

# Thesis Assistant

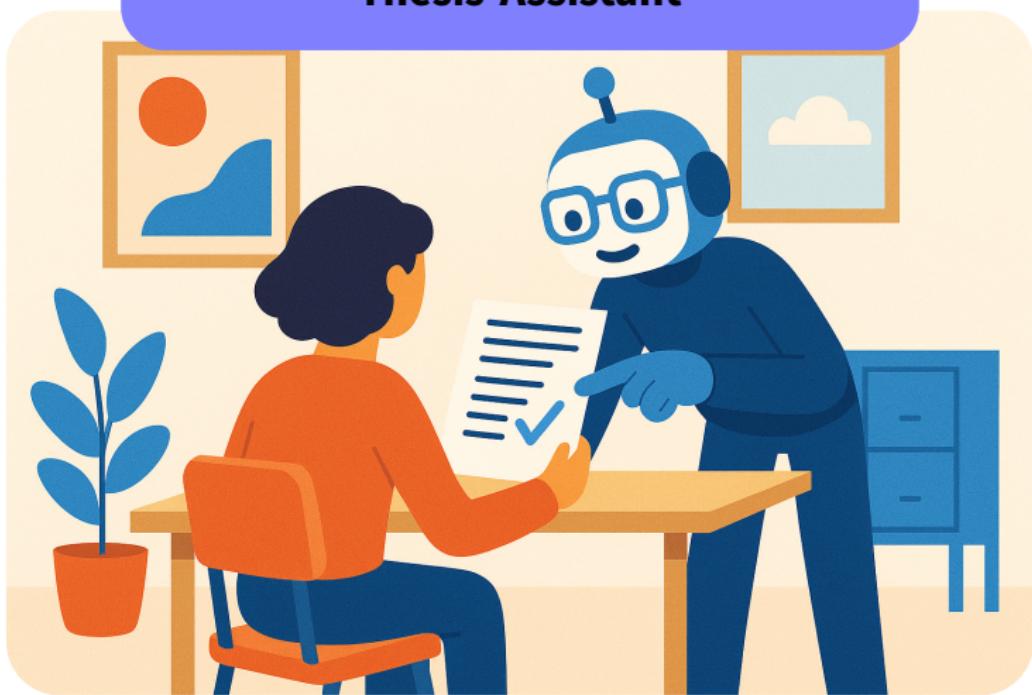
## Your AI Companion from Idea to Submission

Mouaz Anan, Sebastian Sauerbier, Jiadong Han, Hamed Feizabadi

Bonn University

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# Thesis Assistant



# What is the Novel Idea?

## Core Statement

A modular LLM-agent system guided by an ethical core — designed to support students through the entire thesis process without replacing their own reasoning or authorship.

- Interactive agents assist with research, structure, planning, and writing
- Combines outlining, scheduling, and motivational coaching in one system
- Learns from feedback and adapts to field-specific and personal workflows

# What's the Novel Idea?

## Ethics Core

- Labels AI-generated content and tracks usage
- Supports advisor feedback without replacing human discussion
- Promotes critical thinking and responsible writing

**Structure Manager** Transforms papers and your ideas into a clear, field-specific outline.

**Writing Manager** Turns the structure into milestones, reminders, and support for writing progress.

**Together:** They guide your thesis dynamically - ethically, intelligently, and with motivation.

# Comparison with Existed Project

## **ThesisAI (<https://thesisai.io>) vs. Our Thesis Assistant**

Feature	ThesisAI	Our Assistant
Writing	One-shot output	Guided steps
Interaction	One prompt only	Ongoing support
Personalization	Static	Adaptive
Planning	✗ No	✓ Yes
Motivation	✗ No	✓ Yes
Ethics	✗ No	✓ Transparent use
Price	✓ Yes	✗ No

# System Architecture Overview



# Tools to Be Used – Core Infrastructure

## LLM APIs

- **OpenAI (GPT-4), Gemini, LLaMA** – summarization, rewriting, logic reasoning

## Frameworks & Agent Graphs

- **LangGraph (by Hugging Face)** – event-driven multi-agent orchestration and memory handling
- **Hugging Face Spaces** – plug-and-play tools like pdf-reader, latex2code, gpt-detector
- **LlamaIndex** – document indexing, vector search, PDF + arXiv retrieval
- **Overleaf API** – sync LaTeX output to live documents

## Built-in Agent Modules

- AI Researcher Agent – paper querying + summarization
- Wellbeing Agent – motivational feedback and pacing
- Draft Writer Agent – structured thesis writing support

## Research Tools

- **Semantic Scholar API** – fetch citations and metadata
- **NotebookLM (Google)** – AI memory-based research notes
- **LaTeX-OCR** – convert handwritten equations to LaTeX code
- **AI Content Detector** – track AI-generated vs. original text
- **PDF Retriever & Summarizer** – extract key points from literature

## Productivity & Output

- **Google Calendar API** – manage deadlines and thesis milestones
- **Email Sync Module** – advisor comment collection
- **Reference Generator** – auto-cite from arXiv or uploaded papers
- **Presentation Generator** – convert outline to slides (LaTeX Beamer)

- **Tool Integration** – Unstable APIs (Overleaf, arXiv, calendar, LaTeX tools)
- **Agent Coordination** – Routing, memory, and tool calling via LangChain is complex
- **Multimodal Input** – Math image to LaTeX and PDF parsing require reliable pipelines
- **Latency & Cost** – Many LLM/tool calls lead to slow response and high API costs
- **Evaluation & Logging** – Difficult to track and rate quality or user learning

- **Authorship Transparency** – AI text must be labeled and logged
- **Hallucination Risk** – LLMs may generate fake citations or incorrect logic
- **User Over-Reliance** – Promotes passivity unless reflection is enforced
- **Feedback Integration** – Advisor comments must remain central, not overwritten
- **Data Privacy** – Sensitive documents must be protected across APIs

- Han, **Ethics Coordinator** and **Ethic System Engineer**  
Ensures compliance with ethical guidelines and oversees their integration.
- Mouaz, **Motivation Coordinator** and **Motivation System Engineer**  
Designs and implements the agent's motivational support features.
- Hamed, **Integration Coordinator** and **Integration System Engineer**  
Identifies and integrates external tools, ensuring system compatibility.
- Sebastian, **Feature Development Coordinator** and **Feature Development Engineer**  
Develops thesis-related features and maintains internal compatibility.

- Combines governance, emotional intelligence, and agent logic
- Uses Hugging Face tools with LangGraph routing
- Built for students. Built with trust. Built with ethics.