AI Research Agent

IMPORTS

from flask import Flask, render_template, request

- Flask: To initialize the app.

- render_template: To render HTML templates (like index.html).

- request: To handle data sent from forms (POST/GET).

from langgraph.graph import StateGraph

- Imports StateGraph from LangGraph, a workflow tool where each step is a node using shared state.

from langchain_community.tools import TavilySearchResults

- Tavily is a web search tool provided by LangChain. This tool fetches real-time search results based on a query.

from langchain_community.document_loaders import WebBaseLoader

- Loads full HTML documents from web pages.

from langchain_community.document_transformers import Html2TextTransformer

- Converts HTML documents into plain readable text.

from pydantic import BaseModel

from typing import List

- Pydantic's BaseModel: Validates and defines schema for our shared state.

- List: To define list-type fields.

FLASK APP INITIALIZATION

app = Flask(__name__)

- Creates the Flask web app.

STATE SCHEMA

```
class ResearchState(BaseModel):
    topic: str
    docs: List[str] = []
    final_answer: str = ""
    search_results: List[str] = []
```

- Defines the data structure used by each workflow step.

RESEARCH AGENT

def research_agent(state: ResearchState) -> dict:

- A LangGraph node that performs web search and extracts content.

- Initializes Tavily tool, fetches results, extracts URLs.

- Loads each page, converts to text.

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DRAFTING AGENT

def drafting_agent(state: ResearchState) -> dict:

- Another LangGraph node, prepares the final answer by merging documents.

DEFINE WORKFLOW GRAPH

graph = StateGraph(state_schema=ResearchState)

- Initializes workflow, adds research and draft nodes.

- Sets research -> draft -> finish.

- Compiles to app_compiled.

FLASK ROUTE

@app.route("/", methods=["GET", "POST"])

- Defines route to accept query, run graph, and render the output.

RUN THE APP

if __name__ == "__main__":

    app.run(debug=True)

- Starts the Flask app.

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IN SHORT

- Accepts user query (e.g., "AI in education").
- Searches the web.
- Loads & cleans web pages.
- Synthesizes into a clean answer.
- Shows both answer & source URLs.