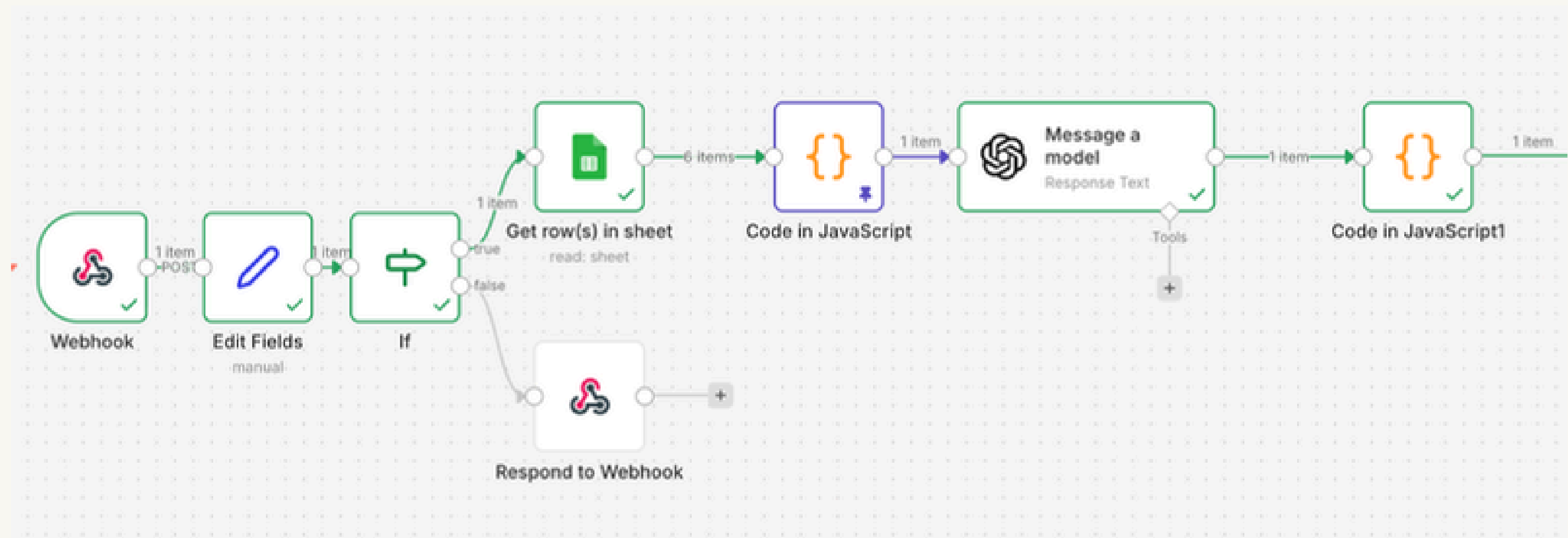


AI RAG Chatbot with Intent Classification & Lead Scoring



Built with n8n + OpenAI + Google Sheets



April Atkinson

"Architecture & Workflow Design Project"



Problem

- Chatbots often return unstructured text
- No deterministic validation
- No intent classification
- No lead prioritization
- No structured API response

I built a structured RAG workflow that transforms raw user input into validated, classified, and scored business output.



Design Principles

- Deterministic before probabilistic
- Structured contracts over free text
- Validation before model invocation
- Retrieval before reasoning



System Architecture

Interface Layer

- Webhook

Control Layer

- Schema normalization
- Validation guardrail

Retrieval Layer

- Knowledge lookup
- Context aggregation

Reasoning Layer

- Structured LLM output

Delivery Layer

- JSON parsing
- API response

Separated deterministic logic from probabilistic reasoning.

Validation and retrieval occur before model invocation to minimize hallucination and maximize control.



RAG-lite Knowledge Retrieval

- Google Sheets as structured knowledge base
- Topic + keyword matching
- Relevance ranking
- Context aggregation before LLM call

Instead of sending raw questions to the LLM, relevant knowledge snippets are injected as structured context.

Google Sheets as structured knowledge base

Knowledge Base Sheet (RAG-lite) ☆ 📁 ☁

File Edit View Insert Format Data Tools Extensions Help

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	A	B	C	D	E	F
1	id	topic	question_patterns	answer_snippet	source	priority
2	pricing_001	pricing	price,pricing,cost,plan,subscription	ur pricing depends on team size and required integrations. For a quote, share your company size and use case.	pricing_faq	10
3	demo_001	sales	demo,call,meeting,book	Yes—happy to do a demo. Please share your email, company, and what you want to automate.	sales_playbook	10
4	integrations_001	integrations	integrate,integration,api,hubspot,salesforce,zapier	We support integrations via API and common tools. Tell me what systems you use (e.g., HubSpot, Salesforce) and the workflow you want.	integrations_faq	9
5	security_001	security	security,soc2,gdpr,compliance,data	We can support GDPR-aligned workflows. For security/compliance requirements, share your constraints and we'll confirm what's supported.	security_faq	9
6	support_001	support	help,issue,problem,broken,error	Sorry about that—tell me what you tried, what happened, and any error message. I'll help troubleshoot or escalate.	support_playbook	8
7	fallback_001	fallback	""	I can help—are you asking about pricing, integrations, security, or support?	fallback	1

[link](#)

Code in JavaScript

main.js

Test results in sheet

The tests below come from the test successfully execution. [Execute mode](#) to refresh them.

new_number

id

topic

question_patterns

answer_snippet

source

priority

0

Run Tests

Workflow

Variables and context

Parameters

Settings

Mode

Run (once for all items)

Language

JavaScript

JavaScript

Code

Run all

14 context scored = context.topicFlow or {}

15 ...new [obj,

16 score: scoreFlow(new, userMessage)

17]};

18

19 // Sort by score

20 scored.sort((a, b) => b.score - a.score);

21

22 // Take top 3 matches

23 const topMatches = scored.slice(0, 3);

24

25 // Build context string

26 const context = topMatches

27 .filter((r => r.score > 0)

28 .map(r => `Topic: \${r.topic} / Answer: \${r.answer_snippet}`)

29 .join("\n");

30

31 // Return single structured object

32 return {

33 {

34 topic: {

35 user_message: userMessage,

36 watched_topics: topMatches.map(r => r.topic),

37 context: context,

38 kb_title: topMatches

39 }

40 }

41 }

42 }

Type B for a list of [special vars/methods](#). Debug by using console.log() statements and viewing their output in the browser console.

This data is proved for test execution. [Debug](#)

main.js

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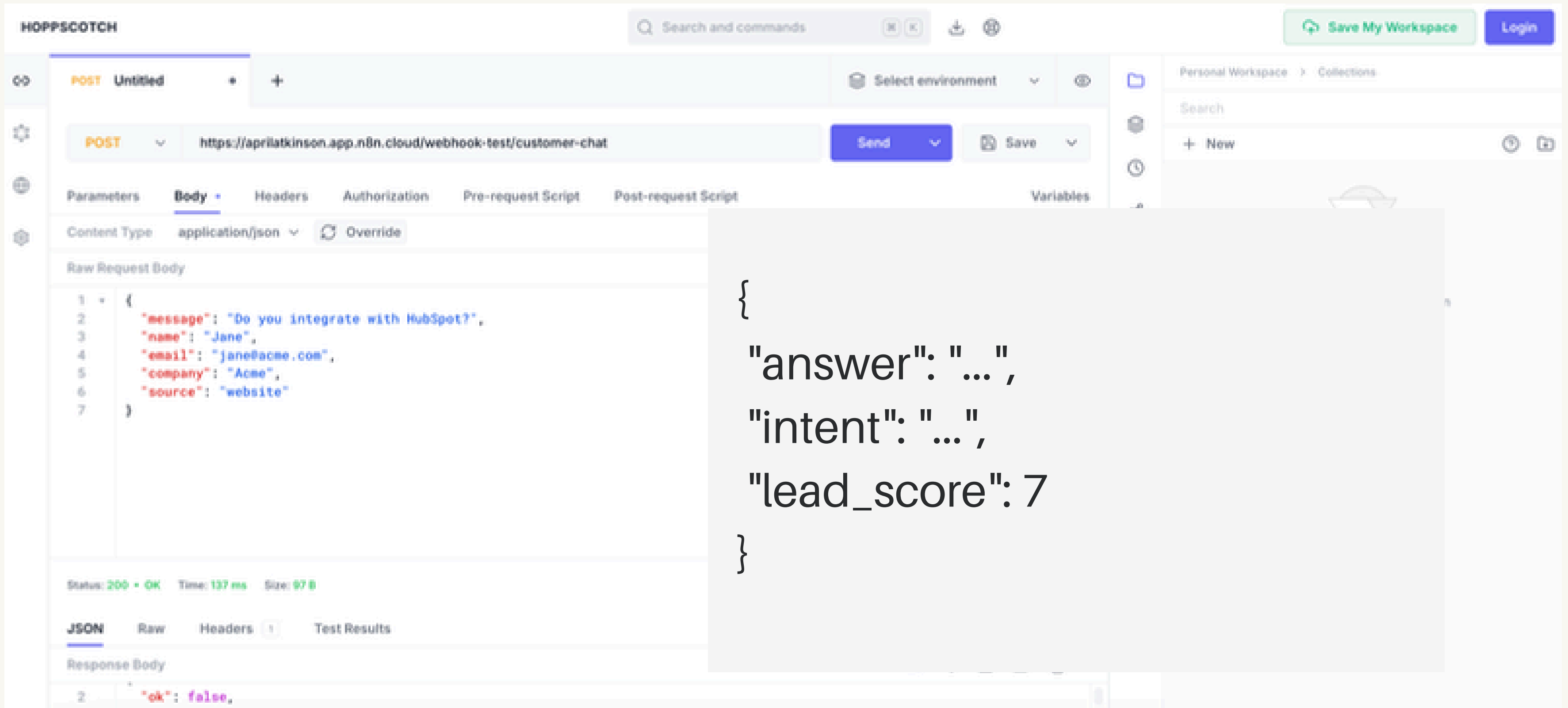


Structured LLM Output

```
{  
  "answer": "...",  
  "follow_up_question": "...",  
  "intent": "integration inquiry",  
  "lead_score": 7  
}
```

- Forced JSON output format
- Intent classification
- Lead scoring
- Deterministic downstream automation

Production-Ready API Response (test)



The screenshot displays the Hoppscotch web application interface. At the top, there's a search bar and buttons for 'Save My Workspace' and 'Login'. The main area shows a POST request configuration for the URL 'https://aprilatkinson.app.n8n.cloud/webhook-test/customer-chat'. The 'Body' tab is selected, showing a JSON payload. Below the request, the 'Response Body' tab is active, displaying the received JSON response. A large, semi-transparent overlay box is positioned over the right side of the response, containing a simplified version of the JSON structure.

Raw Request Body

```
1 {  
2   "message": "Do you integrate with HubSpot?",  
3   "name": "Jane",  
4   "email": "jane@acme.com",  
5   "company": "Acme",  
6   "source": "website"  
7 }
```

Status: 200 • OK Time: 137 ms Size: 97 B

JSON Raw Headers Test Results

Response Body

```
2 {  
3   "ok": false,  
4   "message": "Invalid request body"  
5 }
```

JSON Response (from overlay):

```
{  
  "answer": "...",  
  "intent": "...",  
  "lead_score": 7  
}
```

Potential Expansion

- Vector search instead of keyword matching
- Supabase logging
- Multi-intent routing
- Guardrail / compliance layer
- Conversation memory

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➤ **Thank you!**