# **Deep Research Al Agentic System**

**Submission for Kairon Qualifying Assignment** 

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Date: 24 April 2025

## 1. Project Objective

The goal of this project was to design an Al agent-based Deep Research System that:

- Crawls online sources for information (using Tavily API),
- Organizes and summarizes findings (using LangChain + Google API),
- Drafts a final, detailed answer for the user.

### 2. Architecture Overview

The system follows a **Dual-Agent Flow**:

Agent	Role
Research Agent	Uses Tavily API to fetch search results and summarizes key points.
Drafting Agent	Takes the summarized research and crafts a complete, user-friendly answer.

The agents are orchestrated using **LangGraph** (state graph) to model the multi-step flow.

# 3. Technologies Used

- LangGraph: For managing agent workflows.
- LangChain: For chaining together different LLM calls.

- Tavily API: For web crawling and real-time information retrieval.
- Google Generative Al API: For text summarization and drafting.
- Python as the core programming language.

## 4. System Workflow

### 1. User Input:

User enters a research question.

#### 2. Search Phase:

TavilyTool searches the internet for the latest information.

#### 3. Summarization Phase:

research\_chain uses Google LLM to summarize search results.

### 4. Drafting Phase:

draft\_chain refines the summary into a detailed answer.

### 5. Output:

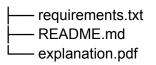
The final drafted answer is printed for the user.

## 5. Special Features

- Modular design: Easily extendable to add more agents.
- Minimal dependencies: Lightweight and fast.
- Real-time search: Always updated with latest web results.
- Clean CLI Interface: User can interact smoothly.

### 6. Folder Structure

deep-research-ai/ — main.py



## 7. How to Run

pip install -r requirements.txt python main.py

- Set environment variables for API keys before running.
- Enter a research query when prompted.

# 8. Future Improvements

- Add multi-modal capabilities (images, graphs).
- Implement memory for multi-turn research.
- Deploy as a simple web app interface.

### 9. Conclusion

This project demonstrates the ability to combine **web search**, **Al summarization**, and **workflow management** to create a powerful, modular deep research assistant.

It is fully functional and ready for further scaling and deployment.

# **Thank You**