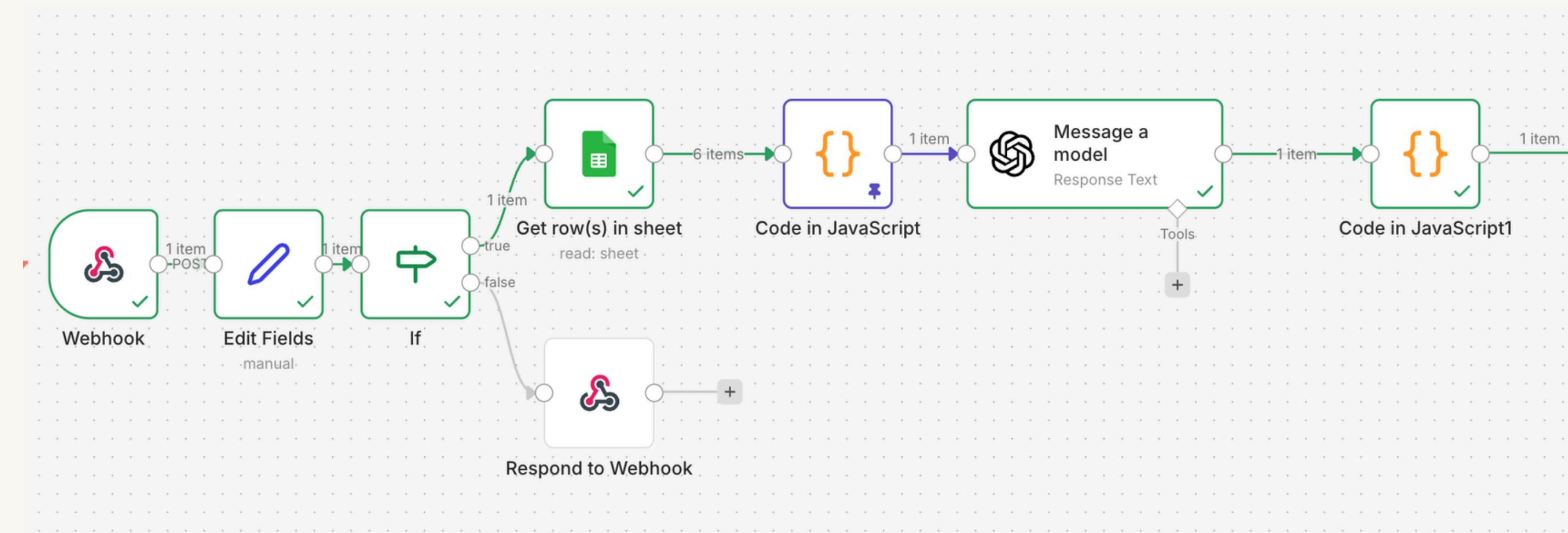


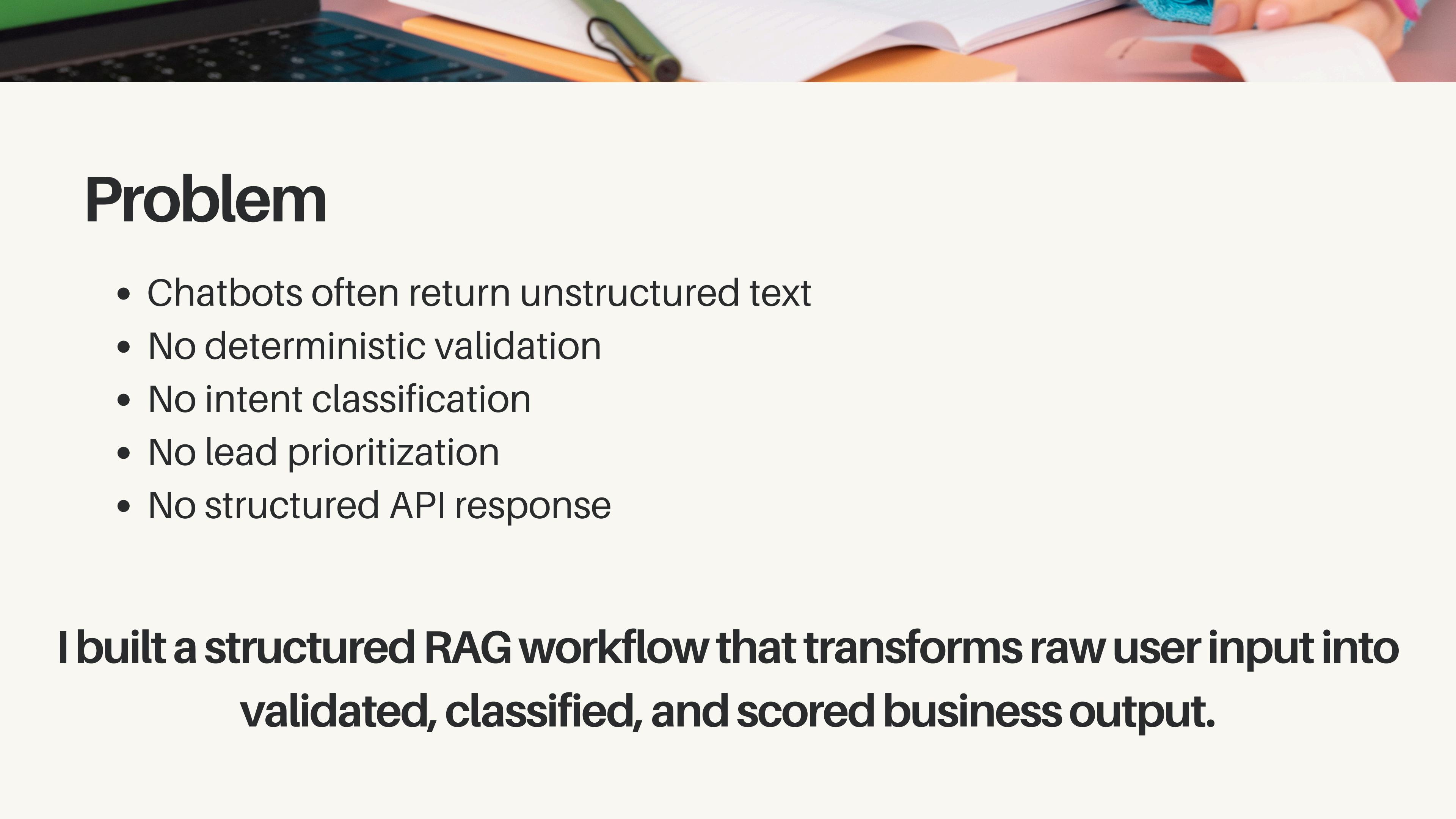
AI RAG Chatbot with Intent Classification & Lead Scoring



Built with n8n + OpenAI + Google Sheets



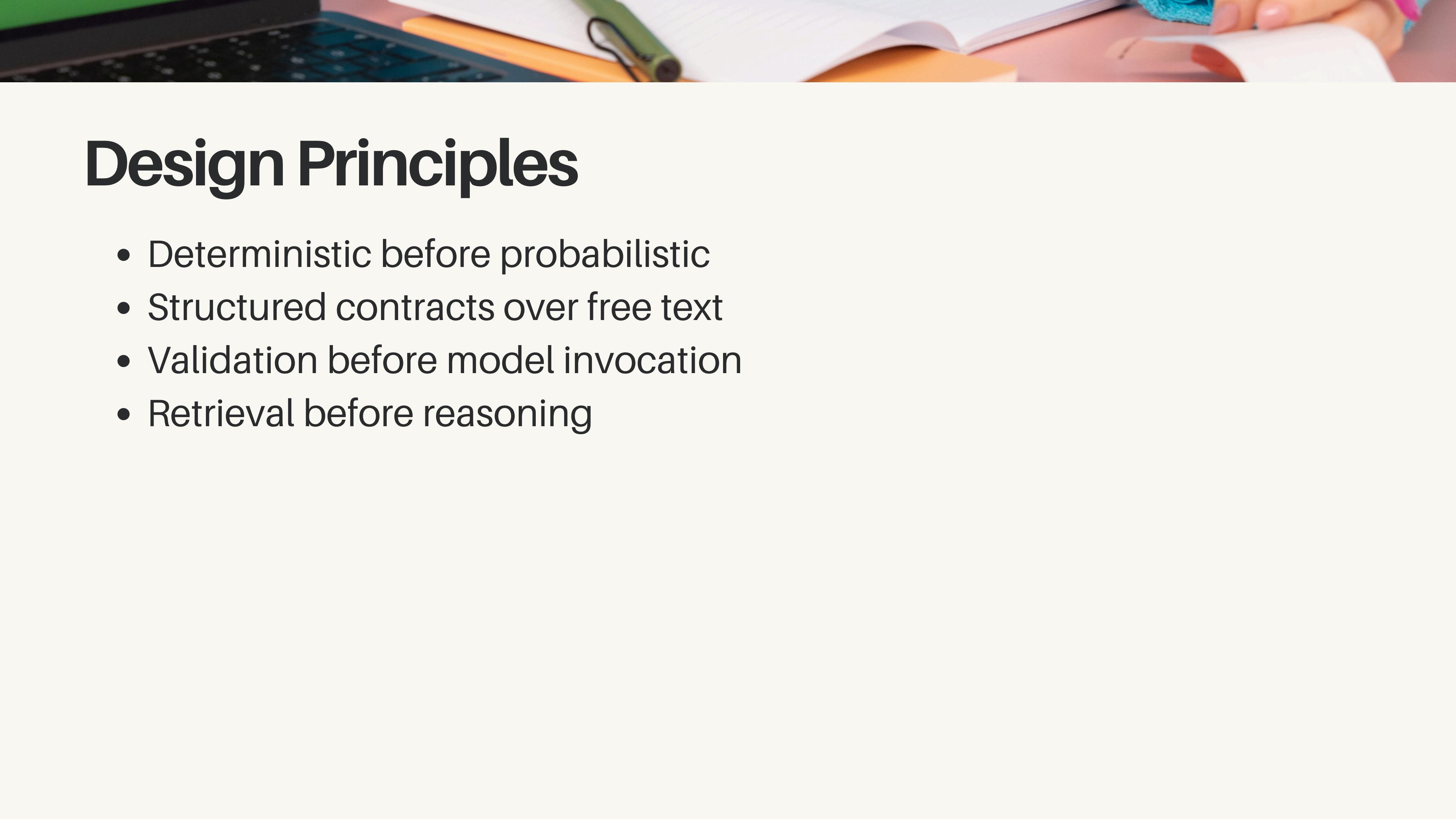
April Atkinson
“Architecture & Workflow Design Project”



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



A screenshot of a Google Sheets spreadsheet titled "Knowledge Base Sheet (RAG-lite)". The sheet contains a table with columns for id, topic, question_patterns, answer_snippet, source, and priority. The data rows represent different knowledge base entries across various categories like pricing, sales, integrations, security, and support.

	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 whasystems 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

Code in JavaScript

INPUT

Get row(s) in sheet

The fields below come from the last successful execution. [Execute node](#) to refresh them.

```
# row_number  
T id  
T topic  
T question_patterns  
T answer_snippet  
T source  
# priority
```

If

Edit Fields

Webhook

Variables and context

Schema Table JSON

Parameters Settings

Execute step

This data is pinned for test executions. [Unpin](#)

Mode

Run Once for All Items

Language

JavaScript

Code

```
'Ask AI'  
const scored = KDBROWS.map(row => ({  
  ...row.json,  
  score: scoreRow(row, userMessage)  
}));  
  
// Sort by score  
scored.sort((a, b) => b.score - a.score);  
  
// Take top 3 matches  
const topMatches = scored.slice(0, 3);  
  
// Build context string  
const context = topMatches  
.filter(r => r.score > 0)  
.map(r => `Topic: ${r.topic}\nAnswer: ${r.answer_snippet}`)  
.join("\n\n");  
  
// Return single structured object  
return [  
  {  
    json: {  
      user_message: userMessage,  
      matched_topics: topMatches.map(r => r.topic),  
      context:  
      kb_hits: topMatches  
    }  
  }  
];
```

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

OUTPUT

1 item

```
[  
  {  
    "user_message": "do you integrate with hubspot?",  
    "matched_topics": [  
      "integrations",  
      "pricing",  
      "sales"  
    ],  
    "context": "Topic: integrations\nAnswer: We support integrations via API and common tools. Tell me what systems you use (e.g., HubSpot, Salesforce) and the workflow you want.\nTopic: pricing\nAnswer: ur pricing depends on team size and required integrations. For a quote, share your company size and use case.\nTopic: sales\nAnswer: Yes-happy to do a demo. Please share your email, company, and what you want to automate.",  
    "kb_hits": [  
      {  
        "row_number": 4,  
        "id": "integrations_001",  
        "topic": "integrations",  
        "question_patterns": "integrate,integration,api,hubspot,salesforce,zapier",  
        "answer_snippet": "We support integrations via API and common tools. Tell me what systems you use (e.g., HubSpot, Salesforce) and the workflow you want.",  
        "source": "integrations_faq",  
        "priority": 9,  
        "score": 13  
      },  
      {  
        "row_number": 2,  
        "id": "pricing_001",  
        "topic": "pricing",  
        "question_patterns": "price,pricing,cost,plan,subscription",  
        "answer_snippet": "ur pricing depends on team size and required integrations. For a quote, share your company size and use case.",  
        "source": "pricing_faq",  
        "priority": 10,  
        "score": 10  
      },  
      {  
        "row_number": 3,  
        "id": "demo_001",  
        "topic": "sales",  
        "question_patterns": "demo,call,meeting,book",  
        "answer_snippet": "Yes-happy to do a demo. Please share your email, company, and what you want to automate.",  
        "source": "sales_playbook",  
        "priority": 10,  
        "score": 10  
      }  
    ]  
}
```

I wish this node would...



Structured LLM Output

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

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

Message a model

INPUT

Code in JavaScript

```

T user_message do you integrate with hubspot?
T matched_topics[0] integrations
T matched_topics[1] pricing
T matched_topics[2] sales
T context Topic: integrations\nAnswer: We support integrations via API and common tools. Tell me what systems you use (e.g., HubSpot, Salesforce) and the workflow you want.\n\nTopic: pricing\nAnswer: Our pricing depends on team size and required integrations. For a quote, share your company size and use case.\n\nTopic: sales\nAnswer: Yes—happy to do a demo. Please share your email, company, and what you want to automate.
kb_hits
kb_hits[0]
# row_number 4
T id integrations_001
T topic integrations
T question_patterns integrate,integration,api,hubspot,salesforce,zapier
T answer_snippet We support integrations via API and common tools. Tell me what systems you use (e.g., HubSpot, Salesforce) and the workflow you want.
T source integrations_faq
# priority 9
# score 13
kb_hits[1]
# row_number 2
T id pricing_001
T topic pricing
T question_patterns price,pricing,cost,plan,subscription
T answer_snippet Our pricing depends on team size and required integrations. For a quote, share your company size and use case.
T source pricing_faq
# priority 10
# score 10
kb_hits[2]
# row_number 3
T id demo_001
T topic sales
T question_patterns demo,call,meeting,book
T answer_snippet Yes—happy to do a demo. Please share your email, company, and what you want to automate.
T source sales_playbook
# priority 10
# score 10
Get row(s) in sheet
  
```

6 items

Parameters

Credential to connect with: OpenAI account

Resource: Text

Operation: Message a Model

Model: From list GPT-4.1-MINI

Messages

Type: Text

Role: System

Prompt: You are a helpful SaaS website assistant.

Type: Text

Role: User

Prompt:

```

User question:
{{json.user_message}}
fx
Context:
{{json.context}}
  
```

User question: do you integrate with hubspot? Context: Topic: integrations Answer: We support integrations via API and common tools. Tell me what systems you use (e.g., HubSpot, Salesforce) and the workflow you want.\n\nTopic: pricing\nAnswer: Our pricing depends on team size and required integrations. For a quote, share your company size and use case.\n\nTopic: sales\nAnswer: Yes—happy to do a demo. Please share your email, company, and what you want to automate.

Add Message

Simplify Output

Connect your own custom n8n tools to this node on the canvas

Built-in Tools

No properties

Add Built-in Tool

Options

Tools

OUTPUT

1 item

```

{
  "id": "resp_0cc5e36187542f3300699dc66220408194ad811429c5bb9070",
  "object": "response",
  "created_at": 1771947618,
  "status": "completed",
  "background": false,
  "billing": {
    "payer": "developer"
  },
  "completed_at": 1771947620,
  "frequency_penalty": 0,
  "incomplete_details": null,
  "instructions": null,
  "max_output_tokens": null,
  "max_tool_calls": null,
  "model": "gpt-4.1-mini-2025-04-14",
  "output": [
    {
      "id": "msg_0cc5e36187542f3300699dc66313a88194b95ffb7f62d7e065",
      "type": "message",
      "status": "completed",
      "content": [
        {
          "type": "output_text",
          "annotations": [],
          "logprobs": [],
          "text": "\n \"answer\": \"We support integrations via API and common tools, including HubSpot. Please share more about your workflow needs with HubSpot so we can assist you better.\",\n \"follow_up_question\": \"Can you describe the specific workflows you want to automate with HubSpot integration?\",\\n \"intent\": \"integration inquiry\",\\n \"lead_score\": 7\\n\""
        }
      ],
      "role": "assistant"
    }
  ],
  "parallel_tool_calls": true,
  "presence_penalty": 0,
  "previous_response_id": null,
  "prompt_cache_key": null,
  "prompt_cache_retention": null,
  "reasoning": {
    "effort": null,
    "summary": null
  },
  "safety_identifier": null,
  "service_tier": "default",
  "store": true,
  "temperature": 1,
  "text": {
    "format": {
      "type": "text"
    },
    "verbosity": "medium"
  }
}
  
```

Production-Ready API Response (test)

The screenshot shows the Hoppscotch API testing tool interface. A POST request is being made to the URL `https://aprilatkinson.app.n8n.cloud/webhook-test/customer-chat`. The request body is a JSON object:

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

The response status is 200 OK, with a time of 137 ms and a size of 97 B. The response body is a JSON object:

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

The Hoppscotch interface includes a search bar, environment selection, save and send buttons, and a sidebar for collections and personal workspace.

Potential Expansion

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

April Atkinson
AI Transformation Consultant



Thank you!