Build an AI Chatbot with RAG

Hands-On Workshop • **Central NJ Data Science Meetup**

Gus Cavanaugh • AI Literacy Educator • February 2026

⚙️ Setup (5 Minutes)

1 Get Anthropic API Key

Go to console.anthropic.com

Sign up (free evaluation!)

Click 'Get API Keys'

Create new key

Copy it (won't see again!)

2 Fork Replit Project

Click: https://replit.com/@guscavanaugh/replitappzip?v=1

Create account & 'Remix'

Add Secret: ANTHROPIC_API_KEY

Paste your API key

Click 'Run' button! 🚀

💡 Links in chat! Takes ~2 minutes. Raise hand if you need help.

01

The Opportunity

Why you're here to build, not just learn

The Challenges Are Real

Heightened competition in every market

Economic uncertainty and inflation

Expectations for instant results

Technology changing faster than ever

Viewpoints | January 28, 2026

VALUING AI: EXTREME BUBBLE, NEW GOLDEN ERA, OR BOTH

By Jeremy Grantham and Edward Chancellor

PART 1

VALUING AI: EXTREME BUBBLE, NEW GOLDEN ERA, OR BOTH

By Jeremy Grantham

At GMO, we have always defined a bubble as a two-standard deviation divergence of the price of any asset class above its long-term real price trend. The U.S. stock market has now been in bubble territory for a prolonged period. Sooner or later, the bubble will burst and the price will return to its historic level.

TECHNOLOGY | ARTIFICIAL INTELLIGENCE Follow

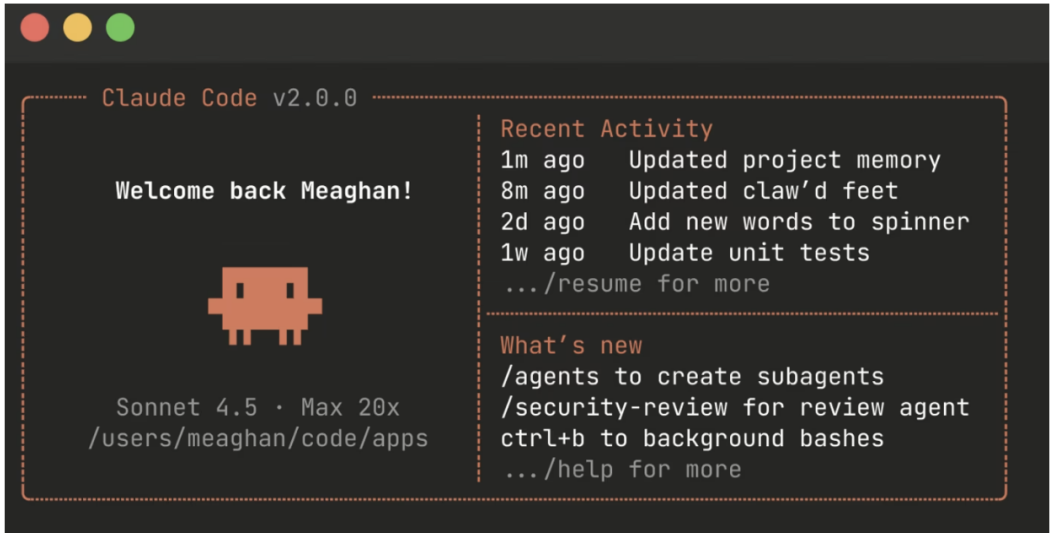
Claude Is Taking the AI World by Storm, and Even Non-Nerds Are Blown Away

Developers and hobbyists are comparing the viral moment for Anthropic's Claude Code to the launch of generative AI

By *Bradley Olson* Follow

Jan. 17, 2026 12:00 pm ET

364 Gift unlocked article Listen (5 min)



CEOs Say AI Is Making Work More Efficient. Employees Tell a Different Story.

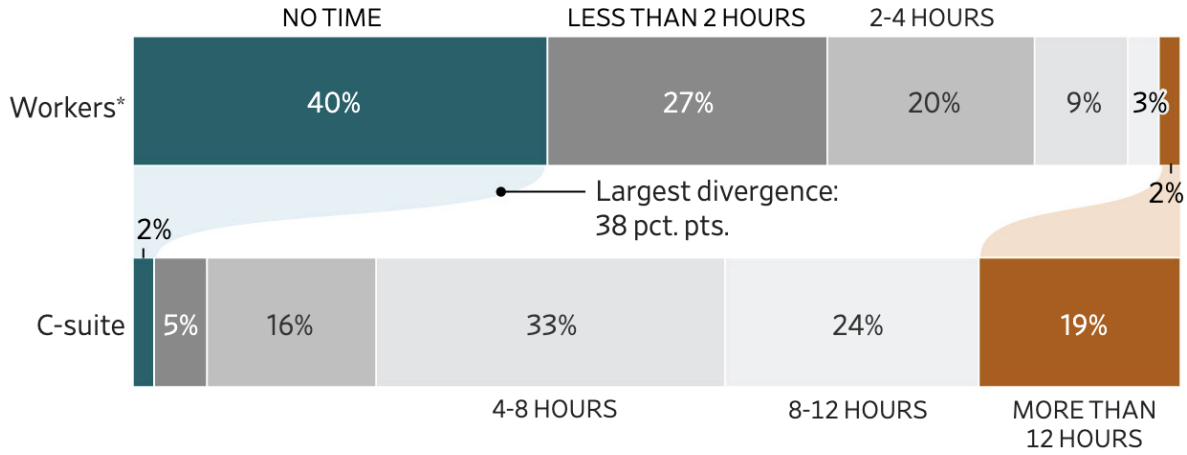
How much time workers say the technology saves them on the job is vastly different from what executives report

By Lindsay Ellis Follow

Jan. 21, 2026 5:00 am ET

126 Gift unlocked article Listen (6 min)

How much time do you think you are saving each week by using AI?



TECHNOLOGY | ARTIFICIAL INTELLIGENCE | HEARD ON THE STREET Follow

AI Won't Kill the Software Business, Just Its Growth Story

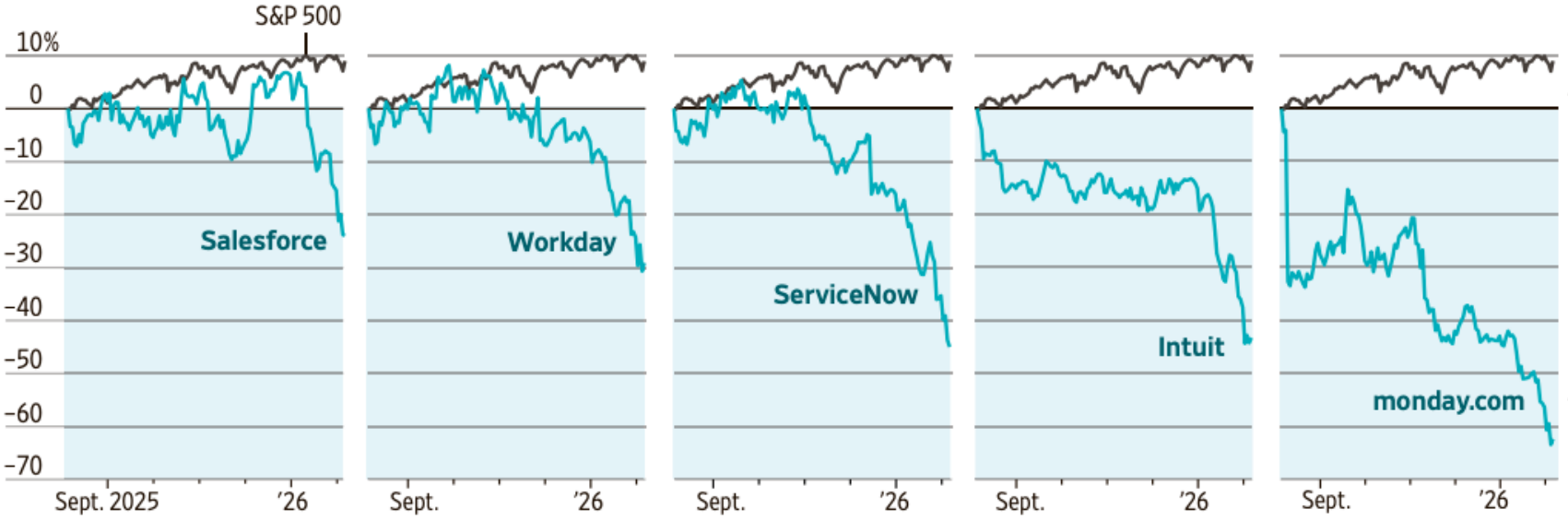
Fears that software companies are facing an extinction event are exaggerated, but other dangers are real

By *Dan Gallagher* Follow

Feb. 4, 2026 11:49 am ET

92 Gift unlocked article Listen (5 min)

Key software companies' share-price vs. index performance, past six months



Source: FactSet

But So Is the Opportunity

Technology is no longer owned by IT

Analysis is no longer owned by Quants

Design is no longer owned by Designers

Applications are no longer owned by Developers

Every SME is now a developer, designer, analyst, builder

02

Your Mission

Build a chatbot for Dairi-O restaurant

You're the New Chief AI Officer of Dairi-O

The CEO wants:

A chatbot to help health-conscious parents

The Goal:

Grow revenue through personalized nutrition guidance

Your Task:

Build it. Today. In this workshop.

The Catch:

You've never built a chatbot before...

The Good News:

Neither had ChatGPT's users before they tried it! 😉

What We're Building

- ✓ AI chatbot with document upload (RAG)
- ✓ Answers nutrition questions from Dairi-O menu
- ✓ Web search for current information
- ✓ Professional branded interface
- ✓ Deployed and shareable immediately
- ✓ Portfolio-ready code

How It Works

User asks a question

↓

Is it about the menu? → Search documents

↓

Is it about current events? → Search Google

↓

Combine everything into one prompt

↓

Send to Claude AI

↓

Get response back

↓

Display to user

03
Building the Chatbot

Let's code!

LIVE DEMO

Open your Replit and follow along!

⚙️ Setup (5 Minutes)

1 Get Anthropic API Key

Go to console.anthropic.com

Sign up (free evaluation!)

Click 'Get API Keys'

Create new key

Copy it (won't see again!)

2 Fork Replit Project

Click: https://replit.com/@guscavanaugh/replitappzip?v=1

Create account & 'Remix'

Add Secret: ANTHROPIC_API_KEY

Paste your API key

Click 'Run' button! 🚀

📄 Download Dairi-O Menu

https://dairio.com/wp-content/uploads/2023/11/Dairi-O-Nutritional-Table.pdf

💡 Links in chat! Takes ~2 minutes. Raise hand if you need help.

AI Chatbot with RAG & Search

Built from scratch in Python! (Replit Version)

Chat

What are the macros for the Dairio Plain Grilled Chicken Sandwich?

I don't have access to documents about Dairio menu items or nutritional information. Let me search for that information for you.

Unfortunately, I'm not finding specific nutritional data for a "Dairio Plain Grilled Chicken Sandwich" in my search results. This could be be

1. **Dairio might be a local or regional restaurant** that doesn't have widely published nutritional information online
2. **The exact name might be slightly different** than what I'm searching for
3. **The information might not be publicly available** online

Here are some suggestions:

- Check the restaurant's official website or menu if they have one
- Call the restaurant directly and ask for nutritional information
- Look on food delivery apps (like DoorDash, Uber Eats, etc.) if they deliver, as these often list macros
- Check if they have a nutrition facts sheet available in-store

If you can provide more context about where Dairio is located or if it's a specific chain, I'd be happy to search again!

04

Problem: RAG Isn't Working!

Tables are breaking our chatbot

If you can provide more context about where Dairio is located or if it's a specific chain, I'd be happy to search again!

What are the macros for the Dairio Plain Grilled Chicken Sandwich?

I apologize for the confusion in my previous response. Looking back at the document I have access to, I can see **Grilled Chicken Wrap (Plain)** listed, mentioned in the nutritional information provided.

However, I do see a **Crispy Chicken Sandwich (Plain)** with these macros:

Crispy Chicken Sandwich (Plain):

- Calories: 610
- Fat: 35g
- Saturated Fat: 9g
- Trans Fat: 1g
- Cholesterol: 110mg
- Sodium: 1200mg
- Carbs: 47g
- Fiber: 3g
- Sugars: 15g
- Protein: 27g

Could you clarify if you're looking for the **Crispy Chicken Sandwich**, or were you asking about a different item? If there's a **Grilled Chicken Sandwic** access to.

› ℹ️ How to use this chatbot

Type your message here...

Why Basic RAG Fails on Tables

- ❌ Text chunking splits table rows from headers
- ❌ Item names get separated from their values
- ❌ Context is lost when chunks break mid-row
- ❌ The AI sees '280' but doesn't know it's calories
- ❌ **Result**: Confident but incorrect answers

What's Actually Happening

`PyPDF2 extracts:`
Grilled Chicken Sandwich (Plain) 280 5 1 0 60 920 23 3 3 38

Then chunks at 500 characters → might split the row!
Headers are on page 1, data on page 2 → separated!
AI sees: "280" but which nutrient is it? 🤷

💡 Key Insight:

Without column headers, numbers are meaningless.
With headers: 'Calories: 280' vs just '280' - huge difference!

05

The Solution

Better table handling for accurate RAG

How We'll Fix It

- ✅ Use pdfplumber instead of PyPDF2 (built for tables!)
- ✅ Keep table rows intact during chunking
- ✅ Include column headers with each data row
- ✅ Increase chunk size (500 → 1000 characters)
- ✅ Retrieve more chunks (3 → 5) for better coverage

The Transformation

❌ Before (PyPDF2):

```
Grilled Chicken Sandwich (Plain) 280 5 1 0 60 920 23 3 3 38
```

✅ After (pdfplumber with headers):

```
Item: Grilled Chicken Sandwich (Plain) | Calories: 280 |
Total Fat (g): 5 | Sat. fat (g): 1 | Trans Fat (g): 0 |
Chol. (mg): 60 | Sodium (mg): 920 | Carbs (g): 23 |
Fiber (g): 3 | Sugars (g): 3 | Protein (g): 38
```

LIVE DEMO

Open your Replit and follow along!

⚙️ Setup (5 Minutes)

1️⃣ Get Anthropic API Key

Go to console.anthropic.com

Sign up (free evaluation!)

Click 'Get API Keys'

Create new key

Copy it (won't see again!)

2️⃣ Fork Replit Project

Click: https://replit.com/@guscavanaugh/WorkshopImprovedRAGRUN

Create account & 'Remix'

Add Secret: ANTHROPIC_API_KEY

Paste your API key

Click 'Run' button! 🚀

📄 Download Dairi-O Menu

https://dairio.com/wp-content/uploads/2023/11/Dairi-O-Nutritional-Table.pdf

💡 Links in chat! Takes ~2 minutes. Raise hand if you need help.

Voilà! Accurate answers!

Key Learning Points

Not all text is equal - tables need special handling

Context is everything in RAG - headers matter!

Retrieval is a trade-off - balance precision vs recall

The right tool for the job - pdfplumber vs PyPDF2

RAG isn't magic - it's thoughtful engineering

06

Making It Professional

Brand it for your portfolio

From Demo to Portfolio-Ready

Custom branding (Dairi-O green color scheme)

Domain-specific prompts (nutrition assistant)

Quick question buttons for UX

Professional disclaimers

Clean, modern interface

Shareable URL immediately

The Power of Prompting

Generic:

"You are a helpful assistant. Be conversational!"

Domain-Specific:

"You are a nutrition assistant for Dairi-O.

- Help customers understand nutritional info
- Compare menu options
- Suggest items based on dietary goals
- Be accurate with numbers
- Cite specific calories, protein, carbs
- Use friendly emojis sparingly"

LIVE DEMO

Open your Replit and follow along!

⚙️ Setup (5 Minutes)

1 Get Anthropic API Key

Go to console.anthropic.com

Sign up (free evaluation!)

Click 'Get API Keys'

Create new key

Copy it (won't see again!)

2 Fork Replit Project

Click: https://replit.com/@guscavanaugh/WorkshopImprovedRAGBrandedApp

Create account & 'Remix'

Add Secret: ANTHROPIC_API_KEY

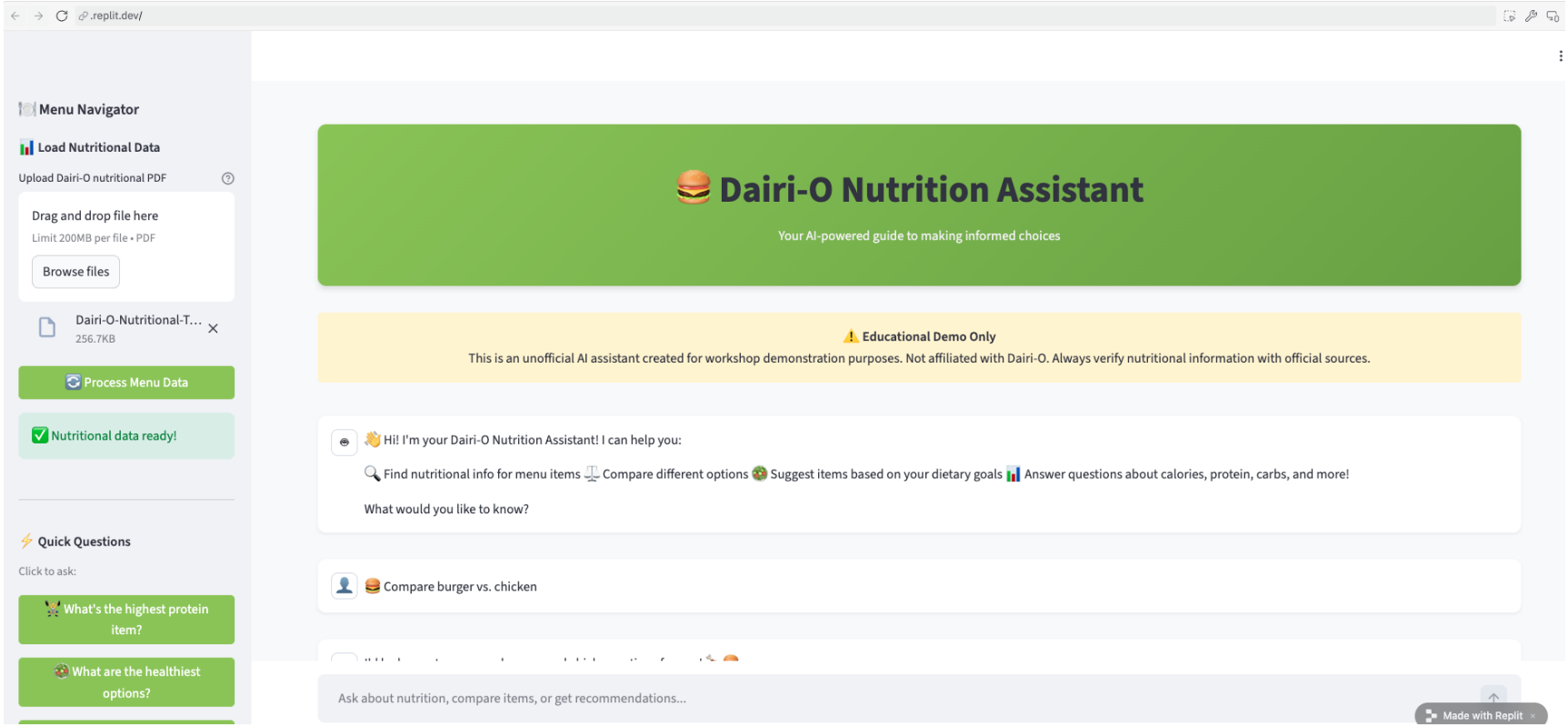
Paste your API key

Click 'Run' button! 🚀

📄 Download Dairi-O Menu

https://dairio.com/wp-content/uploads/2023/11/Dairi-O-Nutritional-Table.pdf

💡 Links in chat! Takes ~2 minutes. Raise hand if you need help.


.replit.dev/
Menu Navigator
Load Nutritional Data
Upload Dairi-O nutritional PDF
Drag and drop file here
Limit 200MB per file • PDF
Browse files
Dairi-O-Nutritional-T...
256.7KB
Process Menu Data
Nutritional data ready!
Quick Questions
Click to ask:
What's the highest protein item?
What are the healthiest options?
Dairi-O Nutrition Assistant
Your AI-powered guide to making informed choices
Educational Demo Only
This is an unofficial AI assistant created for workshop demonstration purposes. Not affiliated with Dairi-O. Always verify nutritional information with official sources.
Hi! I'm your Dairi-O Nutrition Assistant! I can help you:
Find nutritional info for menu items Compare different options Suggest items based on your dietary goals Answer questions about calories, protein, carbs, and more!
What would you like to know?
Compare burger vs. chicken
Ask about nutrition, compare items, or get recommendations...
Made with Replit

What You Built Today

- ✅ Cloud-deployed AI chatbot
- ✅ RAG with document understanding
- ✅ Table handling for structured data
- ✅ Professional branding and UX
- ✅ Portfolio-ready code
- ✅ Real understanding of how AI systems work

What's Next?

✅ Customize your chatbot (change colors, prompts, features)

✅ Try with your own documents (resumes, reports, data)

✅ Learn local deployment with Ollama (free forever!)

✅ Add more advanced features (SQL, vision, audio)

✅ Share your work on LinkedIn and GitHub

Advanced Improvements to Try

- ✅ Pre-process tables into SQLite database
- ✅ Hybrid search (keyword + semantic)
- ✅ Custom chunking strategies by content type
- ✅ Vision-based PDF extraction with multimodal models
- ✅ Memory across sessions
- ✅ Multi-document comparison features

Thank You!

📧 LinkedIn: linkedin.com/in/gustafrcavanaugh

💻 GitHub: https://github.com/Gcav66/-Dairi-O_Nutrition_Assistant

🔗 All code & resources in chat

🎓 Keep building, keep learning!