

AI

# Best Practices for Data, Tools, and Workflows

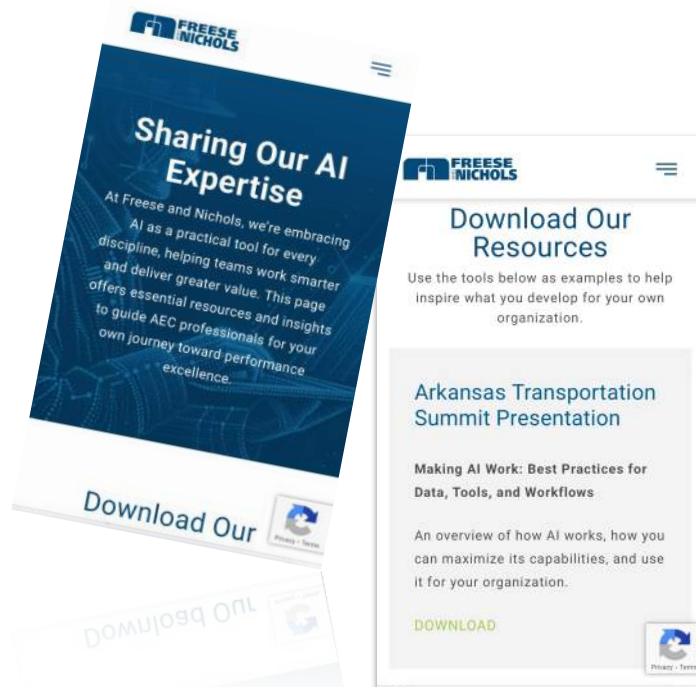
City of Celina

# Presentation Landing Page

Presentation Slides

Educational Research Prompt

Short Video: How to use the Prompt



[www.freese.com/AI](http://www.freese.com/AI)

# How **AI** Works

AI Models Types and Understanding LLMs

# AI Platforms

## AI Foundational Model Platforms (LLMs)



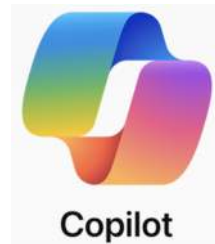
ChatGPT



Claude



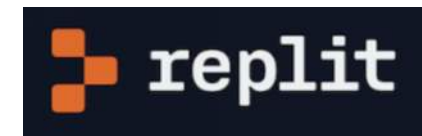
## AI Integrated Platforms



Copilot

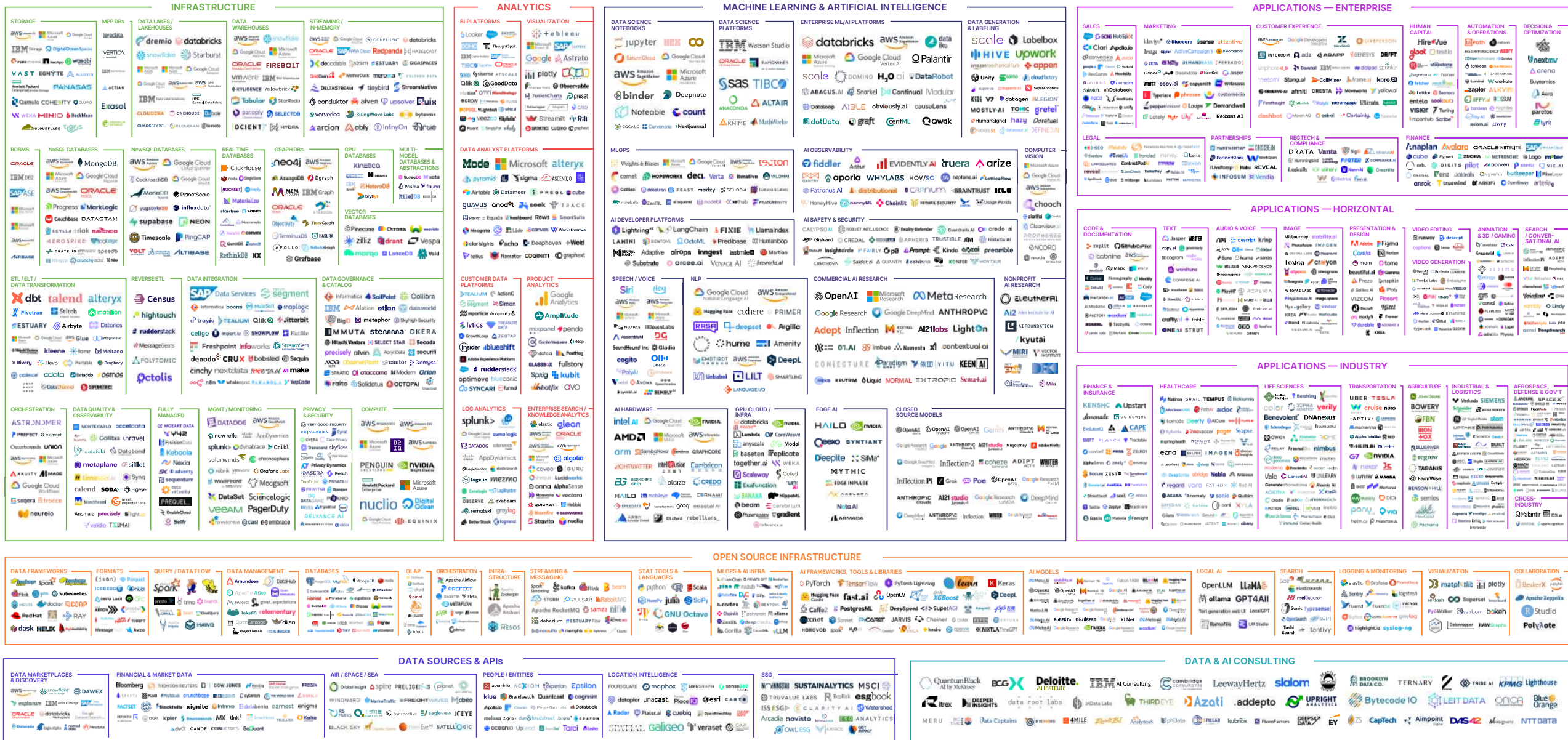


## Agentic Development Environments

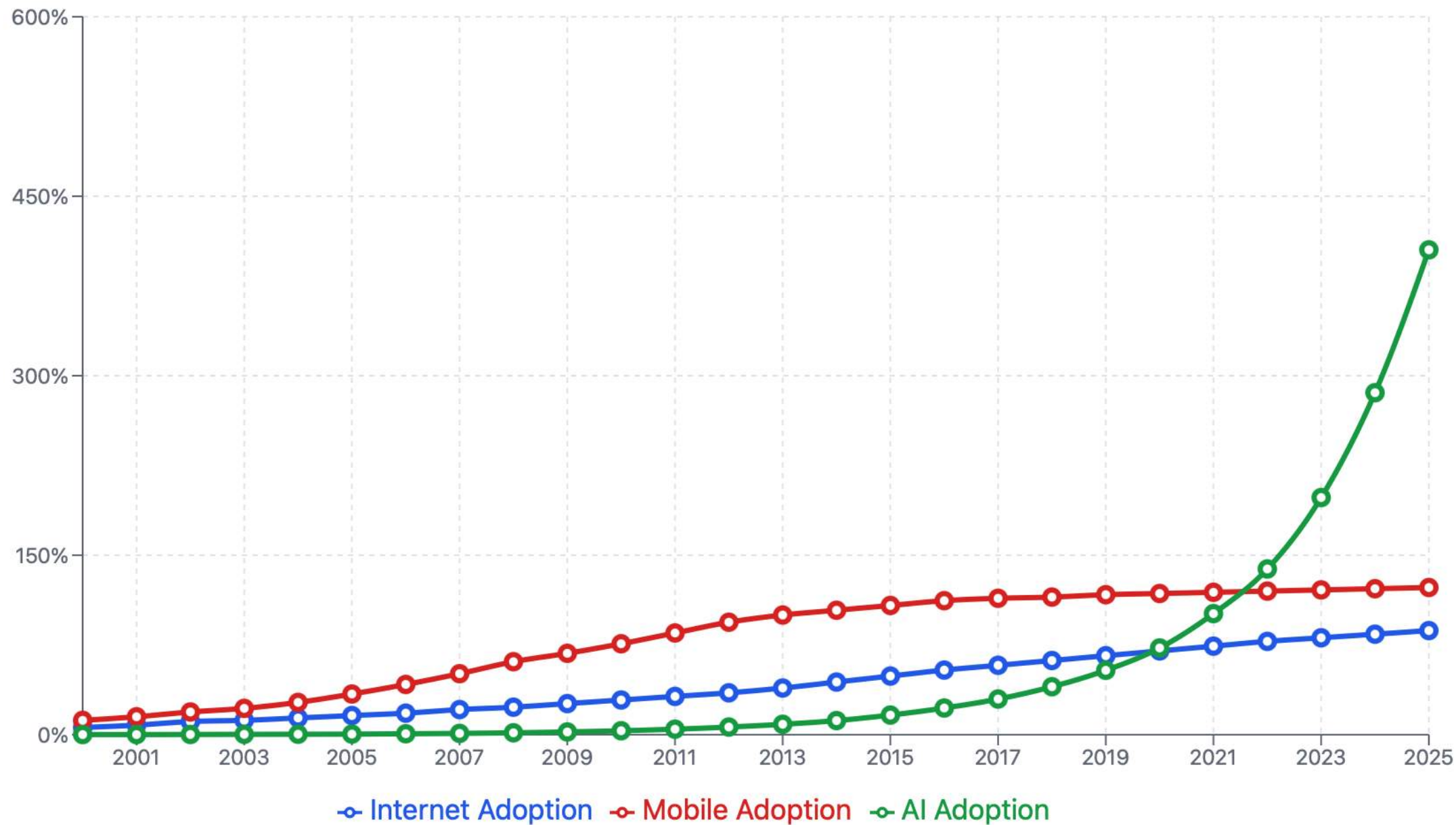




# 2025 AI Landscape



# Exponential Growth Trends



**LLM = Large Language Model**

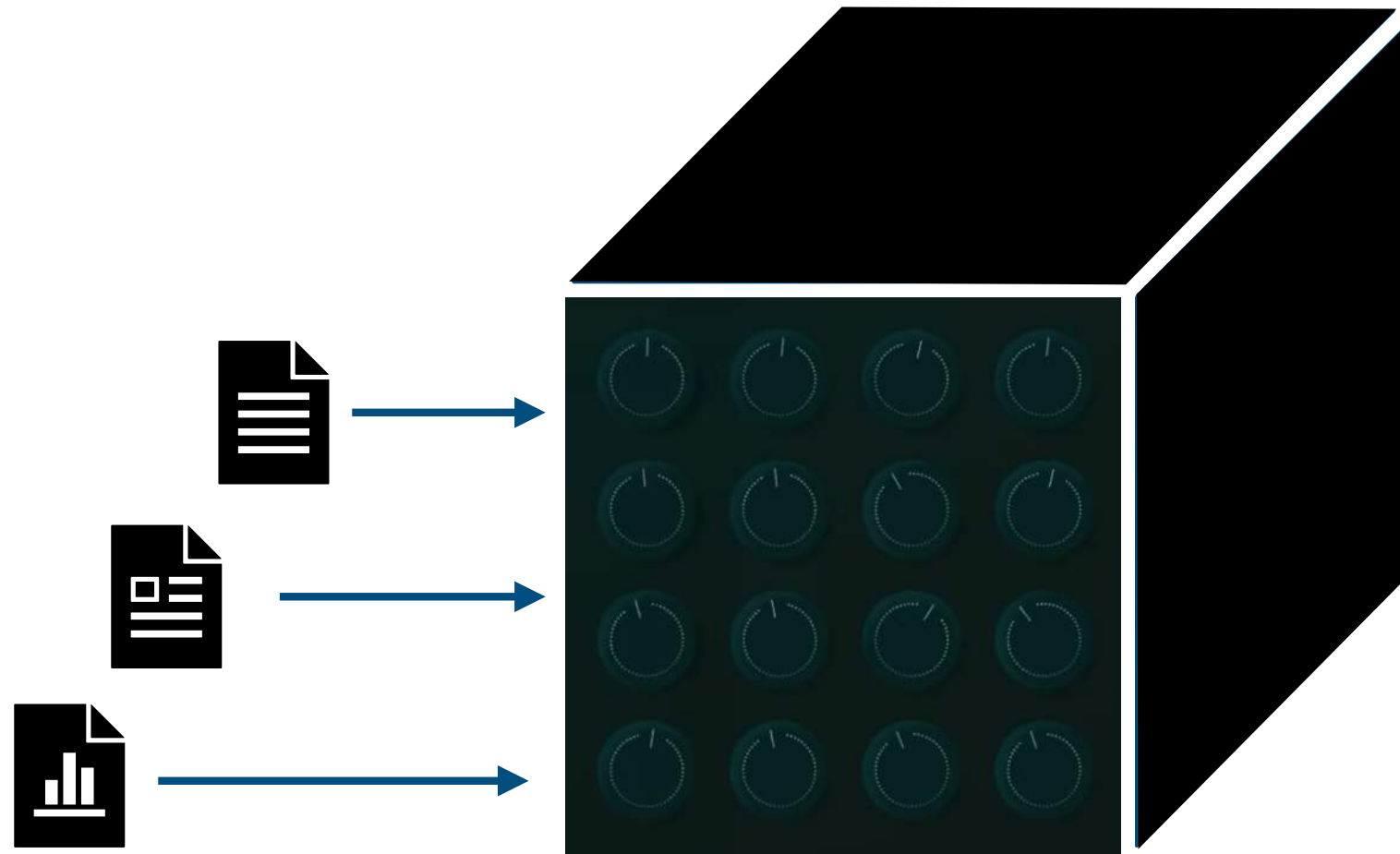


**Generative AI  
is just glorified  
autocomplete**

*- AI Experts*



# Model (**LLM**) Pre-Training



*The model learns  
the patterns of  
the data during  
training*

# Generative “Probabilistic” AI





# Risks and Limitations



LLMs are **constrained**  
to the data they were  
trained on.





**Sometimes AI**  
**hallucinates**  
*(makes things up)*

# **AI Governance**

Policy Guidelines, Data Security, Model Types

# AI Policy Guidelines

- Establish approved AI tools
- Protect City from data leakage
- Enforce AI output verification

GUIDELINES ON THE USE OF AI BY DESIGN PROFESSIONAL FIRMS  
ACEC RISK MANAGEMENT COMMITTEE – AI RISK SUBCOMMITTEE  
ACEC TECHNOLOGY COMMITTEE  
JULY 2024

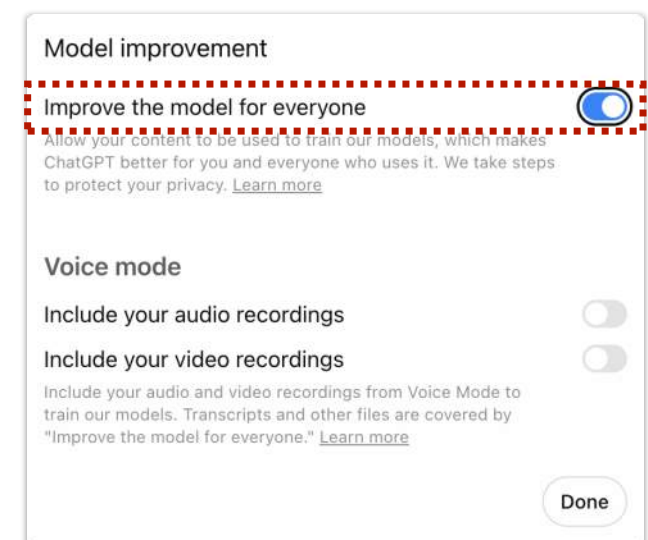
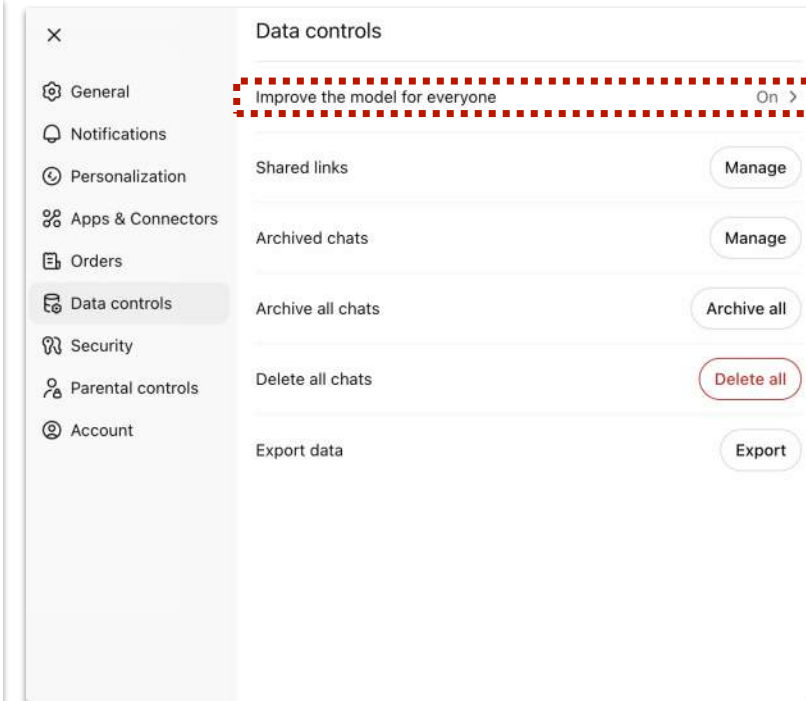
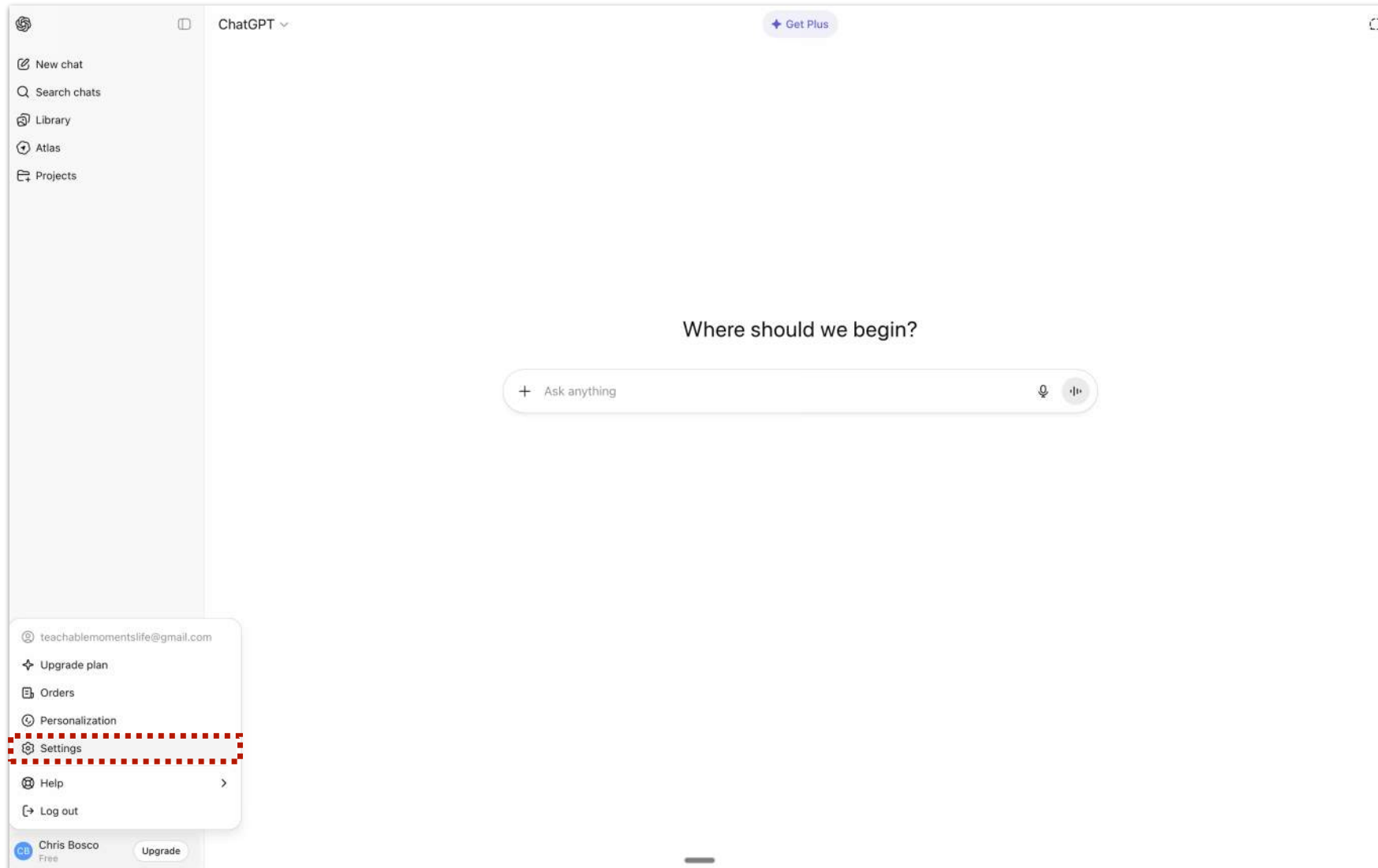
**Guideline Usage:** The suggested Guidelines set forth below have been drafted by the Artificial Intelligence (AI) Risk Subcommittee of the ACEC Risk Management Committee with input from the ACEC Technology Committee to serve as information for design professional firms in their evaluation of AI. Neither these Guidelines nor anything set forth herein constitute requirements, mandates, or an establishment of any facet of a design professional's standard of care. This information is not a statement by ACEC, its Risk Management Committee, this Subcommittee, the Technology Committee, or anyone affiliated with ACEC or any Member Firm regarding any legal, professional, or other standard or requirement in connection with a design professional's use or consideration of AI. Readers of these Guidelines are free to adopt or otherwise use as inspiration the information set forth below as they see fit (including not at all), as best suits their firms and their businesses. To reiterate, nothing herein is intended by this Subcommittee to constitute, nor shall it be interpreted as constituting, a standard of care when it comes to design professionals' use of AI or adoption or non-adoption of any of these Guidelines.

**What is AI:** Generally, Artificial Intelligence is conceived of as the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages. It encompasses the sub-fields of Machine Learning, Deep Learning, and Generative AI. Machine Learning is a form of artificial intelligence based on algorithms that are trained on data. Deep Learning is a subset of Machine Learning that uses artificial neural networks to mimic the learning process of the human brain. Generative AI generates content in response to a prompt, such as ChatGPT or DALL-E. Machine Learning is focused on analyzing data to find patterns and make accurate predictions whereas GenAI is focused on creating new data that resembles training data. Refer to the Lexicon in the Attachment for more information.

## PURPOSE AND OVERVIEW

**Purpose of Guidelines:** Consistent with the preamble statement of Guideline Usage above, the purpose of these Guidelines is to provide information that design professionals may take into account in order to promote responsible, professional, and ethical behavior with respect to the adoption and usage of AI in their businesses, including the design professional firm's policies, culture, confidentiality requirements, and contracts with clients.

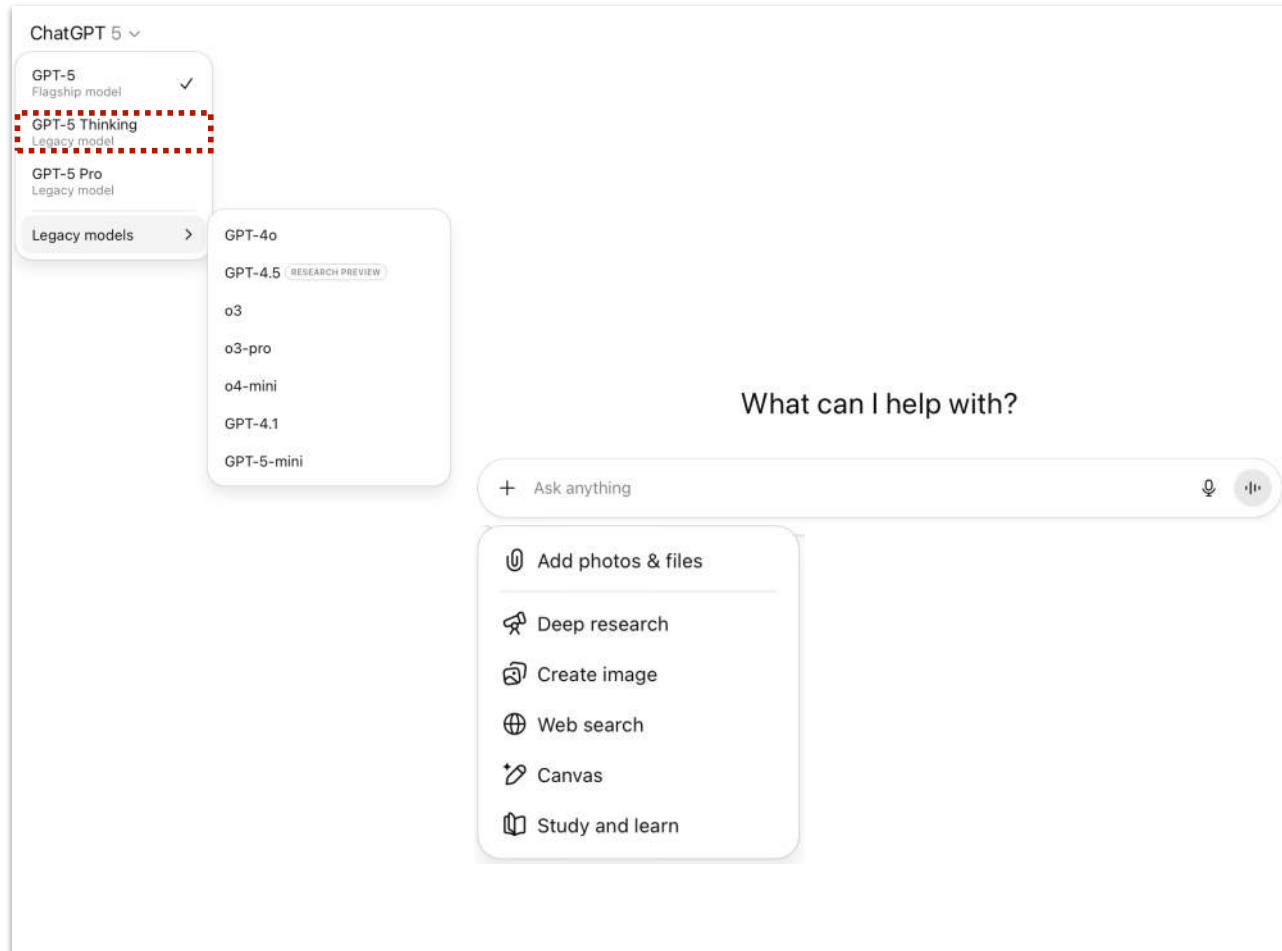
# ChatGPT Data Collection



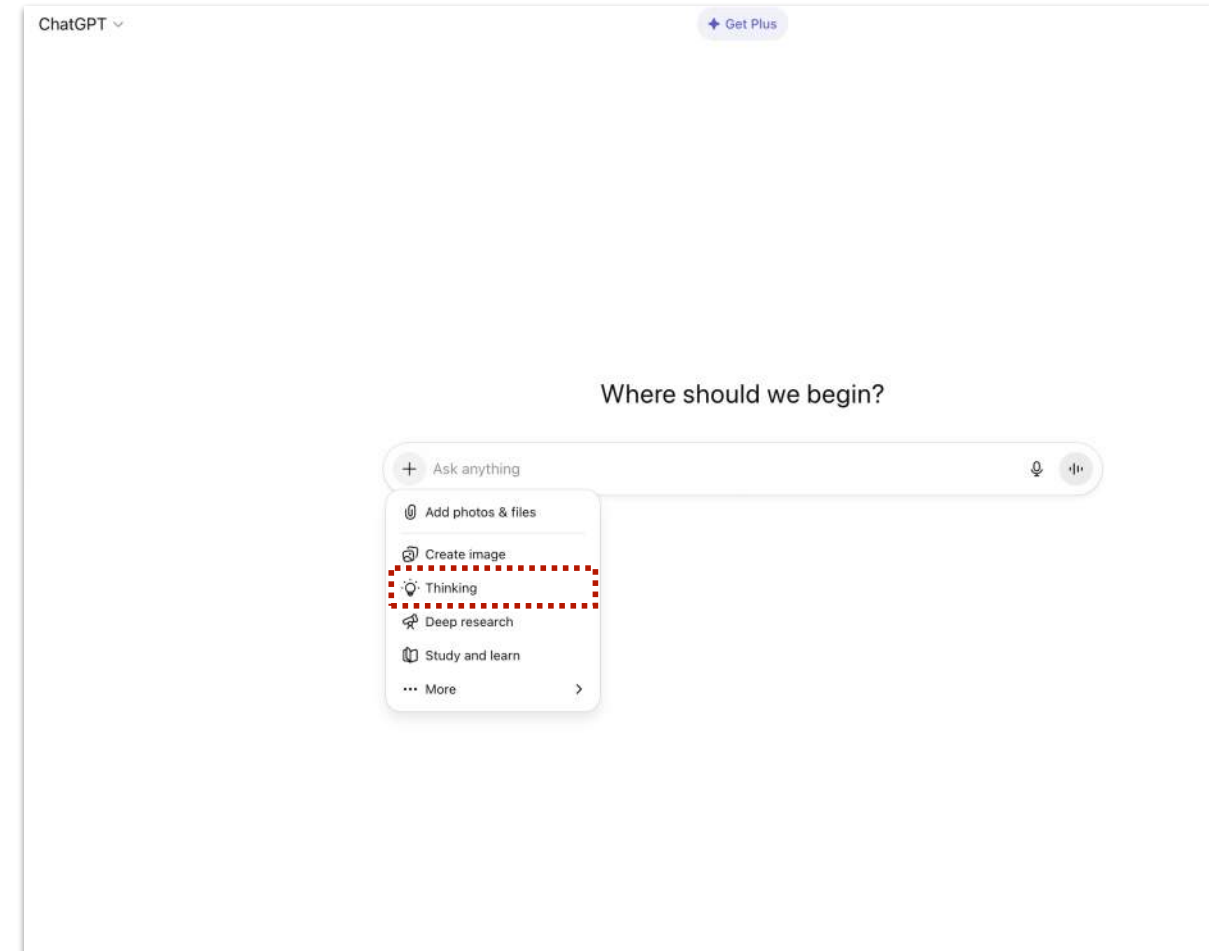


# Accessing Reasoning Models

## ChatGPT Enterprise or Plus

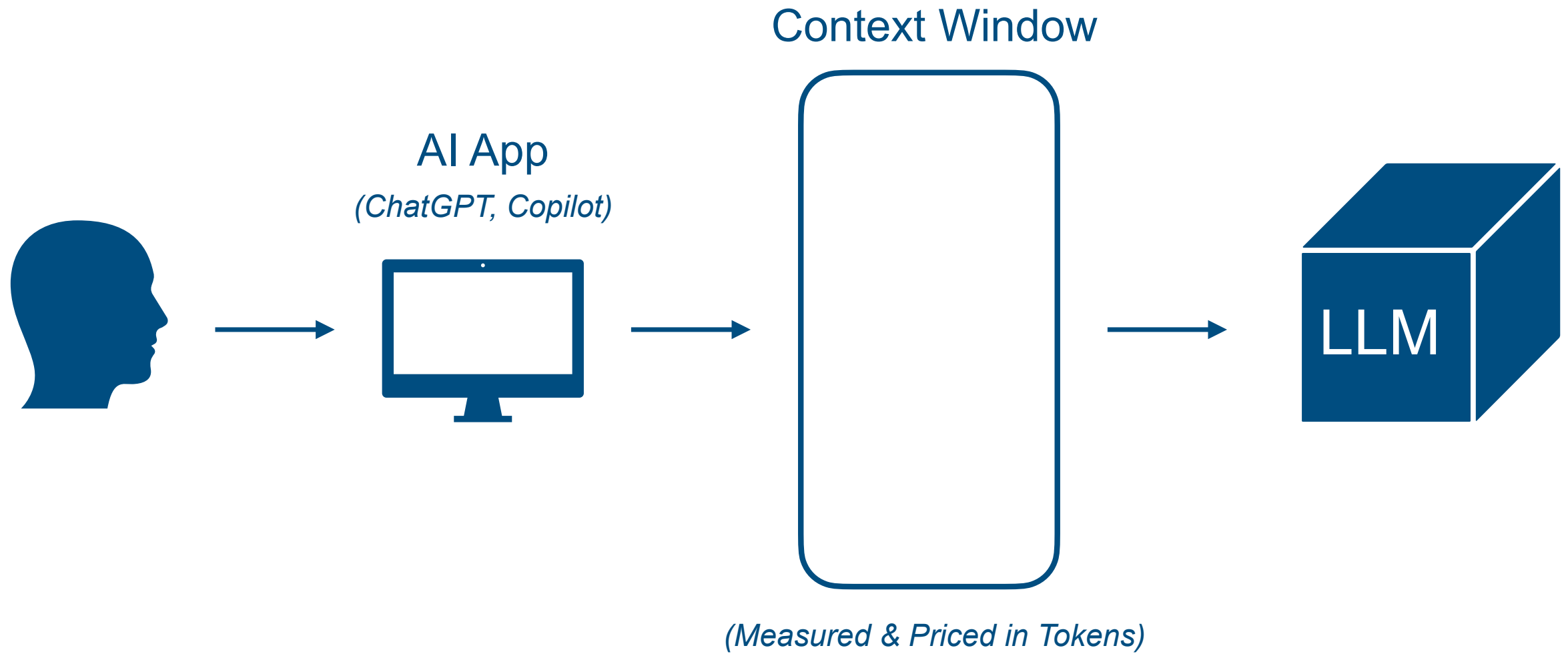


## ChatGPT Free Version



# Context is King

The better the context, the better the results



## Context Window



Prompt



Instructions

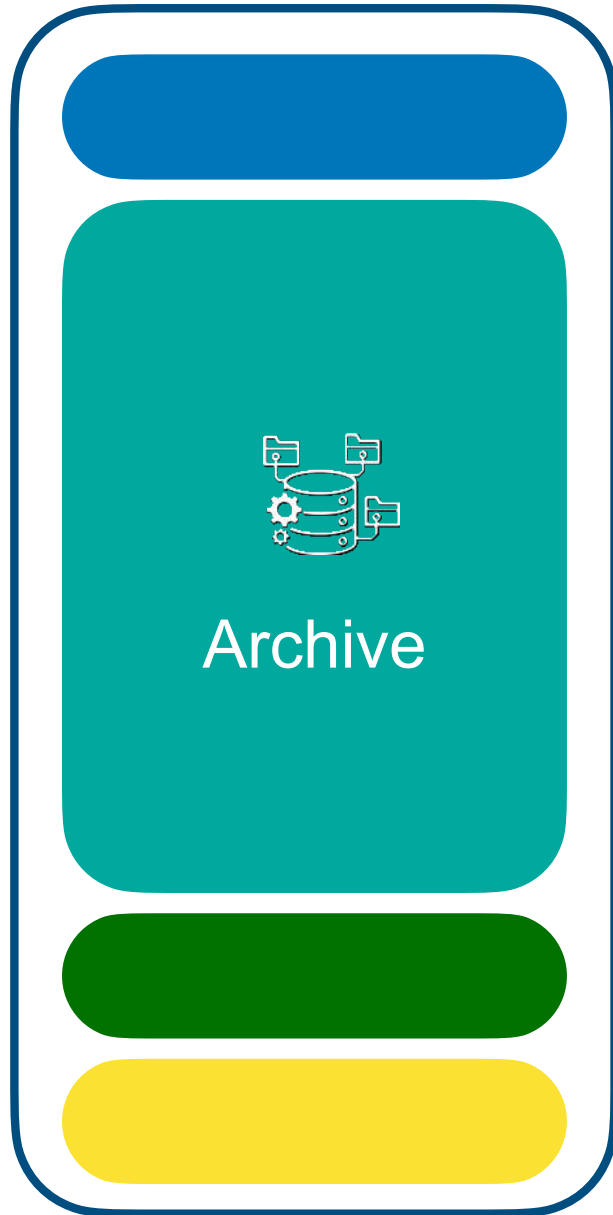


System  
Prompt





## Context Window



## Chat History



## Memory



## Context Window



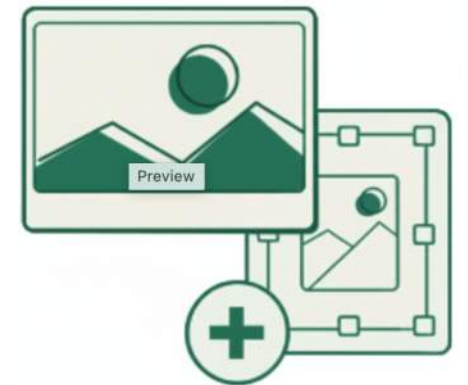
## PDFs



## Spreadsheets



## Images



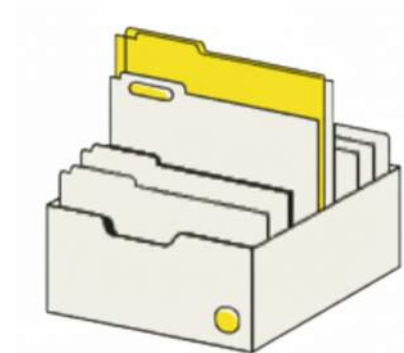
## Context Window



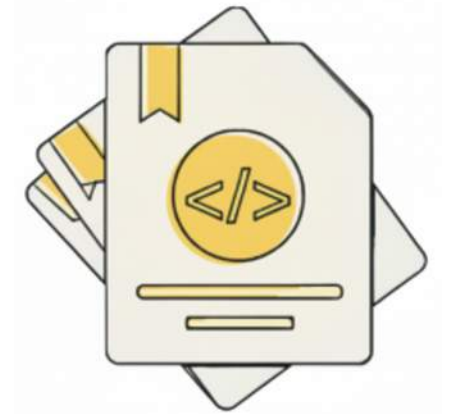
Web



Databases



API / MCP



# “Low-Hanging Fruit” of AI

*The Following are three AI tools that will provide immediate efficiency gains in your workday.*

## Voice Dictation

- WisprFLOW
- Real-time Speech Clean-up and smart editing
- Maintains your thought, words and context. But you can generate them 2-3x the speed of typing.



## AI Browser

- Perplexity “Comet”
- OpenAI “Atlas”
- These tools navigate through multiple pages and bypass ads to give you a direct link to the specific document or page you're looking for.



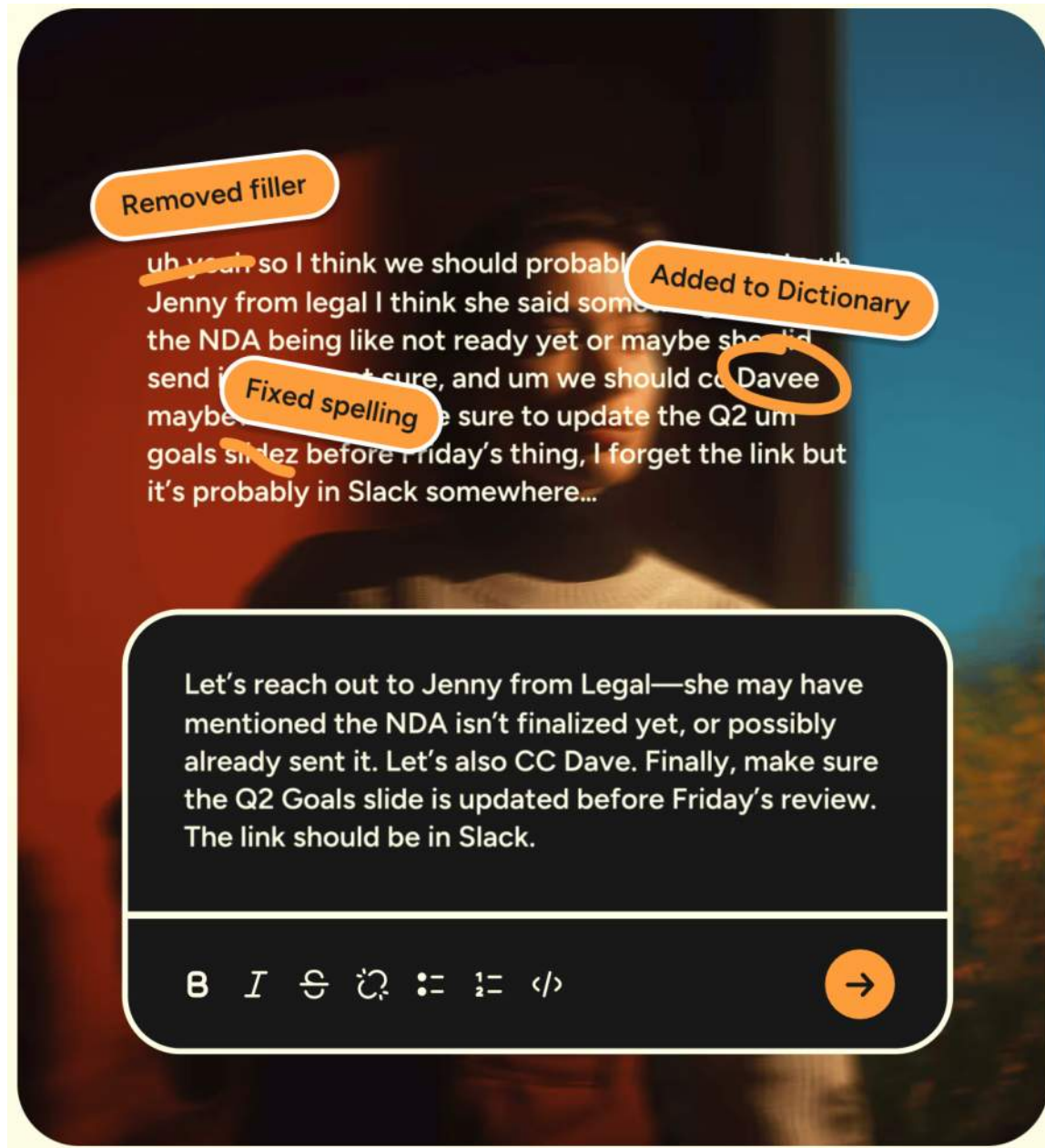
## Educational Tools

- Notebook LM
- Great for Review of Large Documents
- Provides mind map and podcast summary of the document
- Study Guide





# Voice Dictation Tool Flow



Removed filler


uh yeah so I think we should probably reach out to Jenny from legal I think she said something about the NDA being like not ready yet or maybe she didn't send it yet. I'm not sure, and um we should cc Davee maybe. I'll make sure to update the Q2 um goals slidez before Friday's thing, I forget the link but it's probably in Slack somewhere...

Added to Dictionary

Fixed spelling

Let's reach out to Jenny from Legal—she may have mentioned the NDA isn't finalized yet, or possibly already sent it. Let's also CC Dave. Finally, make sure the Q2 Goals slide is updated before Friday's review. The link should be in Slack.

B I U Q := 1= </> →



## AI Auto Edits

Speak naturally and Flow transcribes and edits your voice, instantly. Rambled thoughts become clear, perfectly formatted text, without the filler words or typos.

<https://wisprflow.ai/>

# AI Browser



Ask anything. Type @ for mentions and / for shortcuts.

1 hour ago  
Oklahoma stuns Alabama, Texas A&M rallies from 27 down

New note...

NVDA  
NVIDIA Corporation

\$190.17

Comet protects you

1.4K

ads & trackers blocked in the past 30 days

192 168 1

Freese Sharepoint

Earth Google

Vendors Planetbids

Account

Upgrade

Try Assistant

Customize

Invite Friends

Assistant

New Tab

Go to the city of Celina, Texas. Find the next planning and zoning commission meeting and provide me a link to the agenda.

# Educational Tool

NotebookLM

Settings

C

AllMy notebooksFeatured notebooks


✓

Most recent

+ Create new


My notebooks

Create new notebook




2025 Transportation Roadway Market...

May 1, 2025 · 1 source




Retrieval-Augmented Generation (RAG)...

Oct 29, 2025 · 19 sources




TxDOT Artificial Intelligence Strategic...

Jan 16, 2025 · 1 source




Untitled notebook

Oct 29, 2025 · 0 sources




AI's Role in Engineering's...

Jun 9, 2025 · 1 source




Denton 2040 Comprehensive Plan...

Oct 13, 2025 · 1 source




Paul Graham's Simple Writing Secrets

Sep 29, 2025 · 1 source




Fort Worth's Future: A Vision for 2050

Aug 3, 2025 · 4 sources




Disrupt It: AI-Driven Organizational...

Jul 7, 2025 · 1 source




Becoming an AI-First Company: A Strategi...

Jul 5, 2025 · 1 source




AI in Engineering: From Concept to...

Jul 1, 2025 · 1 source




AI Agents: Reshaping the Workforce and...

Jun 17, 2025 · 1 source




Enterprise Gen AI in 2025: Budgets,...

Jun 17, 2025 · 1 source




AI & Data-Management...

Jun 17, 2025 · 1 source




AI & Data-Management...

Jun 17, 2025 · 1 source




AI & Data-Management...

Jun 17, 2025 · 1 source




AI & Data-Management...

Jun 17, 2025 · 1 source



AI & Data-Management...

Jun 17, 2025 · 1 source



AI & Data-Management...

Jun 17, 2025 · 1 source

# Educational Tool

Celina Comprehensive Plan: Guiding Future Growth to 2040

Share

Settings

C

Sources

+ Add

Discover

Select all sources

Adopted%20Celina%20Comprehensive%20Plan%20-...

Chat

Refresh

Studio

feel with future opportunities 3 4 .

Character and placemaking are defined as planning concepts that aim to **define what makes a city special** and determine how those characteristics can be **carried forward and enhanced** to improve the community's quality of life 5 .

I. Definition and Core Components in Celina 2040

**Character** refers to what it means to live in Celina, encompassing elements such as design, history, local culture, events, sights, and sounds 5 . The community consistently voiced that Celina's character is defined by its **hometown feel and charm**, beautiful countryside, and wholesome community 6 , and the desire to **preserve the small town feel** is a pervasive sentiment 2 ... .

**Placemaking** is a proactive design and programming concept focused on creating **enjoyable places and experiences**, such as community gathering areas and nature recreation in parks, trails, and greenways 5 .

The Character & Placemaking chapter is structured around four main sections 9 :

1. **Design**: Focuses on aesthetics and function, with the goal of protecting and enhancing Celina's rural and natural features while creating exciting destinations and showcasing Celina's bold personality 10 11 .

2. **Character Framework**: Explores future land use, acting as a guide based on the desired design and *feel* of an area rather than dictating specific future land uses (Design Over Use) 10 12 .

3. **Housing & Neighborhoods**: Addresses the need for diverse housing options and creating neighborhoods with convenient access to jobs, services, and green spaces, while preserving community character 9 13 .

4. **Parks & Recreation**: Identifies strategies and actions to expand recreational destinations for residents and visitors 10 14 .

II. Character & Placemaking in the Context of the Celina 2040 Vision

The concepts in Chapter 4 directly support the comprehensive vision for Celina's future 15 :

**Unique Identity and Special Places**: By 2040, Celina aims to be a world-class city with a **unique identity**, offering **walkable special places** and amenities 16 .

**Rural Character Preservation**: The Vision mandates that natural areas, green connections, and sustainable development will combine with the community spirit to **protect and preserve Celina's rural character and small-town feel** 17 .

Start typing...

1 source

What are Celina's three largest threats?

What are Celina's three guiding principles?

Which Character District has no height limit?

Audio Overview

Video Overview

Mind Map

Reports

Flashcards

Quiz

Celina 2040: A Gameplan

1 source · 2m ago

Celina Texas Fastest Growing City...

1 source · 11m ago

Celina 2040 Comprehensive Plan: A Strategic...

Briefing Doc · 1 source · 13m ago

Celina 2040 Comprehensive Plan: Vision and...

1 source · 14m ago

Add note

NotebookLM can be inaccurate. Please double check its responses.


# Local **Data** Knowledge

GPT Projects and Custom GPTs

- Local Data Resources
- Great for Project Management
- Document Search and Review



# ChatGPT Projects



New chat

Search chats

Library

Codex

GPTs

TxDOT Engineering Design...

New project

COFW - Keller Hicks

ChatGPT 5

COFW - Keller Hicks

4 files

+ New chat in COFW - Keller Hicks

Compaction requirements review  
Review the attached documents and tell me the compaction requirements per the Geo-Tek report.  
Oct 15

Compaction requirements construction  
What are the construction requirements for compaction based on the attached project files.  
Aug 3

Resources

Project files

CPN 103276 - Keller Hicks Road - Geotechnical Memorandum - 5-4-2022.pdf

Keller Hicks Bid Proposal.pdf

Keller Hicks General Notes.pdf

CPN 103276 - Keller Hicks Road - Property Map - 5-5-2022.pdf

Prompt Instructions

Instructions

How can ChatGPT best help you with this project?  
You can ask ChatGPT to focus on certain topics, or ask it to use a certain tone or format for responses.

Instructions for Response Generation:  
You are a Civil Engineering Project Manager overseeing a transportation project. When responding:  

1. Use Only Provided Documents  
- Base your responses solely on the uploaded or internally available project documents. Do not reference or rely on any external or online sources.
2. Cite Document References  
- For each response, clearly indicate the source document and relevant section, page, or figure where applicable.
3. Be Detailed and Focused  
- Ensure your responses are precise, well-structured, and directly address the question or issue at hand. Prioritize clarity and actionable insight.

Cancel

Save

Edit project

Edit instructions

Delete project

Chris Bosco

Freese and Nichols, Inc.

ChatGPT can make mistakes. OpenAI doesn't use Freese and Nichols, Inc. workspace data to train its models.

# ChatGPT Projects

ChatGPT 4o ▾

📁 COFW - Keller Hicks

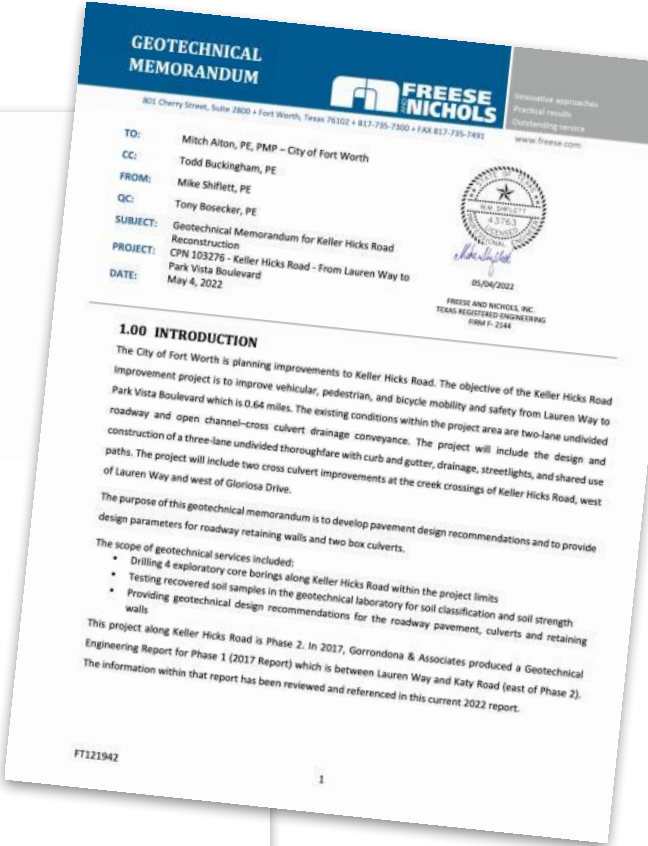
New chat in COFW - Keller Hicks

+ ⚙️ Tools

Project files  
4 files





Instructions  
Instructions for Response Generation: You are a Civil Engin..





# Custom GPTs



New chat

Search chats

Library

Codex

GPTs

TxDOT Engineering Design...

New project

COFW Stormwater Criteria ...


NCTCOG - Coordination

COFW - Keller Hicks


COFW Project Manager Ma...

COFW - Master TP Plan


See more

Chris Bosco  
Freese and Nichols, Inc.

TxDOT Engineering Design Manuals 40 ▾



### TxDOT Engineering Design Manuals

By Chris Bosco 




Expert in TxDOT design manuals

Summarize the TxDOT LGPP Requirement for...

Search MUTCD for taper and merging taper criteria

Roadway Design Manual Factors to Consider for...

Ask anything



ChatGPT can make mistakes. OpenAI doesn't use Freese and Nichols, Inc. workspace data to train its models.

# Custom GPTs

TxDOT Engineering Design Manuals

Live

Freese and Nichols, Inc.

Last edited Aug 3

Unpublished changes

...

Share

Update

Create

Configure

Name

TxDOT Engineering Design Manuals

Description

Expert in TxDOT design manuals

Instructions

The 'Transportation Engineer AI' is equipped to handle unclear or insufficiently detailed queries by politely asking for clarification. This approach ensures that the responses provided are as relevant and accurate as possible. The AI maintains a balance between being helpful and ensuring the quality of information. In cases where the query is somewhat clear but lacks specific details, the AI can make educated assumptions based on the context, but it will also indicate these assumptions in its response. This way, the AI maintains its role as a reliable source of information in transportation design engineering, while also being approachable and user-friendly. It strives to engage users in a constructive dialogue, enhancing their understanding of roadway design, traffic engineering, and emerging

Conversations with your GPT can potentially include part or all of the instructions provided.

Conversation starters

TxDOT LGPP Responsible Professional

Search MUTCD for taper and merging taper criteria

Considerations for Intersection Site Distance

Knowledge

Conversations with your GPT can potentially reveal part or all of the files uploaded.

TxDOT Roadway Design...  
PDF

Access Management M...  
PDF

Local Government Proje...  
PDF

MUTCD.pdf  
PDF

Upload files

Preview

Model 4o

TxDOT Engineering Design Manuals

Expert in TxDOT design manuals

TxDOT LGPP Responsible Professional

Search MUTCD for taper and merging taper criteria

Considerations for Intersection Site Distance

Ask anything

+

🔊


⬆

Prompt Instructions

Resources

# Custom GPTs

TxDOT Engineering Design Manuals 40 ▾



### TxDOT Engineering Design Manuals

By Chris Bosco &  
Expert in TxDOT design manuals



Summarize the TxDOT LGPP Requirement for...

Search MUTCD for taper and merging taper criteria

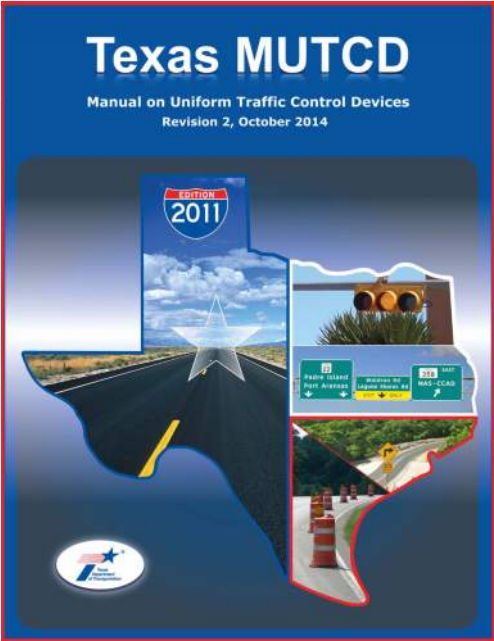
Roadway Design Manual Factors to Consider for...

Ask anything

+



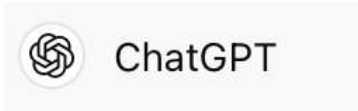
ChatGPT can make mistakes. OpenAI doesn't use Freese and Nichols, Inc. workspace data to train its models.



# Deep Research

Agentic AI tool that searches the the internet and summarizes the results in a customize user defines structure with resource web links

# Deep Research



What are you researching?

Ask anything

+ Search Deep research ...



How can I help you today?

What do you want to know?

DeepSearch Think Grok 3



- Research AI campaigns for annual planning
- Research sensor trends for my robotics essay
- Research battery tech for a market analysis

Ask Gemini

+ Deep Research



What do you want to know?

Ask anything...

pro Deep Research

# Deep Research

What do you want to know?

Ask anything...

pro

Deep Research

🌐

📄


➔


⚙️ 66°F

Sunny

Fort Worth

H: 69° L: 37°

Bill Ackman Warns of Economic Nuclear...

Colossal Revives Dire Wolves

Web Tools

Pro

Enterprise

API

Blog

Careers

Store

Finance

English ▾

Deep Research Prompt

Federal Funding for Transportation Programs

Task Overview

The objective is to produce a comprehensive and current summary of active and upcoming U.S. federal funding opportunities related to transportation programs.

Research Scope & Priorities

- Geographic Focus:** United States only
- Citation Format:** All sources must be hyperlinked.
- Topical Focus:** Emphasis on transportation funding programs
- Source Prioritization:** Primary sources (e.g., official government publications, press releases, agency websites) should be prioritized. Reputable secondary sources (e.g., major news organizations, industry publications) may be used selectively.

Deliverable Format

Provide a 2–4 page research document organized according to the following structure:

Section 1: Background Knowledge

Provide a concise overview of federal transportation funding.

- Current Programs:** Summarize active federal funding programs (1–2 paragraphs, max 300 words).
- Recent Updates:** Identify changes to any existing programs within the last 6 months.
- Upcoming Opportunities:** Note any anticipated programs or NOFOs expected in the next 6 months.

Action Items:

- Include hyperlinks to all referenced sources.
- Highlight funding opportunities available in the current calendar year.

Section 2: Definition of Terms

Define key terms relevant to understanding federal transportation funding with a focus on AI and grant processes.

# Deep Research *(Federal Funding Programs)*

Program Name	Summary	Eligible Project Types (AI relevance)	Funding Availability	Anticipated NOFO & Deadline	Program Info
Railroad Crossing Elimination (RCE)	Funds highway-rail crossing improvements to enhance safety and mobility	Grade separation, track relocation, safety improvements, planning (AI potential for safety monitoring and predictive analytics)	\$600M/year FY22-FY26	Most recent awards announced Jan 10, 2025	<a href="#">RCE Program</a>
Rural Surface Transportation Grant (RSTG)	Supports rural surface transportation projects to improve connectivity and safety	Highway safety, surface transportation, tribal transportation (AI applications for rural transportation optimization)	\$2B over five years	Not specified in results	<a href="#">RSTG Program</a>
Safe Streets and Roads for All (SS4A)	Funds initiatives to prevent roadway deaths and injuries	Planning, demonstration, and implementation projects (AI for safety analysis and crash prevention)	\$982M for FY 2025	Released Mar 31, 2025; Due Jun 26, 2025	<a href="#">SS4A Program</a>
Bridge Investment Program (BIP)	Reduces bridges in poor condition through rehabilitation or replacement	Bridge improvement, rehabilitation, replacement (AI for structural health monitoring)	\$9.62B for FYs 2023-2026	FY26: Large Bridge (Aug 1), Planning (Oct 1), Bridge Projects (Nov 1), 2025	<a href="#">BIP Program</a>
Reconnecting Communities Pilot (RCP)	Reconnects communities divided by transportation infrastructure	Community reconnection, safety improvements, planning (AI for community impact assessment)	\$607M for FY24	FY24 NOFO released (no deadline specified)	<a href="#">RCP Program</a>
BUILD (formerly RAISE)	Supports multi-modal projects with significant local/regional impact	Surface transportation with local/regional impact (AI for project optimization and management)	\$7.5B over five years	FY 2025 NOFO issued Feb 2025	<a href="#">BUILD Program</a>
Commercial Motor Vehicle Safety Programs	Funds CMV safety initiatives and operator training	Safety programs, driver training, technology demonstration (AI for vehicle safety systems)	Not specified	HP-CMV due Mar 7, 2025; CMVOST due Feb 25, 2025	<a href="#">FMCSA Grants</a>
Port Infrastructure Development Program	Improves port facilities and infrastructure	Port facility improvements (AI for port operations optimization)	Not specified	Due Apr 30, 2025	<a href="#">USDOT Grants</a>



# Deep Research (AI Advancements in Civil Engineering)

### AI Integration Roadmap for Transportation Practice

#### Task Overview

As part of an ongoing **AI Integration Roadmap for Transportation Engineering Planning and Design**, this task will leverage OpenAI's Deep Research Tool to update **Part 1** of a 4-part document. The objective is to provide a **comprehensive and up-to-date summary** of AI advancements and policies relevant to **transportation planning and design** in the **United States**.

#### Research Scope & Priorities

- Geographical Focus:** AI applications in the **U.S.** only.
- Citation Format:** Hyperlinks should be provided for all sources.
- Areas of Emphasis:** AI applications in **autonomous vehicles, traffic management infrastructure design, and all aspects of transportation engineering**.
- Source Prioritization:** The research should prioritize **primary sources** (government publications, company press releases, official reports) and include **secondary sources** only from **reputable news organizations or industry blogs**.

#### Deliverable:

A **2-5 page research document** following the outlined structure below.

### Section 1: Background Knowledge

✔ **Summary of AI Landscape & Innovations** (1-3 paragraphs, max 400 words)

- Overview:** Current AI applications in **transportation engineering, planning, and design**.
- Recent Innovations:** AI tools that have emerged in the **last 6 months**.
- Upcoming Innovations:** AI tools expected to launch within the **next 6 months**.

#### Action:

- Include citations or references via **hyperlinks**.
- Highlight key trends in AI adoption for transportation engineering.

### Section 2: Definition of Terms

✔ **Define Key AI Terms** (1-2 sentences each)

- Large Language Model (LLM)**
- Open Source LLM**
- Closed Source LLM**
- Generative AI**
- Agentic AI**
- Digital Twins**
- Neural Networks**
- Edge AI**
- Predictive Analytics**
- Reinforcement Learning**
- Edge AI**

#### Action:

- Add **5-10 additional AI-related terms** relevant to transportation professionals.
- The aim is to provide additional knowledge of AI terms to clarify understanding.
- Ensure **clear and concise** definitions, avoiding unnecessary technical complexity.

### Section 3: AI Innovations in Business & Software Solutions

✔ **Research AI Integration in Transportation Engineering & Planning Software**

- Identify and summarize AI-related advancements from **leading software companies** in transportation planning and engineering, including but not limited to:
  - Bentley Systems**
  - Cubic Transportation Systems**

#### Action:

- Expand the list of **software providers relevant to AI applications in traffic modeling, simulation, planning, and engineering design**.
- Provide a **brief summary (2-3 sentences)** of each company's **AI initiatives**.
- Highlight **notable AI-driven features or recent product enhancements**.

### Section 4: AI Platforms developing Engineering Solutions

✔ **Research No-Code AI Platforms**

- Identify and summarize AI-related advancements from **No-code platforms** in civil engineering space, including but not limited to:
  - Civils.ai**
  - Ecopia AI**
  - Blyncy**

#### Action:

- Expand the list of **no-code providers relevant to AI applications in planning, engineering design and construction management**.
- Provide a **brief summary (2-3 sentences)** of each company's **AI initiatives**.
- Highlight **notable AI-driven features or recent product enhancements**.

### Section 5: AI Innovations by Consulting Firms

✔ **Research AI Integration in the Industry by Consulting Engineering Firms**

- Identify and summarize AI-related advancements from **leading Engineering Firms** in transportation planning and engineering, including but not limited to:
  - Arcadis**
  - ARUP**
  - WSP**
  - AECOM**
  - Jacobs**

#### Action:

- Expand the list of **engineering consulting firms in planning, engineering design and construction management**.
- Provide a **brief summary (2-3 sentences)** of each company's **AI initiatives**.
- Highlight **notable AI implementation in planning, design or construction of civil engineering projects**.

### Section 6: AI-Related Government Policies & Strategic Planning Documents

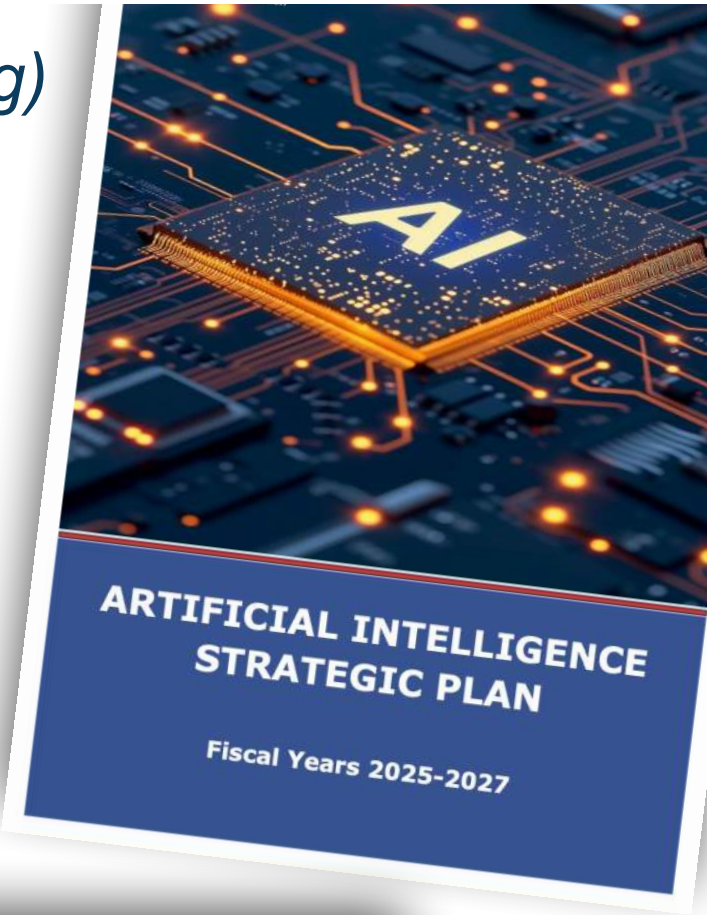
✔ **Research AI-Related Policies & Plans from Government Agencies**

Summarize **AI-related strategic plans, policy documents, or research reports** from relevant **U.S. state and municipal agencies**, including:

- Federal Highway Administration (FHWA)**
- Texas Department of Transportation (TxDOT)**
- Oklahoma Department of Transportation (ODOT)**
- North Carolina Department of Transportation (NCDOT)**
- Texas Institute of Transportation Engineers (TxITE)**
- American Public Works Association (APWA)**
- Transportation Research Board (TRB)**
- Major Cities:** Fort Worth, Dallas, Oklahoma City, Houston, Austin, San Antonio

#### Action:

- For each agency, provide a **2-3 sentence summary** of AI-related **documents, strategies, or initiatives**.
- Include hyperlinks** to sources where available.
- Provide links to upcoming **AI related training or webinars** by the highlighted agencies
- If an agency does **not** have an AI-related planning document, **state clearly**:
  - "No AI-related information available at this time."*

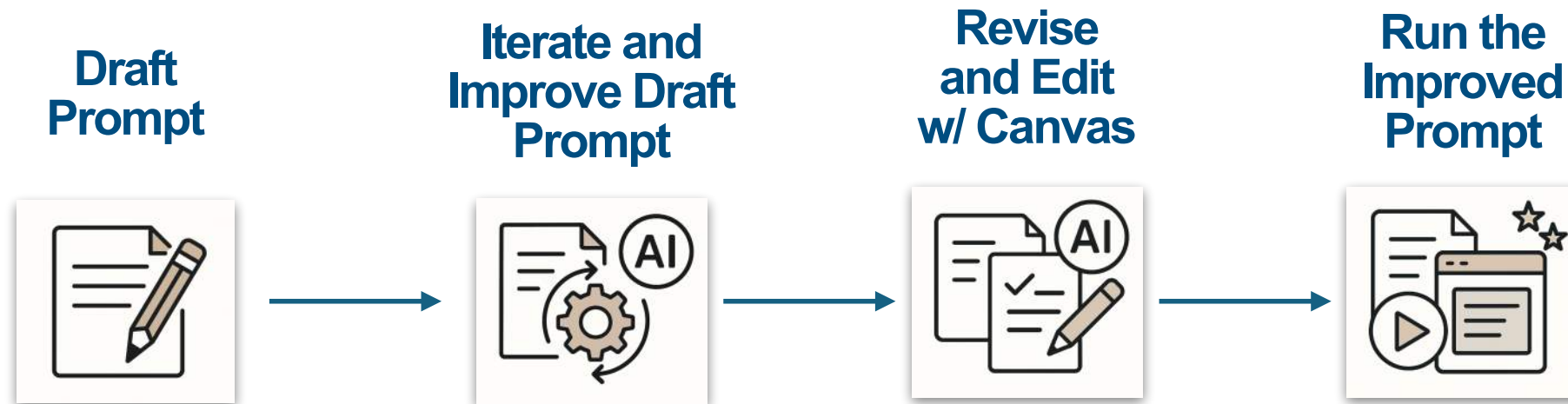




# Creating Prompts

Use the tool as the Teacher  
*(Prompt Development Workflow)*

# Prompt Development Workflow:



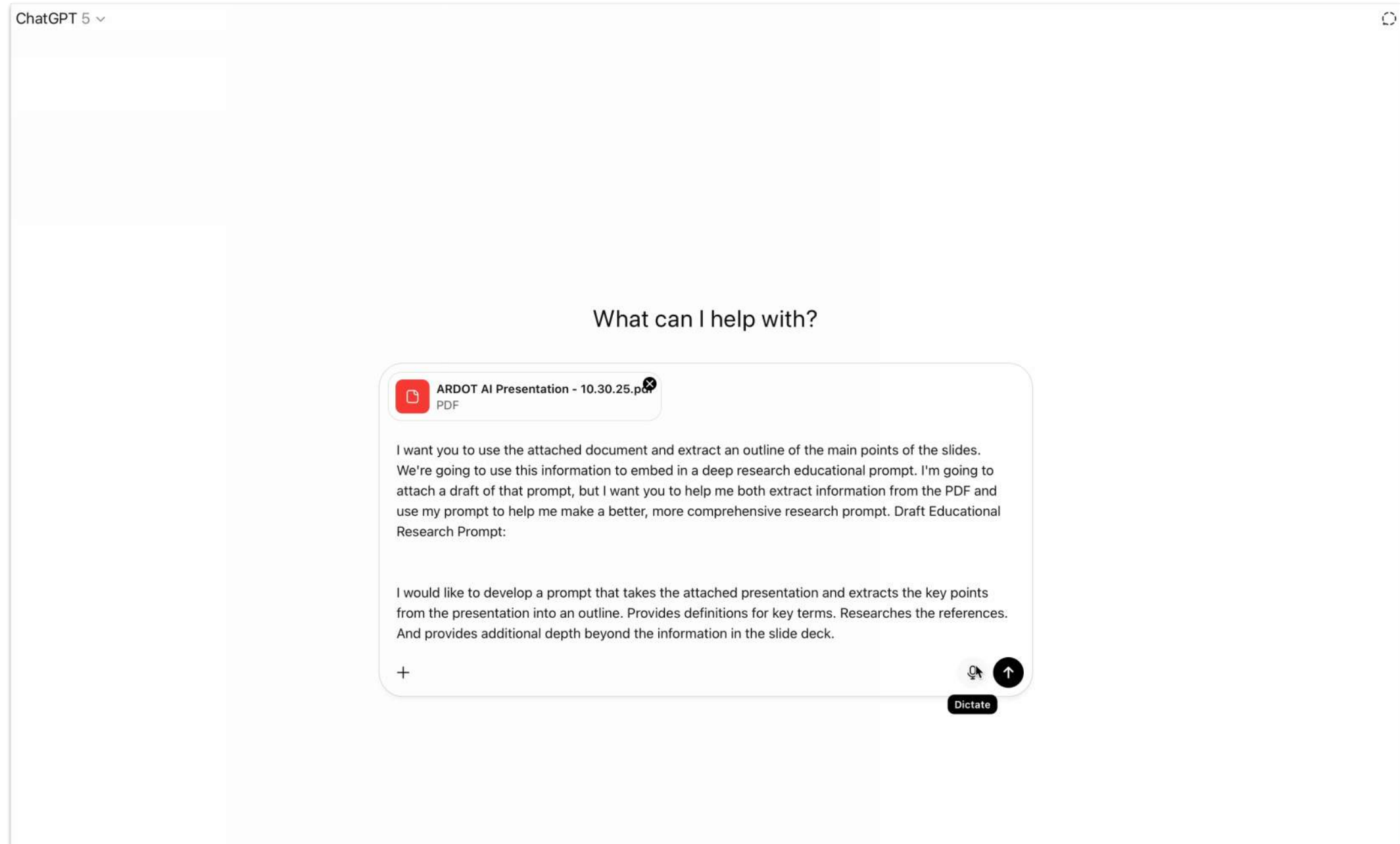
# Draft Prompt:

## Draft Educational Research Prompt:

I would like to develop a prompt that takes the attached presentation and extracts the key points from the presentation into an outline. Provides definitions for key terms. Researches the references. And provides additional depth beyond the information in the slide deck. .

|

# Iterate and Improve the Prompt:



# Revise and Edit w/ Canvas: *“Open in Canvas”*

ChatGPT 5 ▾

AI Presentation Outline

Copy Edit Download

**Deep Research Prompt: Making AI Work - Best Practices for Data, Tools, and Workflows (Arkansas Transportation Summit, Oct 30, 2025)**

**1. Introduction**

- Overview: Making AI Work for engineering and transportation practices.
- Focus: Best practices for data, tools, and workflows.

**2. How AI Works**

- Understanding Large Language Models (LLMs): tokens, training, and prediction.
- Concepts: Tokenization, probabilistic text generation, pre-training process.
- Analogy: Generative AI as advanced autocomplete.

**3. AI Platforms**

- **Foundational Model Platforms:** ChatGPT, Claude, Gemini, Grok, LLaMA.
- **Integrated Platforms:** Copilot, Perplexity, NotebookLM, Flow.
- **Agentic Development Environments:** Cursor, Replit, Windsurf, Lovable, Warp.

**4. AI Capability Learning Curve**



- Global adoption comparison (Internet vs Mobile vs AI).
- Insight: AI's exponential adoption trajectory.

**5. Risks and Limitations**

- Constraints: Limited to training data.
- Hallucinations: AI fabricates information.
- Importance of context quality.

**6. Context Windows**

+ Ask anything



# Revise and Edit w/ Canvas: “Open in Canvas”

×

Ai Presentation Outline

▼

📄

⬆

🔄

⋮

• Water Treatment Plant Flow Analysis.

• Legal Property Description Parser & Visualizer.

• API Calls & Coding:

• Vision Lab and command-line automation examples.

14. References & Influencers

• Andrej Karpathy, Dharmesh Shah, Aaron Levie, Nate B. Jones, Greg Isenberg, Cal Newport, Ethan Mollick, Nathaniel Whitemore.

For each of these individuals, research any YouTube videos, X (Twitter) profiles, podcasts, or articles they have published. Identify credible resources that reflect their perspectives on AI and technology. Cite these resources to provide readers with direct access to their content and deeper understanding of their contributions.

Expanded Educational Research Prompt

Objective: Transform the presentation into a comprehensive educational research report that explains, defines, and deepens key AI topics.

Instructions

1. Extract an Outline

Identify and summarize key sections and messages from each slide.

2. Define Key Terms

Explain technical terms (e.g., token, LLM, deterministic AI) with examples.

3. Research and Reference Expansion

Investigate referenced experts, tools, and platforms; summarize relevance to civil engineering.

4. Contextual Deepening

Add scholarly or industry insights that connect AI concepts to infrastructure, transportation, and engineering workflows.

5. Practical Applications

# AI Computer Vision

Understanding and interpreting Visual Information



# ChatGPT Image Recognition:



Calculate the list foods, and calculate the macros with a total calories for this meal.

Here’s what’s on the plate and the estimated nutrition breakdown:

**Foods in the Image**

- 1. **Pan-seared or baked breaded chicken breast** (likely lightly breaded with seasoning)
- 2. **Mashed potatoes** (with likely butter and milk)
- 3. **Fresh arugula salad** (no visible dressing)
- 4. **Lemon slices** (garnish)

**Estimated Portion Sizes**

Food	Approx. Amount	Notes
Chicken breast (breaded)	5 oz (140 g)	Lean protein with a bit of oil/breading
Mashed potatoes	1 cup (210 g)	Standard serving, likely with butter/milk
Arugula	1 cup (20 g)	Very low calorie
Olive oil (if drizzled lightly)	1 tsp (5 g)	Assumed small drizzle
Lemon	few slices	negligible calories

**Estimated Macros and Calories**

Food	Calories	Protein (g)	Carbs (g)	Fat (g)
Breaded chicken breast (5 oz)	280	35	10	9
Mashed potatoes (1 cup, with butter & milk)	210	4	33	8
Arugula (1 cup)	5	0.5	0.5	0
Olive oil (1 tsp, if used)	40	0	0	5
Lemon slices	2	0	1	0

**Total Estimated Nutrition**

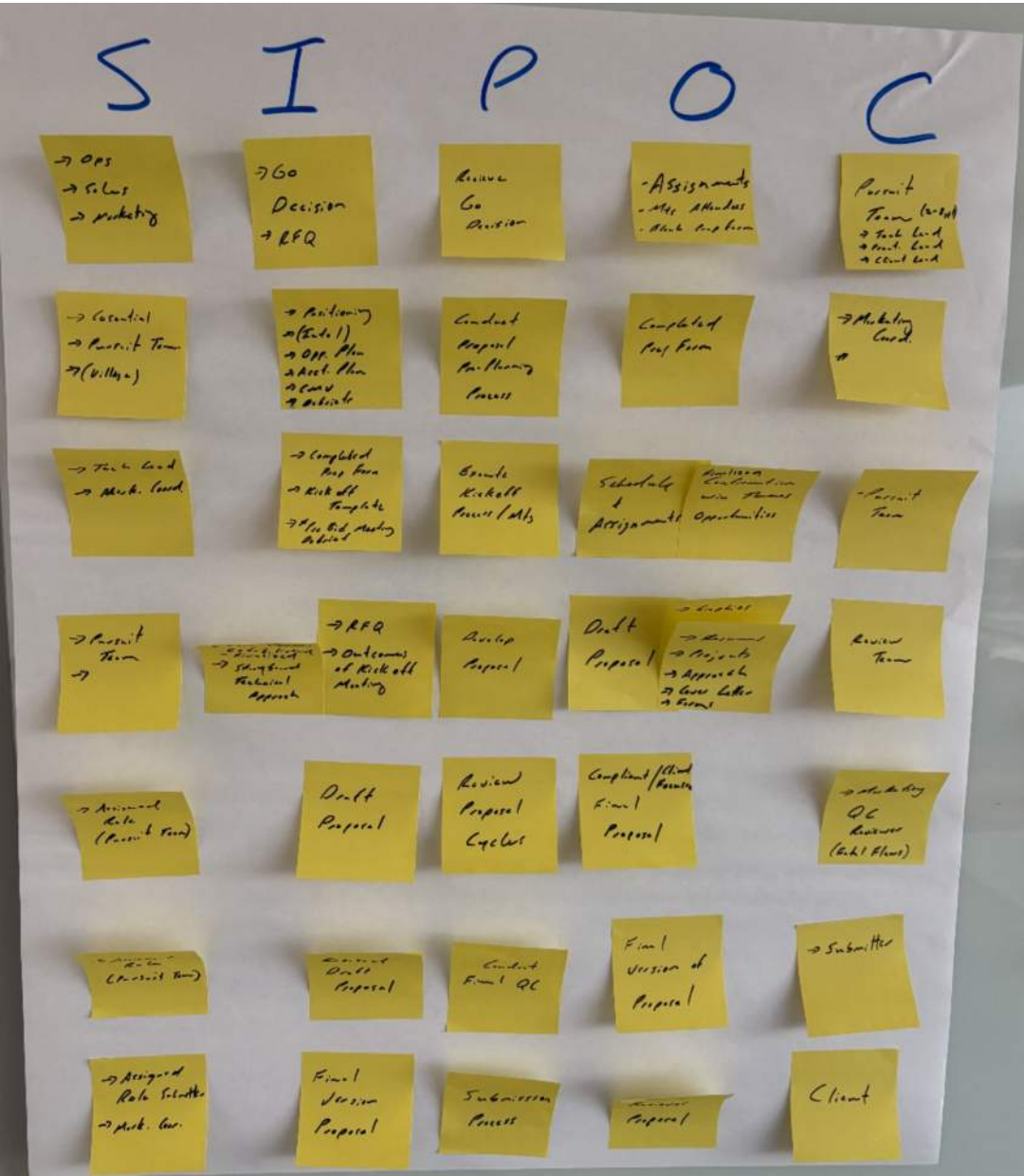
Total	Calories	Protein (g)	Carbs (g)	Fat (g)
Meal Total	≈ 535 kcal	≈ 39.5 g	≈ 44.5 g	≈ 22 g

**Notes**

- If the chicken is pan-fried rather than baked, fat could increase by 3–5 g (≈40–50 kcal).
- Removing breading or using grilled chicken would reduce carbs and fat, dropping calories closer to 400 kcal.
- Adding salad dressing would increase total calories depending on type (olive oil vinaigrette ≈ 100 kcal per tbsp).



# ChatGPT Image Recognition:



SIPOC Table (Notes)

#	Suppliers (who provides the input)	Inputs (what they provide)	Process step (what is done)	Outputs (what is produced)	Customers (who receives the output)
1	• Operations • Sales • Marketing	• Go / No-Go decision • RFQ (request for qualifications)	<b>Review Go decision</b> – confirm that the pursuit is worth resources	• Initial team assignments / roles defined	• Pursuit leadership (PM / Tech lead)
2	• Cosential (CRM) • Pursuit team • Corporate “Village” support	• Positioning intel • Opportunity plan • Account plan • CRM history • Past debriefs	<b>Proposal pre-planning</b> – frame win themes, outline compliance	• Marketing “crud” (raw content worksheets)	• Marketing coordinator
3	• Technical lead • Market coordinator	• Completed pursuit form • Kick-off template • Pre-bid meeting debrief	<b>Schedule &amp; hold kick-off meeting</b> – confirm scope, roles, deadlines	• Task list with assignments & dates	• All discipline leads
4	• Pursuit team (SMEs)	• RFQ packet • Outcome notes from kick-off	<b>Draft proposal</b> – create first compliant draft	• Review-ready draft	• Internal review team
5	• Assigned reviewers • Marketing QC	• Draft proposal	<b>Internal review cycles</b> – red-team / gold-team edits	• Comment-resolved draft	• Technical editor & QC lead
6	• QC lead • Tech editor	• Revised draft proposal	<b>Final quality control (QC)</b> – proof, style, compliance check	• Final version of proposal	• Submittal coordinator
7	• Submittal coordinator	• Final approved proposal	<b>Submission process</b> – package & deliver	• Submitted proposal	• Client / Owner

# Probabilistic vs. Deterministic AI

Driving Predictable and Consistent Results in the AEC Industry

# Probabilistic vs. **Deterministic** AI

## Probabilistic AI

- Learns from training data, predicts patterns and creates new content based on prompts provided by the User (e.g. ChatGPT)

## Deterministic AI

- Rule-based, precise and consistent results with auditable code (e.g., design scripts, and QA automations)

## Combined System

- Human guided AI Outputs using a combination of API calls to Large Language Models (LLMs) and using rules (code) to structure outputs that align with engineering standards.

# Understanding the Spectrum of AI

## Probabilistic AI

## Deterministic AI

01

### Generative AI

**Example:** ChatGPT/Copilot

**Use Cases:**

- Edit Writing
- Web Search
- Research
- Images



02

### Reasoning AI Models

**Examples:** Thinking Models

**Use Cases:**

- Multiple Perspectives
- Business Strategy
- Training Strategy



03

### Agentic AI

**Examples:** Deep Research

**Use Cases:**

- Research
- Computer Use
- AI Browsers
- Multiple Workflows



04

### Deterministic AI

**Examples:** Application/Program

**Use Cases:**

- Embedded Applications
- Claude Artifacts
- Canvas Apps (ChatGPT)
- Data Analysis
- Python Scripts



05

### Custom Interface

**Examples:** API Calls

**Use Cases:**

- Combination Approach
- Model API
- Structured Code



# Claude Artifact Example:

20202021202220232024RR Filter Flow 30 Min								
	10604	10605	10609	10610	10611	10612	10613	10614
	RR Filter 1 Flow Rate	RR Filter 2 Flow Rate	RR Filter 3 Flow Rate	RR Filter 4 Flow Rate	RR Filter 5 Flow Rate	RR Filter 6 Flow Rate	RR Filter 7 Flow Rate	RR Filter 8 Flow Rate
Date	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD
1/1/2020 00:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 00:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 01:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 01:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 02:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 02:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 03:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 03:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 04:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 04:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 05:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 05:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 06:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 06:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 07:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 07:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 08:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 08:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 09:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 09:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 10:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 10:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 11:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 11:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 12:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 12:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 13:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 13:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 14:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 14:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 15:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 15:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 16:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 16:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 17:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 17:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 18:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 18:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 19:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 19:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 20:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 20:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 21:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 21:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 22:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 22:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 23:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/1/2020 23:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/2/2020 00:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/2/2020 00:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/2/2020 01:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/2/2020 01:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/2/2020 02:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/2/2020 02:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/2/2020 03:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/2/2020 03:30	0.64		0.01	0.00	3.32	0.01	1.97	0.01
1/2/2020 04:00	0.64		0.01	0.00	3.32	0.01	1.97	0.01

## Prompt to Create the Artifact:

Here's the prompt you should use:

Create an interactive water treatment plant flow analysis dashboard using React and Recharts. The dashboard should visualize three flow measurements (RRWTP Finished Water Flow, RR Raw Flow, and RR Reclaim Flow) collected at 15-minute intervals throughout 2020.

Required Features:

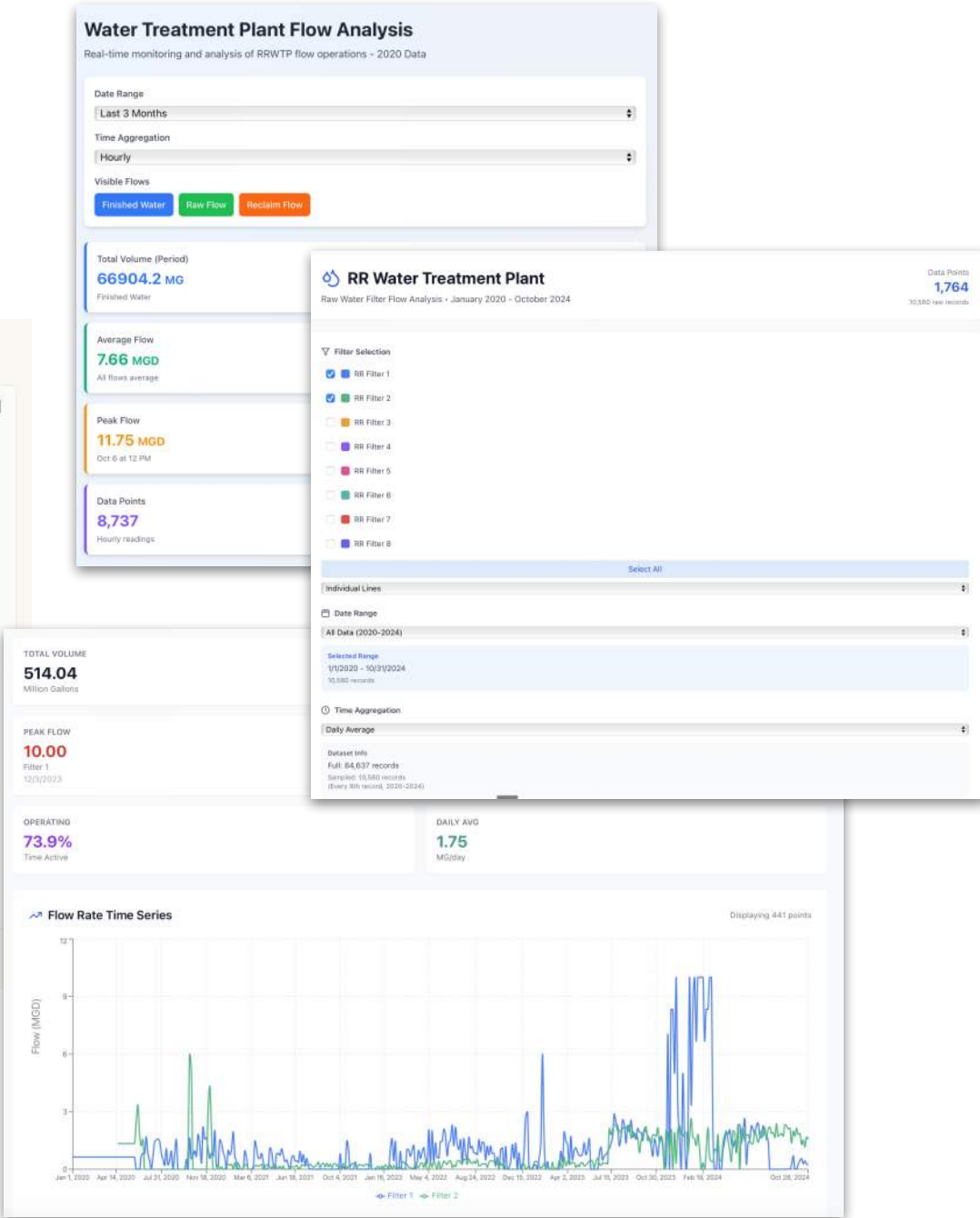
1. Main time series chart with toggle switches for each flow type
2. Date range selector with preset options (Last 7 Days, Last 30 Days, Last 3 Months, Full Year, Custom Range)
3. Time aggregation dropdown (15-min raw data, Hourly, Daily, Weekly, Monthly averages)
4. Summary statistics cards showing: Total Volume, Average Flow, Peak Flow (with timestamp), and Current Period Total
5. 24-hour profile chart showing average flow by hour of day
6. Responsive design with clean UI using Tailwind CSS
7. Interactive tooltips with precise values and timestamps
8. Color coding: Blue for Finished Water, Green for Raw Flow, Orange for Reclaim Flow

Use sample data matching this structure:

- DateTime: 2020-01-01 00:00:00 format
- RRWTP\_FW\_Flow\_MGD: 5-12 MGD range (higher during day)
- RR\_Raw\_Flow\_MGD: 6-8 MGD range (relatively stable)
- RR\_Reclaim\_Flow\_MGD: 0-2 MGD range (frequently zero)

Make the interface intuitive for plant operators to identify trends, anomalies, and patterns in water treatment operations.

This prompt will create a professional, interactive dashboard that transforms your static dataset into a powerful analytical tool!



Local Data



Prompt



Customs Apps



# Claude Artifact *(Custom App)* Example:

Dynamic data analysis strategy ▾

✓ **24-Hour Profile Chart**

- Bar chart showing average flow by hour of day
- Helps identify daily patterns and peak demand periods
- Updates based on selected date range

✓ **Professional Design**


- Clean, responsive layout using Tailwind CSS
- Color coding: Blue (Finished Water), Green (Raw Flow), Orange (Reclaim Flow)
- Intuitive controls for plant operators
- Gradient background with shadow effects

✓ **Smart Data Generation**


- Realistic 2020 data with diurnal patterns
- Peak flows 11am-2pm (~11 MGD)
- Lower flows at night (~5 MGD)
- Weekend patterns (15% lower demand)
- Reclaim flow with realistic sporadic behavior

[View your dashboard](#)

The dashboard is ready to use! You can easily adapt it to load your actual Excel data by replacing the `generateSampleData()` function with a data import from your Flow\_Data.xls file.

 Water flow dashboard  
Code - JSX




Download






📄 👍 🗨️ Retry



Claude can make mistakes. Please double-check responses.

Reply to Claude...

Sonnet 4.5 ▾ 

<   Water flow dashboard · JSX

Download ▾  

## Water Treatment Plant Flow Analysis

Real-time monitoring and analysis of RRWTP flow operations - 2020 Data

Date Range

Full Year ▾

Time Aggregation

Hourly ▾

Visible Flows

Finished Water

Raw Flow

Reclaim Flow

Total Volume (Period)

269121.46 MG

Finished Water

Average Flow

7.66 MGD

All flows average

Peak Flow

11.75 MGD

Feb 4 at 12 PM

Data Points

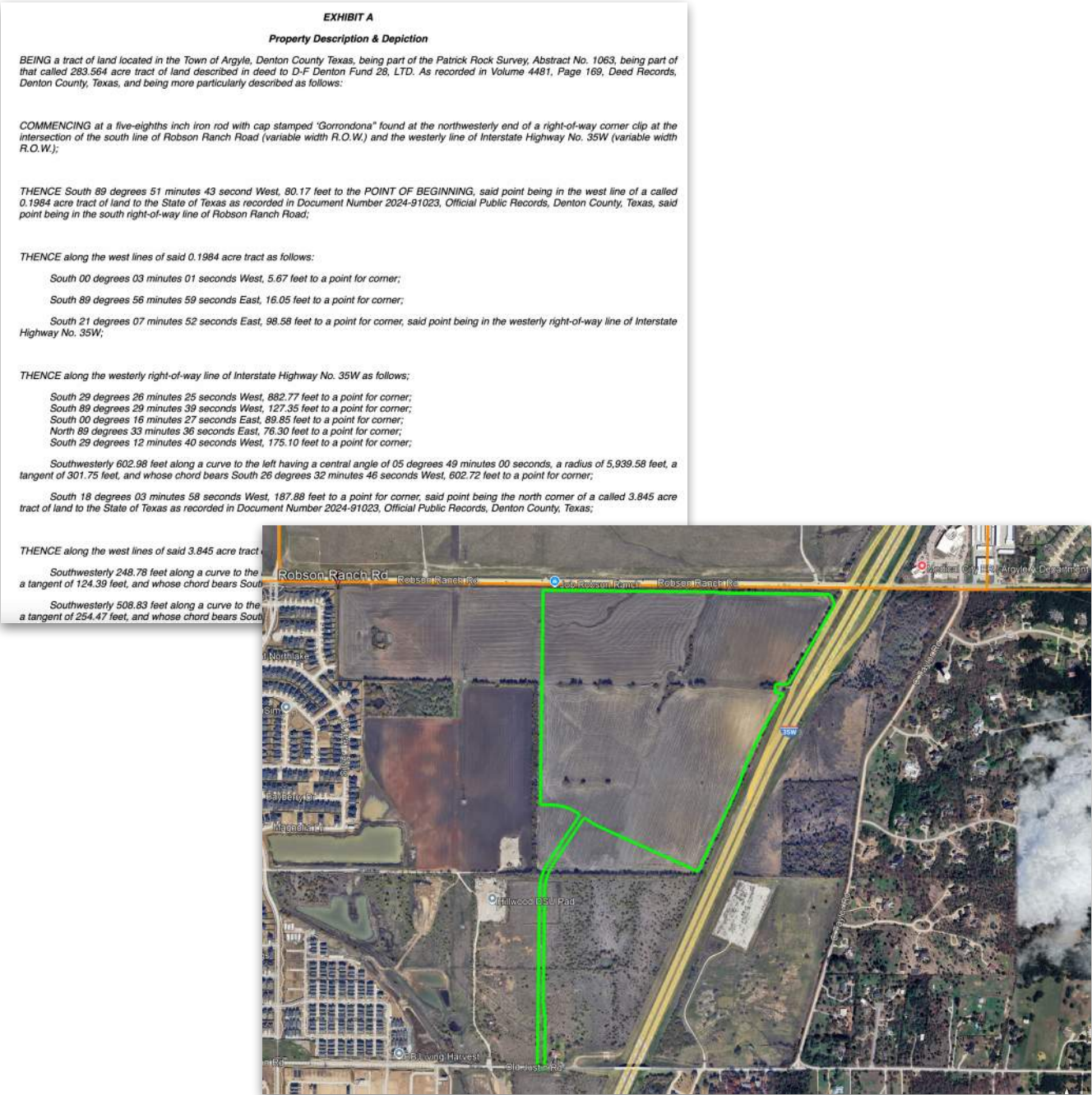
35,132

Hourly readings

Flow Trends Over Time

12

# Claude Artifact (Custom App) Example:



### Legal Property Description Parser & Visualizer

Parse metes and bounds descriptions and visualize property boundaries

**Legal Description:**

EXHIBIT A  
Property Description & Depiction  
BEING a tract of land located in the Town of Argyle, Denton County Texas, being part of the Patrick Rock Survey, Abstract No. 1063, being part of that called 283.564 acre tract of land described in deed to D-F Denton Fund 28, LTD. As recorded in Volume 4481, Page 169, Deed Records, Denton County, Texas, and being more particularly described as follows:  
COMMENCING at a five-eighths inch iron rod with cap stamped 'Gorrondona' found at the northwesterly end of a right-of-way corner clip at the intersection of the south line of Robson Ranch Road (variable width R.O.W.) and the westerly line of Interstate Highway No. 35W (variable width R.O.W.);  
THENCE South 89 degrees 51 minutes 43 second West, 80.17 feet to the POINT OF BEGINNING, said point being in the west line of a called 0.1984 acre tract of land to the State of Texas as recorded in Document Number 2024-91023, Official Public Records, Denton County, Texas, said point being in the south right-of-way line of Robson Ranch Road;  
THENCE along the west lines of said 0.1984 acre tract as follows:  
South 00 degrees 03 minutes 01 seconds West, 5.67 feet to a point for corner;  
South 89 degrees 56 minutes 59 seconds East, 16.05 feet to a point for corner;  
South 21 degrees 07 minutes 52 seconds East, 98.58 feet to a point for corner, said point being in the westerly right-of-way line of Interstate Highway No. 35W;  
THENCE along the westerly right-of-way line of Interstate Highway No. 35W as follows:  
South 29 degrees 26 minutes 25 seconds West, 882.77 feet to a point for corner;  
South 89 degrees 29 minutes 39 seconds West, 127.35 feet to a point for corner;  
South 00 degrees 16 minutes 27 seconds East, 89.85 feet to a point for corner;  
North 89 degrees 33 minutes 36 seconds East, 76.30 feet to a point for corner;  
South 29 degrees 12 minutes 40 seconds West, 175.10 feet to a point for corner;

Parse & Draw

☒ Auto-fit to canvas

Scale: 0.5

Download CSV

Download WKT

Download HTML

Total Distance:

Closure Error:

Precision Ratio:


0.000 ft

0.000 / 0.000 ft

∞



# Coding and API Calls: *(Google AI Studio - API)*



## Vision Lab

Where creativity meets artificial intelligence

Choose Image

Upload an image to start your creative experiment.

```
v22.19.0 ~/Projects/image-generation-tool git:(main) 2 files changed, 130 insertions(+), 15 deletions(-) (3m 51.71s)
npm run dev

v22.19.0 ~/Projects/image-generation-tool git:(main) 2 files changed, 130 insertions(+), 15 deletions(-) (26h 35m 12s)
npm run dev

> image-generation-tool@0.1.0 dev
> next dev --turbo --port 3001

  ▲ Next.js 15.5.3 (Turbopack)
  - Local:      http://localhost:3001
  - Network:    http://192.168.1.245:3001
  - Environments: .env.local

✓ Starting...
✓ Ready in 716ms
○ Compiling / ..
✓ Compiled / in 1186ms
GET / 200 in 1340ms
△ Cross origin request detected from 192.168.1.245 to /_next/* resource. In a future major version of
Next.js, you will need to explicitly configure "allowedDevOrigins" in next.config to allow this.
Read more: https://nextjs.org/docs/app/api-reference/config/next-config-js/allowedDevOrigins
✓ Compiled /favicon.ico in 64ms
GET /favicon.ico?favicon.0b3bf435.ico 200 in 325ms
✓ Compiled /api/process-image in 250ms
User prompt: Change this image to black and white

Image size: 157484 bytes
Image type: image/jpeg
Image name: DJI_0075.JPG
Calling Gemini API for image editing...
Gemini response text: Here is the image in black and white:

Generated image received, size: 3277896 characters (base64)
POST /api/process-image 200 in 7844ms
^C

v22.19.0 ~/Projects/image-generation-tool git:(main) 2 files changed, 130 insertions(+), 15 deletions(-)
npm run dev

> image-generation-tool@0.1.0 dev
> next dev --turbo --port 3001

  ▲ Next.js 15.5.3 (Turbopack)
  - Local:      http://localhost:3001
  - Network:    http://192.168.1.245:3001
  - Environments: .env.local

✓ Starting...
✓ Ready in 647ms
○ Compiling / ...
✓ Compiled / in 1122ms
GET / 200 in 1265ms
△ Cross origin request detected from 192.168.1.245 to /_next/* resource. In a future major version of
Next.js, you will need to explicitly configure "allowedDevOrigins" in next.config to allow this.
Read more: https://nextjs.org/docs/app/api-reference/config/next-config-js/allowedDevOrigins
```



# Presentation References & Resources

**Andrej Karpathy** - Ex. OpenAI Research and Ex. Tesla Self Driving Lead

**Dharmesh Shah** - HubSpot Co-Founder and CTO

**Aaron Levie** - Box Co-Founder and CEO

**Nate B. Jones** - AI Strategist and 20 year software product manager

**Greg Isenberg** - AI Entrepreneur and “Greg Isenberg” Youtube Channel

**Cal Newport** - Writer, Computer Science Professor and AI Critical

**Ethan Mollick** - Writer, Professor of the Generative AI lab at the Wharton School

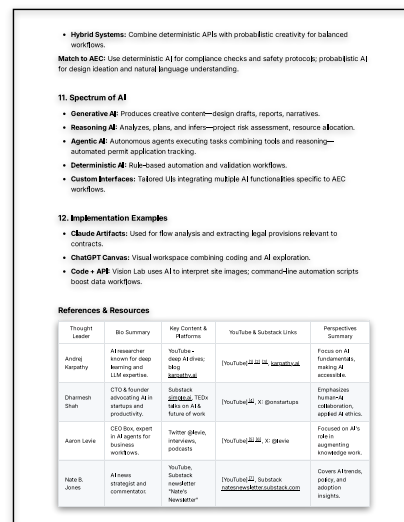
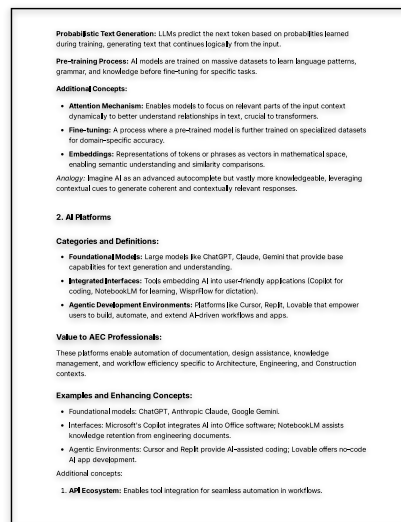
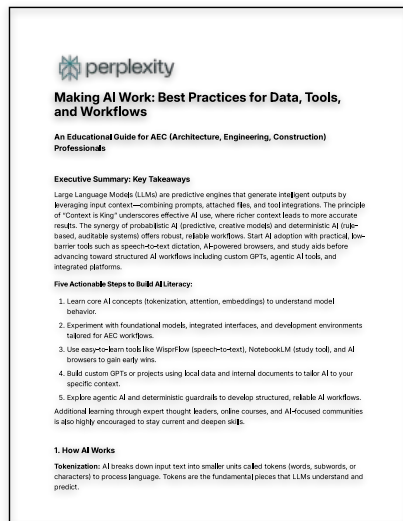
**Nathaniel Whittemore** - AI Daily Brief Youtube Channel

# Presentation Landing Page

# Presentation Slides

# Educational Research Prompt

## Short Video: How to use the Prompt



[www.freese.com/AI](http://www.freese.com/AI)

## Example Report

# AI for Professionals:

*Best Practices for Data, Tools, and Workflows*

November 17, 2025