

Internship Automation Hub

System Architecture: The Internship Automation Hub is an Agentic AI workflow built in n8n that automates job parsing, resume tailoring, cover letter generation, and file upload. The system consists of a controller agent and several specialized agents working in sequence using shared memory via Google Sheets.

Controller Agent: Orchestrates flow between input retrieval, AI processing, and file generation.
Routes job rows to specialized agents.
Ensures error handling, fallback defaults, and process completion signaling.

Specialized Agents:

Job Parsing Agent: - Extracts job title, role category, seniority, tech stack, skills and sets Match Score.
Uses an LLM tool to transform raw job description into structured fields.

Resume Tailoring Agent: Receives job object + resume JSON.
Produces tailored summary, skills, and achievements.
Ensures JSON-safe output parsing via code node.

Cover Letter Agent:

Generates personalized cover letter grounded in user's real experience.
Outputs clean JSON containing row_number and cover_letter text.

Built - in Tools:

1. Google Sheets (read & update job table)
2. Google Drive (upload tailored files)
3. LLM Tool (text generation and transformation).
4. Code Node (data transformation and JSON parsing)

Custom Tool:

FileWriterTool:

Converts AI text output into .txt files. - Assigns filename using row_number. - Returns binary for Google Drive upload.
Includes validation and error handling.

Workflow Orchestration: - Trigger → Get rows → Filter unprocessed → Parse → Tailor resume → Generate cover letter → Write files → Upload → Update sheet → Mark PROCESSED. - Parallel agents

run via repeated function-style branching. - Merge nodes ensure downstream actions wait for upstream completions.

Challenges & Solutions:

JSON extraction failures: Implemented regex-controlled parsing with fallback.

Escape character issues: Added sanitization for newlines and quotes.

File upload binary mismatch: Custom file writer ensured correct encoding.

Row number propagation: Added structured passing of row_number through nodes.

Multi-job handling: Merged job objects with resume using item-wise transformations.

Evaluation Test Cases:

Missing fields in job description handled gracefully.

AI output malformed JSON → auto-corrected by parsing node.

Drive upload failures retried using n8n error workflow.

Metrics:

100% correct file upload for processed jobs.

Tailored resume accuracy aligns with job keywords.

End-to-end workflow success: Verified for multiple jobs simultaneously.

Limitations:

Dependent on LLM consistency.

Not optimized for large-scale job batches.

Future Improvements:

Add RL-based reward signal for tailoring quality.

Build a similarity-ranking agent to improve match_score.

Extend system to automate recruiter outreach.

Conclusion:

The Internship Automation Hub successfully demonstrates a multi-agent orchestration pipeline with a controller, specialized agents, multiple built-in tools, and a custom tool. It satisfies the core requirements of an Agentic AI workflow and delivers practical automation for internship application tasks.