Writer Agent → Final Summary

### 4. Execution Pipeline

The planner creates tasks, the searcher fetches and summarizes data, and the writer produces the final consolidated report.

### 5. Installation

```
pip install langgraph langchain openai tavily-python pydantic
```

### 6. Advantages

Modular, extensible, and industry-level design for automated research workflows.