# Langgraph Agent FastAPI with Human Feedback

## Documentation

The API exposes a **checkpointed, interrupt-aware LangGraph agent** via FastAPI. It supports **human-in-the-loop workflows**, allowing execution to pause, collect feedback, and resume **without restarting**. It is agent-agnostic ( any single agent can be used in this API)

## Overview

**Execution process:**

1. Client creates a new agent thread
2. Client starts streaming execution
3. Agent may emit an interrupt and pause
4. Client submits user feedback through endpoint
5. Client resumes execution from checkpoint
6. Process repeats until completion

LangGraph handles **state persistence** internally using thread_id.

## Prerequisites

- **.env file should contain the following environment variables:**
  - **LLM API calls (OpenAI, Gemini , Claude etc.)**

```
OPENAI_API_KEY="<API KEY>"
```

  - **Langsmith Tracing (OPTIONAL) :**

```
LANGSMITH_API_KEY="<API KEY>"
LANGCHAIN_API_KEY="<API KEY>"
LANGCHAIN_TRACING_V2="true"
LANGCHAIN_PROJECT="<project workspace name>"
```

  - **Langfuse Tracing (OPTIONAL)**

```
LANGFUSE_SECRET_KEY="<API KEY>"
```

```
LANGFUSE_PUBLIC_KEY="<API KEY>"
LANGFUSE_HOST="<LANGFUSE SERVER URL>" #defaults to
https://cloud.langfuse.com
```

- **Interrupts in agent must use the following format:**

```
{
  "question": "",
  "details": ""
}
```

# Execution cycle

```
created thread
  ↓
running
  ↓
waiting_for_user  < - -
  ↓                      |
ready_to_resume          |
  ↓                      |
running - - - - - - - - - -
  ↓
completed
```

# API Endpoints

## 1. Start Agent

### POST /agent/start

Creates a new agent thread and initializes the execution state.

### Request Body Example

```
{
  "prompt":"Write a guide on NCS",
  "confidence_threshold":0.85,
```

```
  "max_regen_attempts":3
}
```

### Response

```
{
  "thread_id": "5e67b3a9-d41c-4123-b0e2-86d19f945c26",
  "status": "created",
  "message": "Agent thread initialized"
}
```

## 2. Stream / Resume Agent Execution

### GET /agent/stream/{thread_id}

Starts or resumes agent execution and streams events.

### Request  Example

http://localhost:8000/agent/stream/5e67b3a9-d41c-4123-b0e2-86d19f945c26

### Response

```
{
  "type": "update",
  "data": [
    "ai_generate_with_confidence"
  ]
}
{
  "type": "update",
  "data": [
    "evaluate_sections"
```

```
  ]
}
{
  "type": "interrupt",
  "data": [
    {
      "question": "Review complete. Approve all reviewed sections? (y/n): ",
      "details":
"\n============================================================\nDOCUMENT
SECTIONS
GENERATED\n============================================================\n\nAUTO
-APPROVED SECTIONS (no review
needed):\n------------------------------------------------------------\n\n▪ Introduction to Cheese
(Confidence: 0.90)\n  Cheese is a dairy product derived from milk that is produced in a wide
range of flavors, textures, and forms. It is made by coagulating the milk prote...\n\n▪ Types
of Cheese by Milk Source (Confidence: 0.85)\n  Cheese can be categorized based on the type
of milk used in its production. Common sources include:\n1. Cow's Milk: Most widely used,
producing cheeses...\n\n▪ Types of Cheese by Texture (Confidence: 0.90)\n  Cheeses can be
categorized by their texture, which affects their culinary uses and mouthfeel. Common
categories include:\n1. Soft Cheese: Includes Brie...\n\n▪ Conclusion (Confidence: 0.90)\n
Cheese is a diverse food product with a multitude of types based on various classifications.
Understanding these types can enhance culinary experience...\n\nSECTIONS REQUIRING YOUR
REVIEW:\n------------------------------------------------------------\n\n Section: Types of Cheese by
Aging Process\n   Confidence: 0.80\n   Reason: While the aging process is a clear
classification, the nuances of aging times and flavor development can introduce some
ambiguity.\n\n   Content:\n   The aging process of cheese can significantly influence its flavor
and texture. Types include:\n1. Fresh Cheese: Not aged, such as Ricotta and Cottage
Cheese.\n2. Aged Cheese: Aged for a short period, like Havarti and Gouda.\n3. Mature
Cheese: Aged for longer periods, developing complex flavors, such as Cheddar and
Gruyère.\n------------------------------------------------------------\n"
    }
  ]
}
```


## 3. Respond to Agent Interrupt

### POST /agent/respond/{thread_id}

Stores user feedback and updates state without executing the graph.

### Request Body Example

```
{
  "response": "n"
}
```

### Response

```
{
  "status": "ready_to_resume",
  "details": "response sent to agent! use /stream/{thread_id} to continue execution",
   "thread_id": "37c9d1e2-2586-4404-9355-bd915371c973"
}
```

## 4. Get Thread / State data

### /agent/state/{thread_id}

Returns the thread data and the state variables associated with it

### Request Data

http://localhost:8000/agent/state/5e67b3a9-d41c-4123-b0e2-86d19f945c26

### Response

```
{
  "thread_id": "5e67b3a9-d41c-4123-b0e2-86d19f945c26",
  "values": {
     "prompt": "Types of cheese",
     "output": "",
```

```
  "messages": [
    {
      "content": "Generated 5 sections",
      "additional_kwargs": {},
      "response_metadata": {},
      "type": "ai",
      "name": null,
      "id": "2f0b6fcb-7124-4fef-abcf-f0f1e5c00972",
      "tool_calls": [],
      "invalid_tool_calls": [],
      "usage_metadata": null
    }
  ],
  "feedback": "",
  "mistakes": [],
  "revision_count": 0,
  "sections": [
    {
      "name": "Introduction to Cheese",
      "content": "Cheese is a dairy product derived from milk that is produced in a wide range of flavors, textures, and forms. It is made by coagulating the milk protein casein, which can be done using rennet or an acidic substance. Cheese can be classified based on various factors including milk source, texture, aging process, and flavor.",
      "confidence": 0.9,
      "reasoning": "The introduction provides a clear overview of cheese, its origins, and the basic process of cheese-making, which is straightforward and well-defined.",
      "status": "auto_approved"
    },
    {
      "name": "Types of Cheese by Milk Source",
      "content": "Cheese can be categorized based on the type of milk used in its production. Common sources include:\n1. Cow's Milk: Most widely used, producing cheeses like Cheddar and Gouda.\n2. Goat's Milk: Known for its tangy flavor, producing cheeses like Chevre and Feta.\n3. Sheep's Milk: Rich in flavor, producing cheeses like Pecorino and Roquefort.\n4. Buffalo's Milk: Used for Mozzarella and other Italian cheeses.",
      "confidence": 0.85,
      "reasoning": "The classification by milk source is clear and commonly understood, though there may be less known types that could add complexity.",
      "status": "auto_approved"
    },
    {
      "name": "Types of Cheese by Texture",
```

```
            "content": "Cheeses can be categorized by their texture, which affects their culinary uses and mouthfeel. Common categories include:\n1. Soft Cheese: Includes Brie and Camembert, characterized by a creamy texture.\n2. Semi-soft Cheese: Includes Gouda and Havarti, with a firmer texture but still spreadable.\n3. Hard Cheese: Includes Parmigiano-Reggiano and Cheddar, known for their dense and crumbly texture.\n4. Blue Cheese: Characterized by blue veins of mold, such as Gorgonzola and Roquefort.",
            "confidence": 0.9,
            "reasoning": "The texture classification is well-established and widely recognized, making it easy to provide clear examples.",
            "status": "auto_approved"
        },
        {
            "name": "Types of Cheese by Aging Process",
            "content": "The aging process of cheese can significantly influence its flavor and texture. Types include:\n1. Fresh Cheese: Not aged, such as Ricotta and Cottage Cheese.\n2. Aged Cheese: Aged for a short period, like Havarti and Gouda.\n3. Mature Cheese: Aged for longer periods, developing complex flavors, such as Cheddar and Gruyère.",
            "confidence": 0.8,
            "reasoning": "While the aging process is a clear classification, the nuances of aging times and flavor development can introduce some ambiguity.",
            "status": "pending_review"
        },
        {
            "name": "Conclusion",
            "content": "Cheese is a diverse food product with a multitude of types based on various classifications. Understanding these types can enhance culinary experiences and appreciation for this versatile ingredient.",
            "confidence": 0.9,
            "reasoning": "The conclusion summarizes the content effectively and reinforces the importance of cheese diversity, which is a straightforward task.",
            "status": "auto_approved"
        }
    ],
    "high_confidence_sections": [
        "Introduction to Cheese",
        "Types of Cheese by Milk Source",
        "Types of Cheese by Texture",
        "Conclusion"
    ],
    "review_req_sections": [
        "Types of Cheese by Aging Process"
    ],
    "approved_sections": [],
```

```
    "rejected_sections": [],
    "section_feedback": {},
    "section_rules": {},
    "auto_approval_count": 4,
    "human_review_count": 0,
    "confidence_threshold": 0.85,
    "max_regen_attempts": 3
  },
  "next_nodes": [
    "human_selective_review"
  ],
  "metadata": {
    "source": "loop",
    "step": 2,
    "parents": {}
  }
}
```


## References:


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2. https://docs.langchain.com/oss/python/langgraph/interrupts
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4. https://docs.langchain.com/oss/python/integrations/providers/langfuse
5. https://langfuse.com/guides/cookbook/integration_langgraph