Intelligent Agent Engineering for Scientific Research: Workflow Automation with n8n/Zapier and Local LLMs

Establishment: Mnémosyne Team - Inria Bordeaux (Inria Centre at the University of Bordeaux)
Partnership: Institute of Neurodegenerative Diseases (IMN) - Bordeaux
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Context & Problem

The Mnémosyne team (Inria Bordeaux) conducts cutting-edge research in AI and computational neuroscience, focusing on neuroscience modeling, machine learning, and data analysis. Researchers and PhD students spend a large portion of their time tracking scientific literature, extracting data from PDFs, writing proposals, analyzing experimental results, or managing references and figures—long and repetitive tasks. With its dedicated GPU infrastructure (>100GB VRAM), the team can locally deploy very large open-source LLMs (Qwen3, GLM, Llama, Mistral, GPT-OSS, DeepSeek, etc.) via Open WebUI and LMStudio. This offers a unique opportunity to automate these tasks via intelligent agents without relying on external services, thereby guaranteeing data privacy.

Internship Objective

Design, develop, and deploy intelligent agents based on local LLMs, orchestrated via n8n/Zapier, to automate repetitive scientific research tasks, leveraging the available high-performance infrastructure.

1. Understand and exploit the deployment of local LLMs (via OpenWebUI, LMStudio) for RAG tasks, text generation, summarization, correction, etc.
2. Design AI agents via n8n/Zapier workflows inspired by the following ideas:
    - Automated scientific monitoring (Google Scholar / arXiv / PubMed).
    - Data extraction from PDFs (methods, results, raw data).
    - Automatic generation of literature reviews / meeting minutes.
    - Trend analysis (trends, authors, institutions).
    - Generation of figures/tables from CSV/Excel.
    - etc.
3. Integrate AI agents (LLMs, RAG, embeddings) into workflows, with performance monitoring (latency, memory cost, output quality).
4. Ensure agent robustness: error handling, logs, alerts, versioning (Git).
5. Write complete technical documentation, including:
    - Installation and configuration guide.
    - User manual for researchers.
    - System architecture (n8n/Zapier diagrams, API, database).

Depending on the intern's skills and speed of execution, the project and tools developed may evolve, and the intern may also propose their own innovative agents. The entire work may be published at a conference or in a journal with the code open-sourced (hosted on Github and/or Inria Gitlab).

Tools and Technologies

- n8n/Zapier: Open-source visual automation platform (workflow orchestration).
- Local LLMs: OpenWebUI, LMStudio (with GPU >100GB VRAM).
- Languages & Formats: Python (via n8n/Zapier Python nodes), Markdown, JSON, CSV, LaTeX, potentially JavaScript.
- Integrations: Mattermost, Zotero, GitHub/GitLab, email, messaging services (Telegram/WhatsApp).
- Monitoring: Visualization tools (e.g., Grafana), detailed logs, alerts.

Required Skills

- Python (Advanced): for scripts, integrations, debugging.
- Technical Writing: clear writing, documentation, user guides.
- Innovation Capacity: ability to translate a scientific need into an engineering tool.

Bonus Skills ("Nice to have")

- LLMs: understanding of prompts, RAG, embeddings, context management.
- n8n/Zapier: mastery of the visual interface, nodes, complex workflows.
- DevOps: Docker, Git, monitoring, VRAM/GPU management, SSH.

Expected Deliverables

1. Intelligent agents via complete and documented n8n/Zapier workflows.
2. Complete documentation:
    - Installation and configuration guide.
    - User guide (with screenshots).
    - System architecture (diagrams).
3. Oral presentation within the team.
4. Drafting of a scientific article and/or technical note.

How to Apply?

To apply, we invite you to send us your CV by email with the subject line:
[Stage Workflow] Application Firstname Lastname

Our email addresses are as follows:

- Yannis Bendi-Ouis: `yannis.bendi-ouis@inria.fr`
- Xavier Hinaut: `xavier.hinaut@inria.fr`

Please ensure you send the email to BOTH Yannis AND Xavier (you can put one or the other in CC).