API Documentation for Learning Roadmap Generator

Solution Description

The Learning Roadmap Generator API creates personalized learning roadmaps for users based on their desired topics. The API leverages OpenAI for topic generation, Serper for web resource recommendations, and various graph algorithms for optimizing the learning path. Key functionalities include generating a learning roadmap, expanding nodes, merging graphs, retrieving resources, applying PageRank, and converting graphs to trees.

Setup Instructions

Prerequisites
- Python 3.7+
- pip
- Virtual environment

Installation
1. Clone the repository:

   ```
   git clone https://github.com/CogniticCore/Mapster
   cd ROADMAP_PLANNER_API
   ```

2. Create and activate a virtual environment:

   ```
   python -m venv venv
   source venv/bin/activate  # On Windows, use `venv\Scripts\activate`
   ```

3. Install the dependencies:

   ```
   pip install -r requirements.txt
   ```

4. Set up environment variables. Create a `.env` file in the root directory and add your API keys:

```
OPENAI_API_KEY=<your_openai_api_key>
SERPER_API_KEY=<your_serper_api_key>
```

5. Run the application:

```
uvicorn main:app --reload
```

API User Guide

Endpoints

GET /graph/full

Generate a full learning roadmap with all cleaning and ranking steps.

Parameters

- openai_api_key (str): OpenAI API key.
- serper_api_key (str): Serper API key.
- prompt (str): The prompt for the LLM.
- depth (int): The depth of the roadmap. Default is 3.
- retries (int): The number of retries for the LLM call. Default is 2.

Responses

- 200 OK: Returns the cleaned and ranked learning roadmap.
- 422 Unprocessable Entity: Validation error.

Example

```
curl -X 'GET' \
  'http://mapster-
cogniticcore.onrender.com/graph/full?openai_api_key=<OPENAI_API_KEY>&serper_a
pi_key=<SERPER_API_KEY>&prompt=Learn+Python&depth=3&retries=2' \
  -H 'accept: application/json'
```

POST /graph/ExpandNode

Expand a specific node in the roadmap.

Parameters

- openai_api_key (str): OpenAI API key.
- serper_api_key (str): Serper API key.
- upload_file (UploadFile): The uploaded roadmap file.
- depth (int): The depth of the roadmap. Default is 3.
- retries (int): The number of retries for the LLM call. Default is 2.
- target_node (str): The ID of the target node to expand.

Responses

- 200 OK: Returns the expanded learning roadmap.
- 422 Unprocessable Entity: Validation error.

```
curl -X 'POST' \
  'http://mapster-
cogniticcore.onrender.com/graph/ExpandNode?openai_api_key=<OPENAI_API_KEY>&se
rper_api_key=<SERPER_API_KEY>&depth=3&retries=2&target_node=node1' \
  -H 'accept: application/json' \
  -H 'Content-Type: multipart/form-data' \
  -F 'upload_file=@path_to_your_file.json'
```

GET /graph

Generate a learning roadmap.

Parameters

- `openai_api_key` (str): OpenAI API key.
- `prompt` (str): The prompt for the LLM.
- `depth` (int): The depth of the roadmap. Default is 3.
- `retries` (int): The number of retries for the LLM call. Default is 2.

Responses

- `200 OK`: Returns the generated learning roadmap.
- `422 Unprocessable Entity`: Validation error.

Example

```
curl -X 'GET' \
  'http://mapster-
cogniticcore.onrender.com/graph?openai_api_key=<OPENAI_API_KEY>&prompt=Learn+
Python&depth=3&retries=2' \
  -H 'accept: application/json'
```

POST /mergegraph

Merge nodes in the roadmap to remove redundancy.

Parameters

- `openai_api_key` (str): OpenAI API key.
- `upload_file` (UploadFile): The uploaded roadmap file.
- `retries` (int): The number of retries for the LLM call. Default is 2.

Responses

- `200 OK`: Returns the roadmap with redundant nodes removed.
- `422 Unprocessable Entity`: Validation error.

Example
```
curl -X 'POST' \
  'http://mapster-
cogniticcore.onrender.com/mergegraph?openai_api_key=<OPENAI_API_KEY>&retries=
2' \
  -H 'accept: application/json' \
  -H 'Content-Type: multipart/form-data' \
  -F 'upload_file=@path_to_your_file.json'
```

POST /graph/resources

Get recommended resources for the roadmap.

Parameters

- serper_api_key (str): Serper API key.
- upload_file (UploadFile): The uploaded roadmap file.
- retries (int): The number of retries for the LLM call. Default is 2.

Responses

- 200 OK: Returns the roadmap with recommended resources.
- 422 Unprocessable Entity: Validation error.

Example
```
curl -X 'POST' \
  'http://mapster-
cogniticcore.onrender.com/graph/resources?serper_api_key=<SERPER_API_KEY>&ret
ries=2' \
  -H 'accept: application/json' \
  -H 'Content-Type: multipart/form-data' \
  -F 'upload_file=@path_to_your_file.json'
```

POST /graph/pageranker

Apply PageRank algorithm to the roadmap.

Parameters

- upload_file (UploadFile): The uploaded roadmap file.

Responses

- 200 OK: Returns the roadmap with PageRank scores.
- 422 Unprocessable Entity: Validation error.

Example
```
curl -X 'POST' \
  'http://mapster-cogniticcore.onrender.com/graph/pageranker' \
  -H 'accept: application/json' \
  -H 'Content-Type: multipart/form-data' \
  -F 'upload_file=@path_to_your_file.json'
```

POST /graph/tree

Convert a graph to a tree structure.

Parameters

- `upload_file` (UploadFile): The uploaded roadmap file.

Responses

- `200 OK`: Returns the roadmap as a tree structure.
- `422 Unprocessable Entity`: Validation error.

Example

```
curl -X 'POST' \
  'http://mapster-cogniticcore.onrender.com/graph/tree' \
  -H 'accept: application/json' \
  -H 'Content-Type: multipart/form-data' \
  -F 'upload_file=@path_to_your_file.json'
```

POST /graphranking

Sort the roadmap by PageRank scores.

Parameters

- `upload_file` (UploadFile): The uploaded roadmap file.

Responses

- `200 OK`: Returns the sorted roadmap.
- `422 Unprocessable Entity`: Validation error.

Example

```
curl -X 'POST' \
  'http://mapster-cogniticcore.onrender.com/graphranking' \
  -H 'accept: application/json' \
  -H 'Content-Type: multipart/form-data' \
  -F 'upload_file=@path_to_your_file.json'
```

Input/Output Details

Input Data

- **openai_api_key**: OpenAI API key for generating topics.
- **serper_api_key**: Serper API key for web search recommendations.
- **prompt**: The prompt for generating the learning roadmap.
- **depth**: The depth of the roadmap to generate.
- **retries**: The number of retries for API calls.
- **upload_file**: JSON file containing the roadmap graph.
- **target_node**: The ID of the target node to expand.

Output Data

- **Learning Roadmap**: JSON object representing the learning roadmap with nodes and edges.
- **Recommended Resources**: JSON object with web resources related to the topics.
- **PageRank Scores**: JSON object with nodes ranked based on PageRank algorithm.
- **Converted Tree**: JSON object representing the roadmap as a tree structure.
- **Ranked Roadmap**: JSON object with nodes ranked based on various attributes.