

Artificial Intelligence and Stormwater

2024 Stormwater Workshop
April 4, 2024



Cory Horton, P.E., CFM, CPESC, ENV-SP
“Not a robot”



AI - “A magic robot solving all the
world’s stormwater problems”

ChatGPT Sprints to One Million Users

Time it took for selected online services to reach one million users



* one million backers ** one million nights booked *** one million downloads
Source: Company announcements via Business Insider/LinkedIn

ChatGPT becomes fastest application to hit 100 million users, overtaking Facebook and Google



The global AI market is currently worth \$136.6 billion

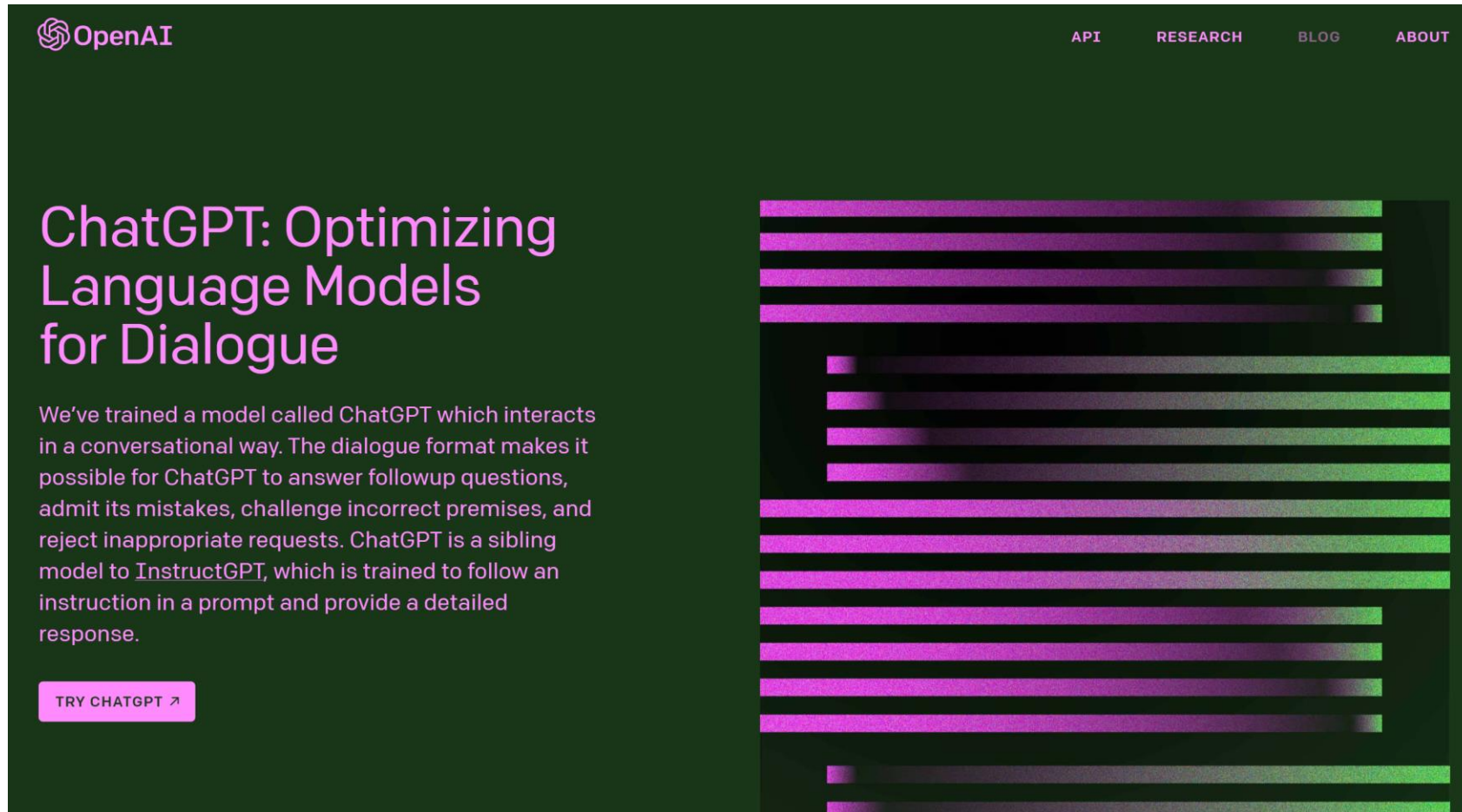
2022

196 Billion in 2023

1.8 Trillion projected in 2030

So - What is Artificial Intelligence?

Let's get the information straight from the source!



The image shows a screenshot of the OpenAI website. At the top left is the OpenAI logo. At the top right are navigation links for API, RESEARCH, BLOG, and ABOUT. The main content area features the article title "ChatGPT: Optimizing Language Models for Dialogue" in a large, bold font. Below the title is a paragraph of text describing the model's capabilities. At the bottom left of the article content is a button labeled "TRY CHATGPT". The right side of the screenshot is partially obscured by a dark, semi-transparent overlay with horizontal lines.

OpenAI

API RESEARCH BLOG ABOUT

ChatGPT: Optimizing Language Models for Dialogue

We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests. ChatGPT is a sibling model to [InstructGPT](#), which is trained to follow an instruction in a prompt and provide a detailed response.

[TRY CHATGPT ↗](#)



You

Give me a 5th grade level of what AI is.



Copilot

Certainly! Imagine **AI (Artificial Intelligence)** as a super-smart computer friend. 🤖 ✨

- **AI can learn:** Just like you learn from books and practice, AI learns from lots of data and examples.
- **AI can think:** It solves problems by following rules and patterns, like figuring out math puzzles.
- **AI can see and hear:** It can look at pictures or listen to sounds and understand what they mean.
- **AI can help:** It assists doctors, plays games, and even talks to you on your phone.

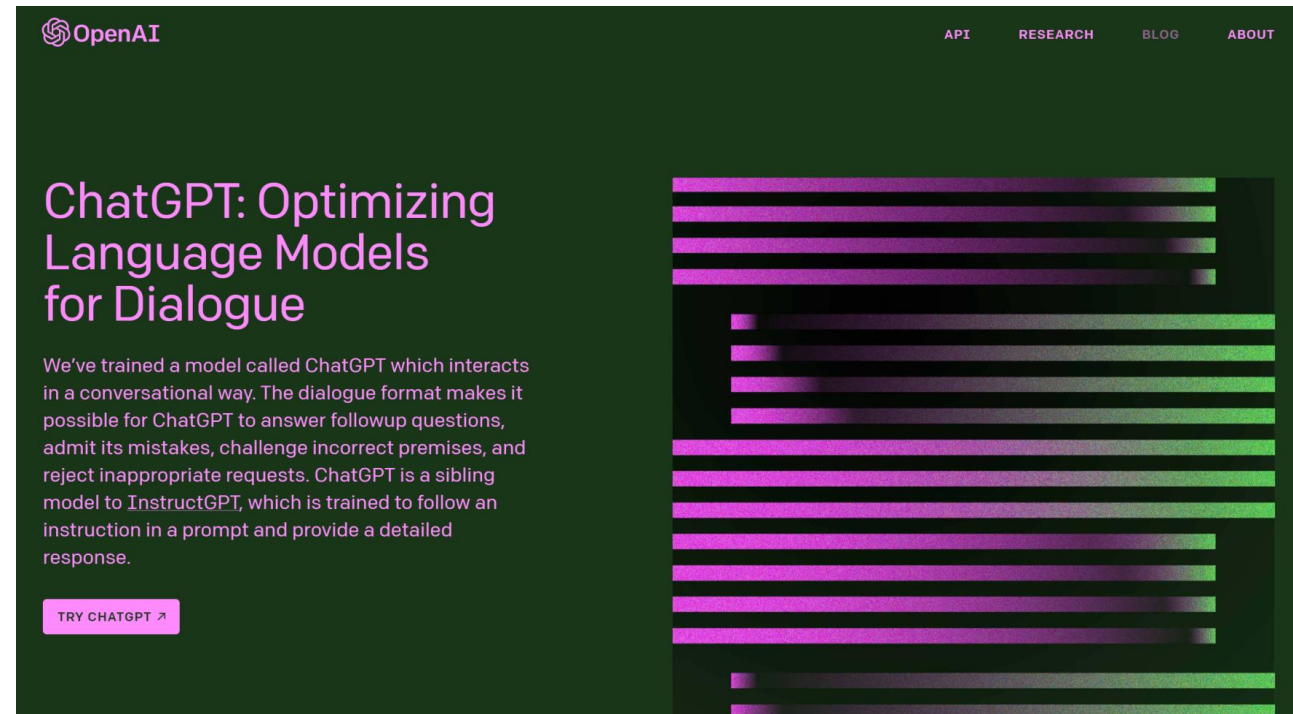
So, AI is like having a clever digital buddy who's always ready to help! ☀️ 😊

AI: The magical blend of algorithms, data, and caffeine that transforms silicon into a digital sorcerer. It can predict your next move, recommend cat videos, and occasionally confuse a toaster for a time machine. 🤖 ✨

I'm watching a webinar on stormwater. Why are we talking about Artificial Intelligence (AI)?

Have you tried playing around with ChatGPT?

Did you know it can solve the worlds greatest mysteries.....



Stormwater or Storm water?????

One word or two?



You

STORMWATER or STORM WATER? Which is correct?



Copilot

Both "STORMWATER" and "STORM WATER" are used, but the more correct one seems to be "STORMWATER" as a single word ¹. This term refers to water that originates from precipitation, including heavy rain and meltwater from hail and snow ². However, you may see both versions used in different contexts. For example, the Federal Water Pollution Control Act uses both spellings ¹. More recent permits from the EPA and specifically the NPDES use "STORMWATER" as a single word ¹. So, while both are technically correct, "STORMWATER" is more commonly used in recent times ¹.

Oh-well - I guess this will be debated.....forever.

Hopefully - I can get you thinking about how to use AI as a tool to save you time and to help solve your stormwater problems.

While there are many different forms of AI, today I am going to focus how to quickly start using text based generative AI in your job.



STORMWATER

(ONE WORD)

Today – I will focus on ChatGPT and Microsoft CoPilot.

STEP 1:

Sign up for an account with ChatGPT (4.0 paid or 3.5 unpaid).

OR

You can directly use Microsoft Copilot (built into Edge/Bing/etc.)

STEP 2:

Jump in and play!!!



Examples of how AI can be helpful.....

Quick document searches.....



Copilot

In Waukesha County, Wisconsin, stormwater management and erosion control permits are required for specific land development and land disturbing activities. Here are the key criteria for when a permit is necessary:

1. Stormwater Management Permit:

- **Subdivision Plats:** Any proposed land development activity that involves a subdivision plat.
- **Addition of Impervious Surfaces:** Land development activities resulting in the addition of 0.5 acres or more of impervious surfaces (that did not exist prior to May 28, 1998), including smaller individual sites within a common plan of development.
- **New Public or Private Roads:** Construction of any new public or private road.
- **Environmentally Sensitive Areas:** Any land development activity, regardless of size, that the Local Reviewing Authority (LRD) determines is likely to cause adverse impacts to environmentally sensitive areas or other properties.

2. Erosion Control Permit:

- **Land Disturbing Activity:** Activities that disturb a total land surface area of 3,000 square feet or more.
- **Excavation or Filling:** Involves excavation or filling exceeding 400 cubic yards of material.
- **Utility Work and Disturbance of Channels:** Laying, repairing, replacing, or enlarging underground utilities, pipes, or other facilities, or disturbing road ditches, grass swales, or other open channels for a distance of 300 feet or more.
- **Maintenance of Existing Stormwater BMPs:** Activities related to maintaining existing stormwater Best Management Practices (BMPs).
- **Environmentally Sensitive Areas:** Any land disturbing activity, regardless of size, that the LRD determines may cause adverse impacts to environmentally sensitive areas or violate erosion control standards.

Drafting documents.....

3. Vegetated Swales and Grass Channels

Training and Responsibilities

1. **Maintenance Personnel:**

- Designate responsible individuals for BMP maintenance.
- Provide training on inspection procedures.
- Ensure personnel understand the importance of BMPs.

Conclusion

This maintenance plan aims to promote sustainable stormwater management practices within the project area. Regular inspections, timely maintenance, and adherence to the plan will contribute to the overall success of our stormwater management efforts.

Please consult the full Waukesha County Stormwater Ordinance for additional guidance and requirements.

- Submit an annual report to the Waukesha County Land Resources Division (LRD).
- Include inspection findings, maintenance performed, and any BMP repairs.
- Address any non-compliance issues.

Emergency Response

1. **Storm Events:**

- Inspect BMPs after significant storm events.
- Address any damage promptly.
- Report emergencies to the LRD.

Targeted web searches.....



ChatGPT

In Wisconsin, there are several potential sources of grants for streambank stabilization projects:

on,
s.
s:



ChatGPT

The grant application deadline for the Great Lakes Restoration Initiative (GLRI) Sediment and Nutrient Reduction Program in 2024 is April 29, 2024, at 5 p.m. Eastern Time ([GLRI](#)).



...ing activities and programs along the Great Lakes and Lake Michigan

These grants may support activities such as erosion control and habitat restoration.

s,

3. **Great Lakes Restoration Initiative (GLRI):** Wisconsin receives funding through the GLRI, which supports projects that address water quality issues and habitat restoration in the Great Lakes region. Streambank stabilization projects that improve water quality and enhance habitat may be eligible for funding through GLRI grants.

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Automate tasks



You

write a job description for an entry level stormwater engineer

Entry-Level Stormwater Engineer¶

Job Overview:¶

As an entry-level stormwater engineer, you will play a crucial role in designing and implementing solutions to manage stormwater runoff, prevent erosion, and protect water quality. You'll work closely with senior engineers and project managers to contribute to various projects related to stormwater management, flood control, and environmental sustainability.¶

Responsibilities:¶

1. → Design and Planning:¶

- → Assist in the design and preparation of erosion control, hydrology, and drainage plans.¶
- → Collaborate on post-construction stormwater management strategies.¶
- → Develop construction plans and reports related to stormwater infrastructure.¶

2. → Field Work:¶

- → Conduct site visits to assess existing stormwater systems and identify areas for improvement.¶
- → Assist in field investigations, data collection, and monitoring.¶

3. → Modeling and Analysis:¶

- → Use software tools to model stormwater flow, sediment transport, and pollutant removal.¶
- → Analyze data to optimize stormwater management practices.¶

4. → Regulatory Compliance:¶

- → Ensure compliance with local, state, and federal regulations related to stormwater management.¶
- → Assist in permitting processes for stormwater projects.¶

5. → Collaboration:¶

- → Work closely with multidisciplinary teams, including civil engineers, environmental scientists, and landscape architects.¶
- → Communicate effectively with clients, contractors, and regulatory agencies.¶

6. → Project Support:¶

- → Assist in project coordination, budgeting, and scheduling.¶
- → Prepare technical reports and documentation.¶

Qualifications:¶

- → Bachelor's degree in civil or environmental engineering (or related field).¶
- → Proficiency in engineering software (e.g., AutoCAD, HEC-RAS, SWMM).¶
- → Strong analytical and problem-solving skills.¶
- → Excellent communication and teamwork abilities.¶
- → Passion for environmental stewardship and sustainable design.¶

Career Growth:¶

As you gain experience, you'll have opportunities to take on more complex projects, lead your own initiatives, and specialize in specific areas of stormwater engineering.¶

A starting point



write a short outline to a watershed based plan



Here is a short outline for a watershed-based plan:

I. Introduction

- A. Background information on the watershed
- B. Purpose and scope of the plan

II. Watershed Assessment

- A. Description of the watershed's physical characteristics
- B. Analysis of land use and land cover
- C. Identification of water quality issues
- D. Evaluation of habitat conditions

III. Goals and Objectives

- A. Identification of overarching goals for the watershed
- B. Specific objectives to achieve these goals

IV. Management Strategies

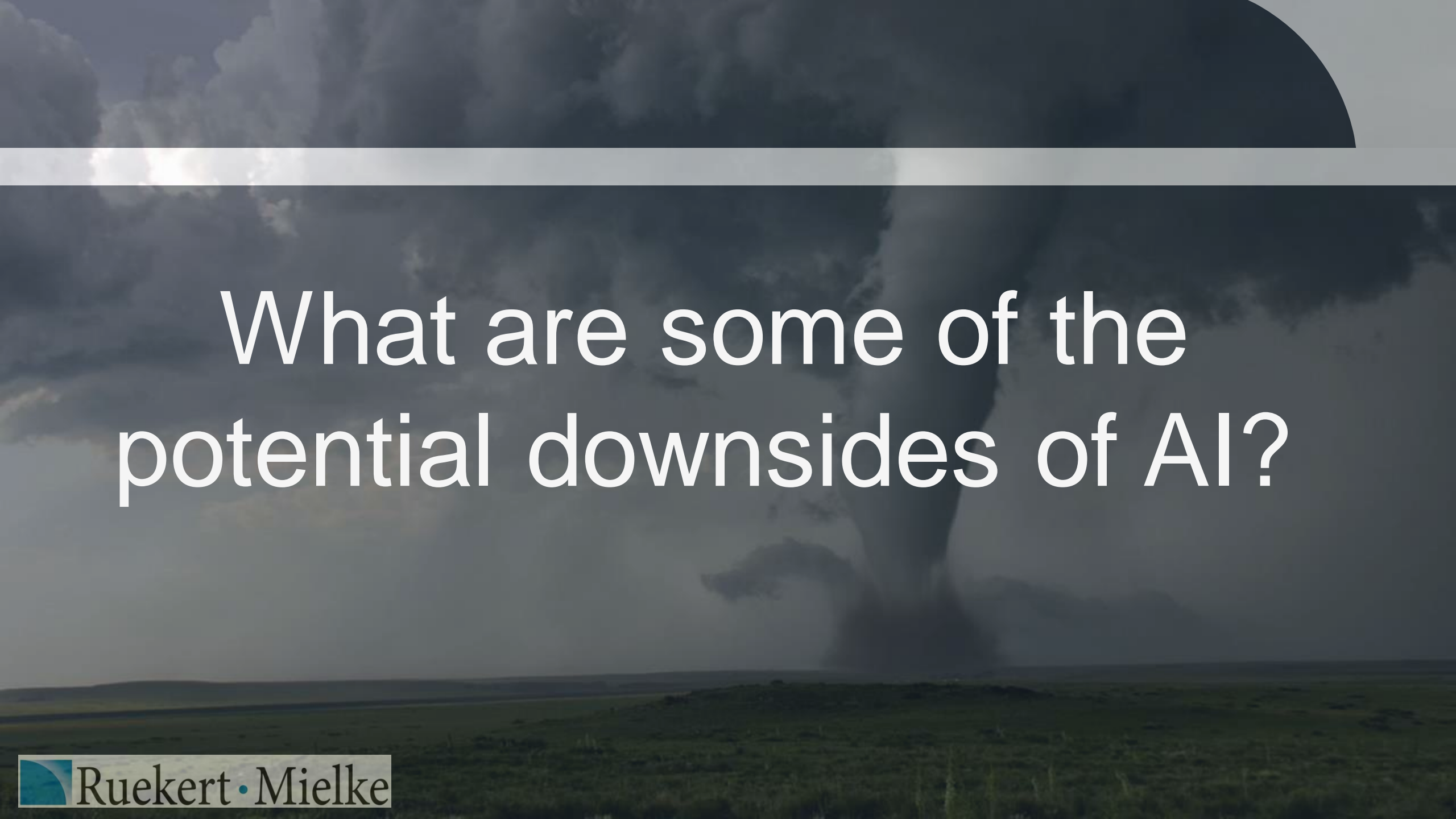
- A. Description of management strategies to achieve objectives
- B. Identification of potential partners and stakeholders
- C. Implementation and monitoring plans

V. Outreach and Education

- A. Description of outreach and education efforts
- B. Target audience and messaging strategies
- C. Evaluation of outreach and education efforts

VI. Conclusion

- A. Summary of the plan
- B. Identification of next steps and future considerations.



What are some of the
potential downsides of AI?



Not always correct

Bias

Creative thought

Data privacy.....

Takeaways

- Try it! Think about things you do and see if AI can help.
- Don't use AI to do things beyond your knowledge.
- Always double check!
- Stay creative!

Questions?

