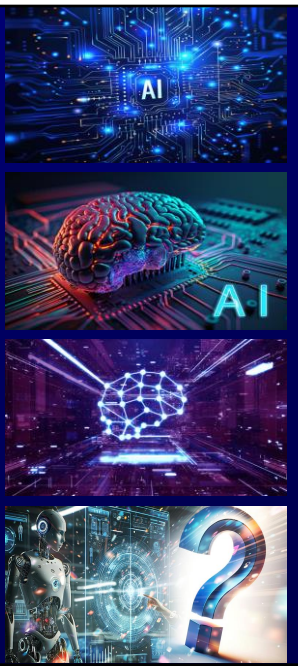
A Brief Overview of AI and Its Application in Photo Editing

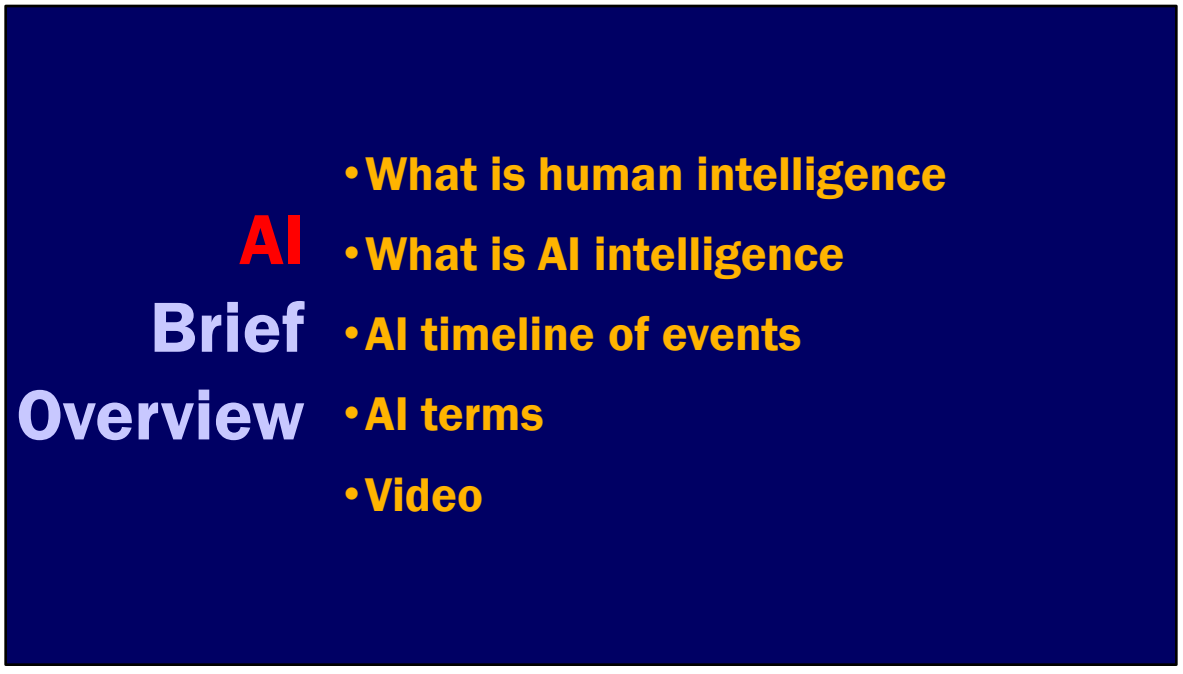
A presentation by Tony Poulos for the December 5, 2024, Computer Club Meeting



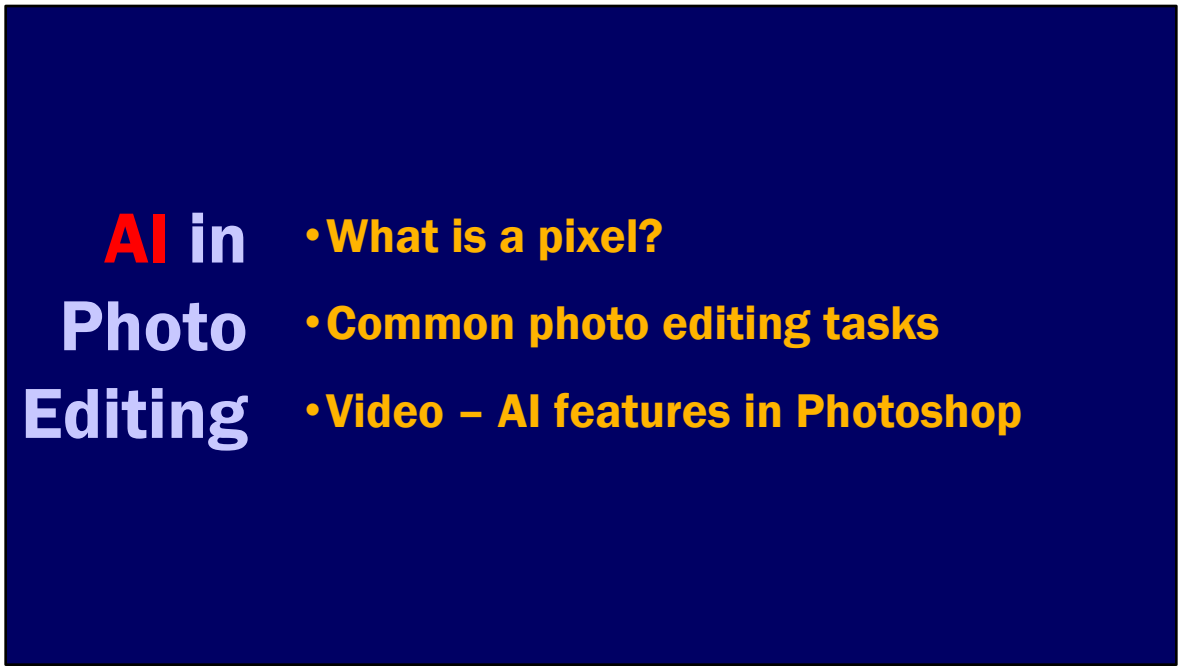
Good afternoon. Thank you for attending. This afternoon, we're going to take a brief look at AI and a more detailed look at the use of AI in photo editing. I hope you enjoy the presentation.

AI Brief Overview

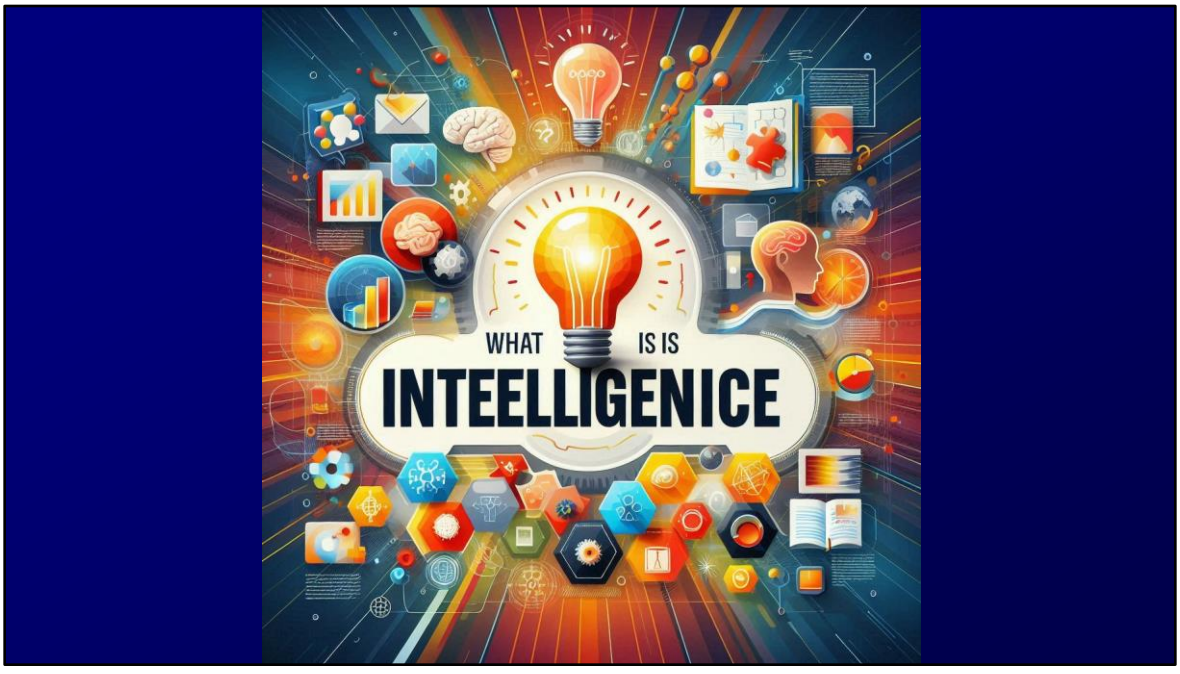
- What is human intelligence
- What is AI intelligence
- AI timeline of events
- AI terms
- Video



Here’s the material we’re going to cover.

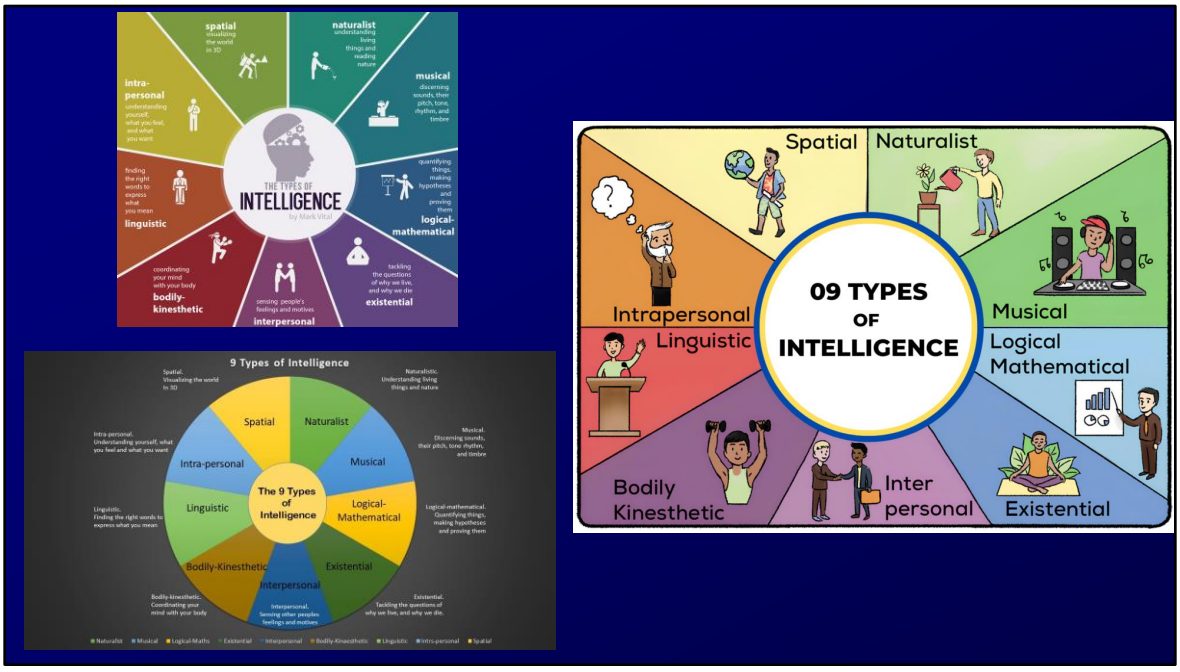


Here's the material we're going to cover.
I wanted to start with a definition of human intelligence as background. But I wanted a good graphic to use to introduce the topic so I asked AI to generate one.
Here's what it did.

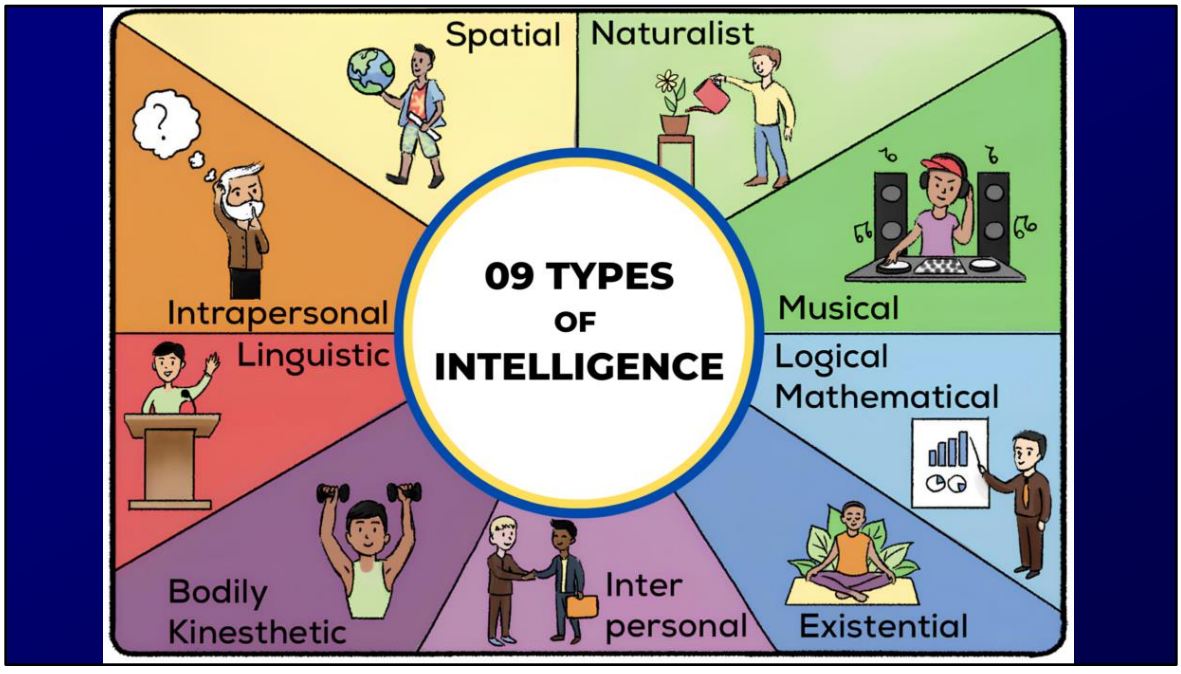


So, first lesson. Use current AI with caution.

It could do better. Here are some images that are better.



The definition of human intelligence isn't so easy. It turns out different people have described intelligence differently. Many use several categories, nine being common.



An overall definition: Human intelligence refers to the ability of humans to learn from experience, adapt to new situations, understand and handle abstract concepts, and use knowledge to manipulate one's environment.

Overall, intelligence is not just one thing but a combination of various abilities that allow individuals to navigate the world, solve problems, and create new ideas.

What is Human Intelligence?

The ability to
learn from experience,
adapt to new situations,
understand and handle abstract concepts,
use knowledge to control an environment

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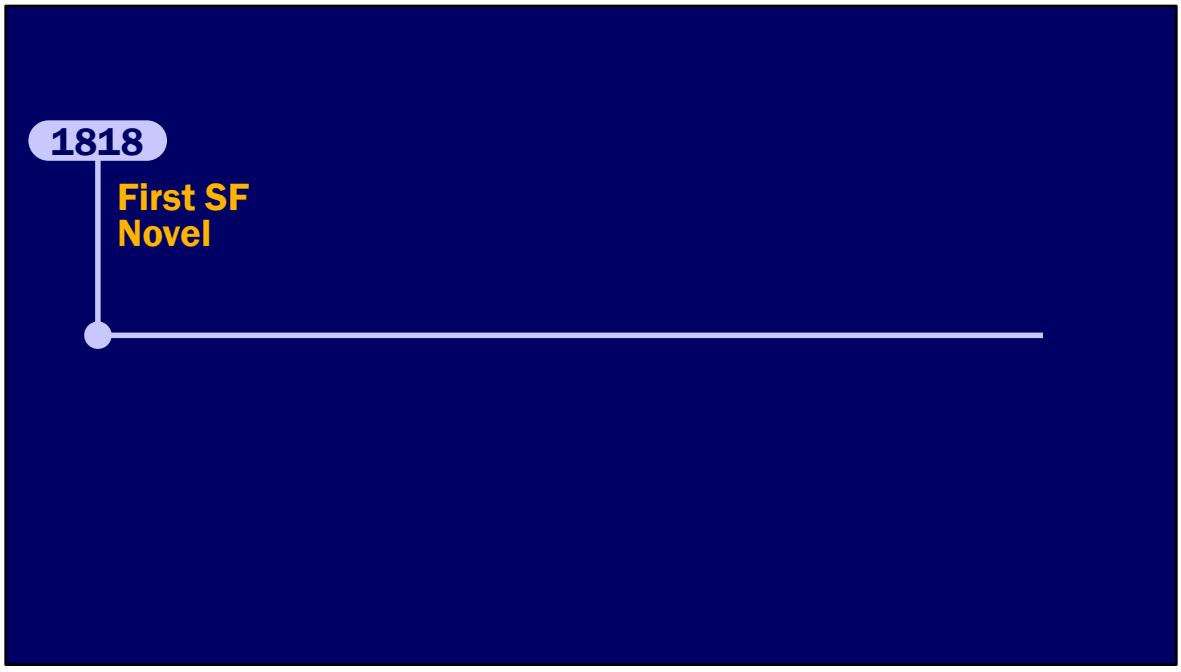
What is AI?

The capabilities of machines to perform tasks that typically require human intelligence

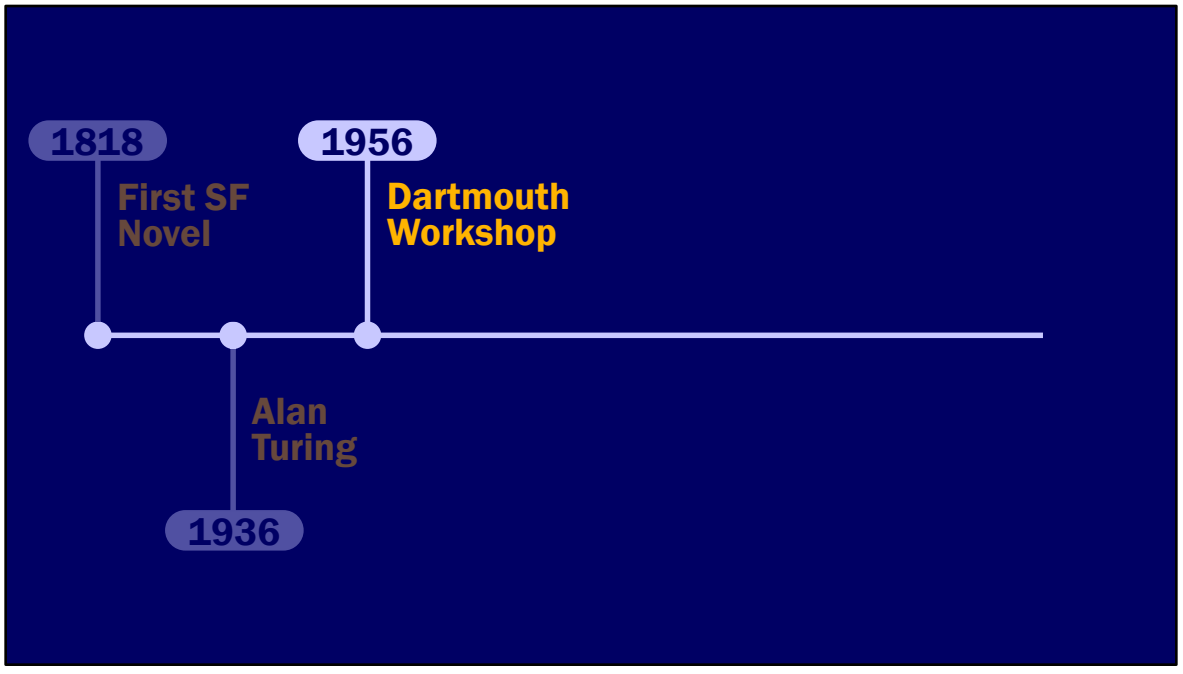
The definition of artificial intelligence is a little easier. It's the capability of machines to perform tasks that typically require human intelligence.

These tasks include learning from data, recognizing patterns, making decisions, and solving problems.

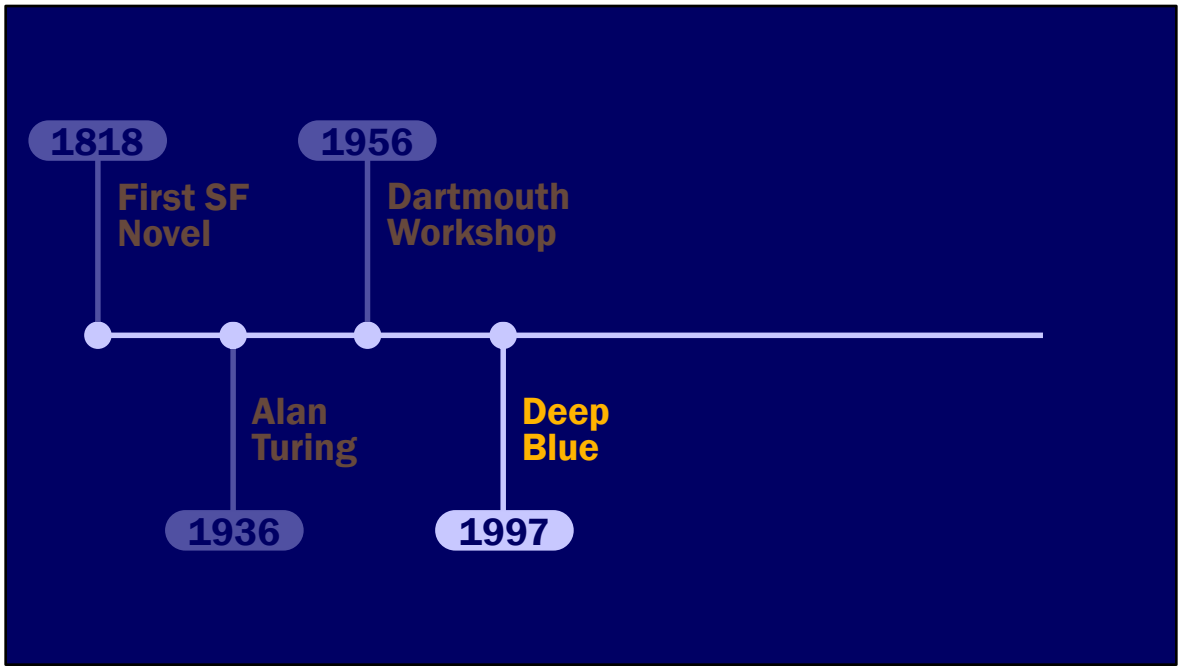


1818 – The first Science Fiction novel. More about this and why it's important later.

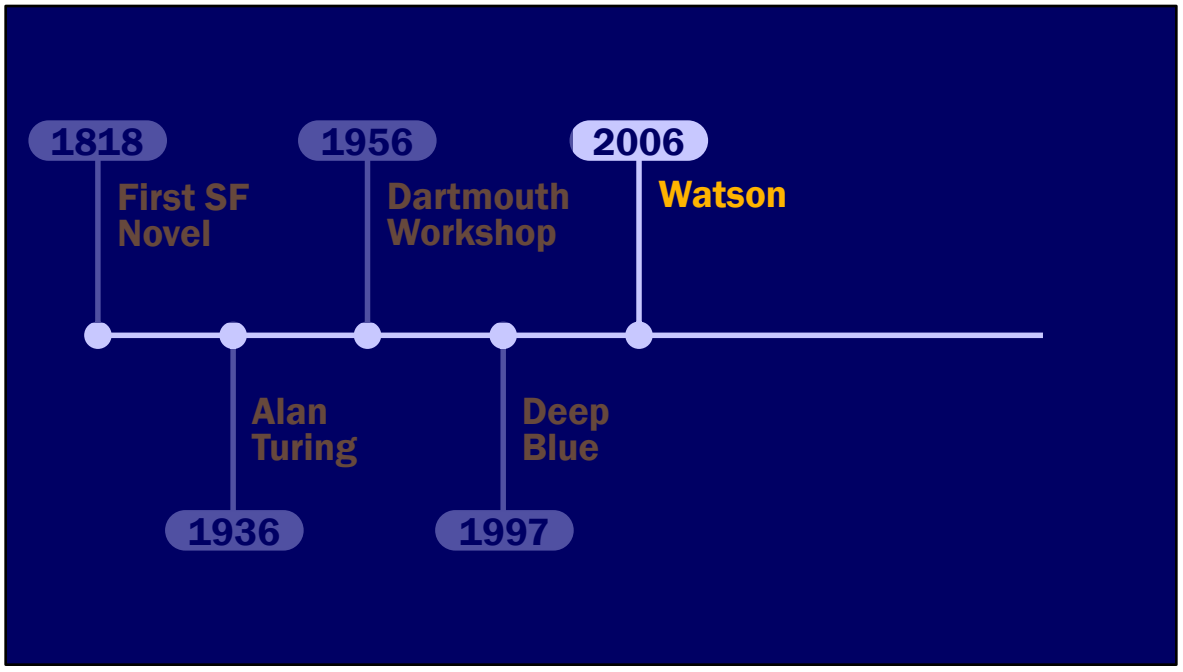
1936 – Alan Turing proposed the concept of a universal machine and the idea of machine intelligence. In 1950 he proposed a deceptively simple method of determining whether a machine can demonstrate human intelligence. It's called the Turing Test. If a machine can engage in a conversation with a human without being detected as a machine, it has demonstrated human intelligence. The first time a computer passed this test was in 1966 but it's not universally accepted.



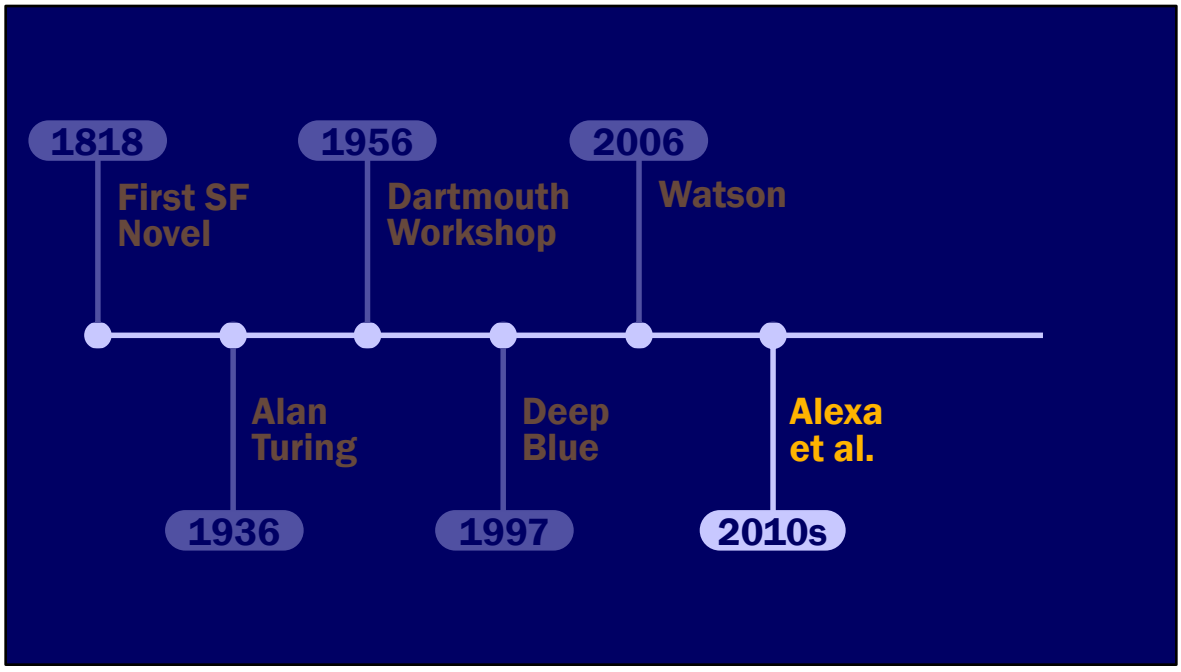
1956 – Dartmouth Workshop – Considered the birthplace of AI as a field of study. This workshop is widely considered the founding event of artificial intelligence as a field. It was organized by John McCarthy, a computer and cognitive scientist. He's the first to use the term "artificial intelligence." He is considered the father of AI.



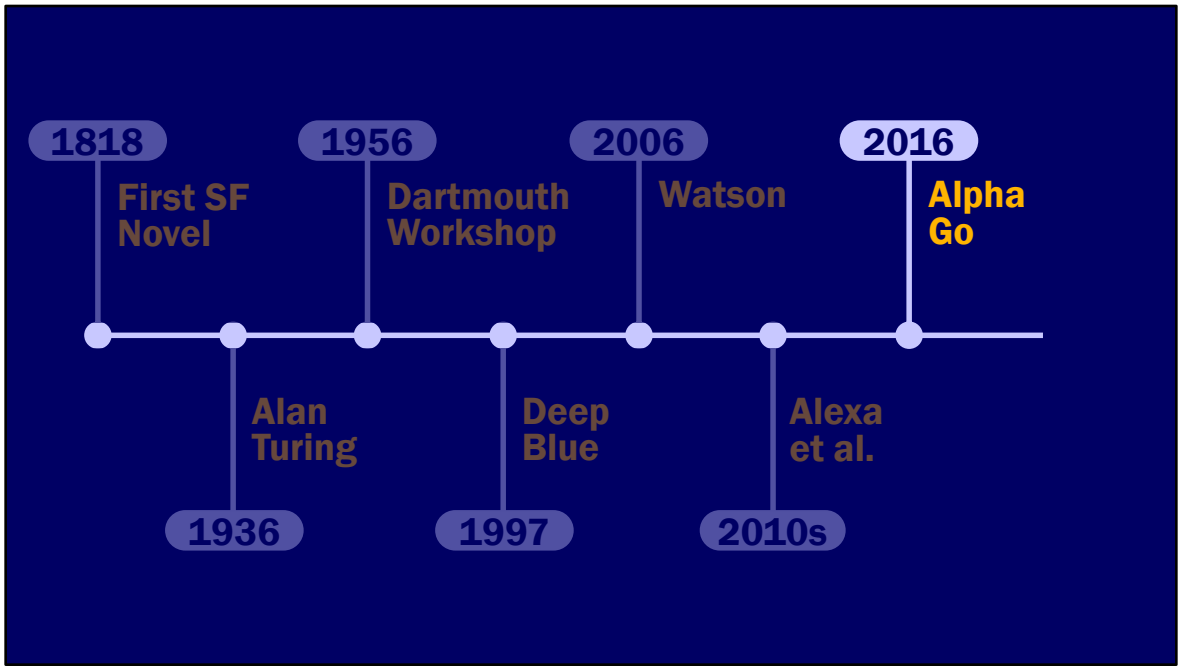
1997 – Deep Blue was an IBM chess-playing program that defeated the world champion Gary Kasparov. It could evaluate 200 million positions per second. It was a significant milestone in the history of AI.



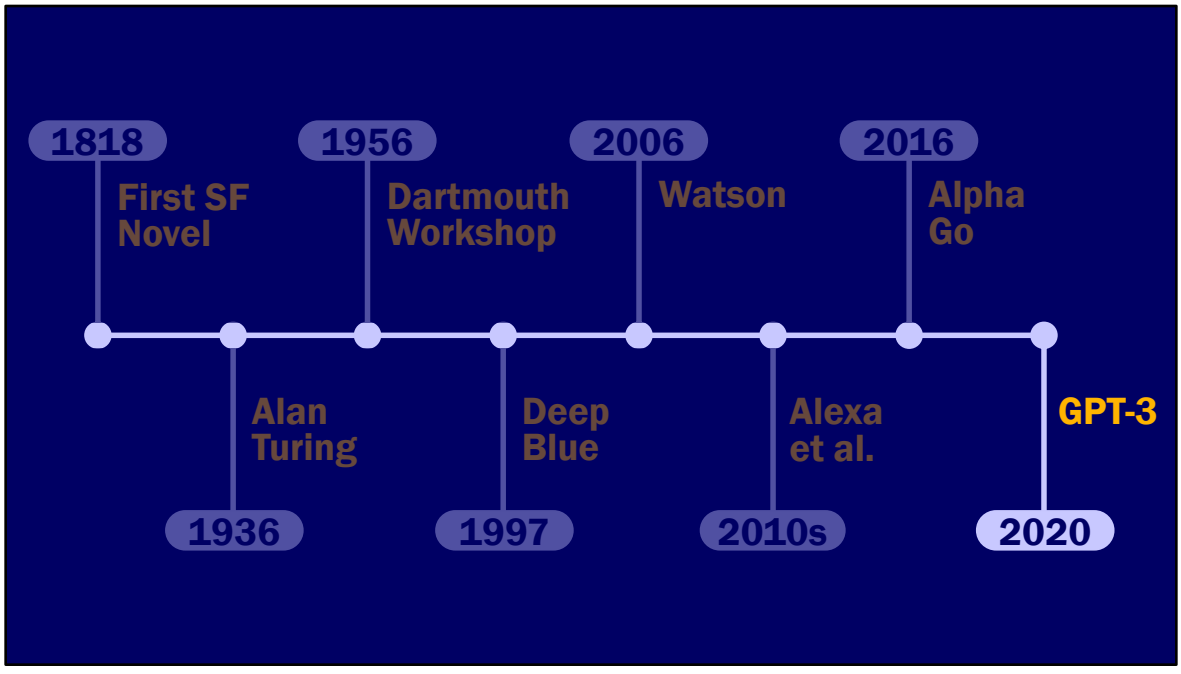
2006 – IBM Watson's victory on the game show Jeopardy! showcased the potential of AI in understanding and responding to natural language.



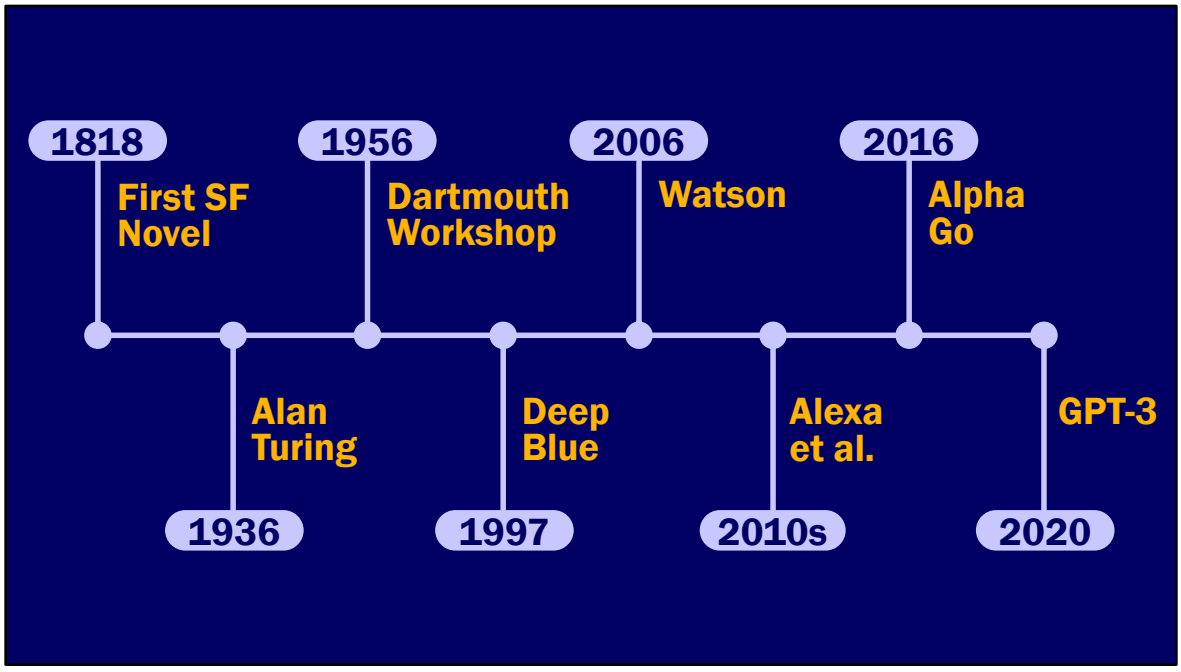
2010s – Voice Assistants like Siri, Alexa, Google Assistant, and Cortana brought conversational AI into the mainstream and integrated with various devices and services.



2016 – Google's AlphaGo defeated the 18-time world champion. This was considered a landmark event in AI history and demonstrated the potential of AI to tackle complex problems that were previously thought to be beyond its reach.



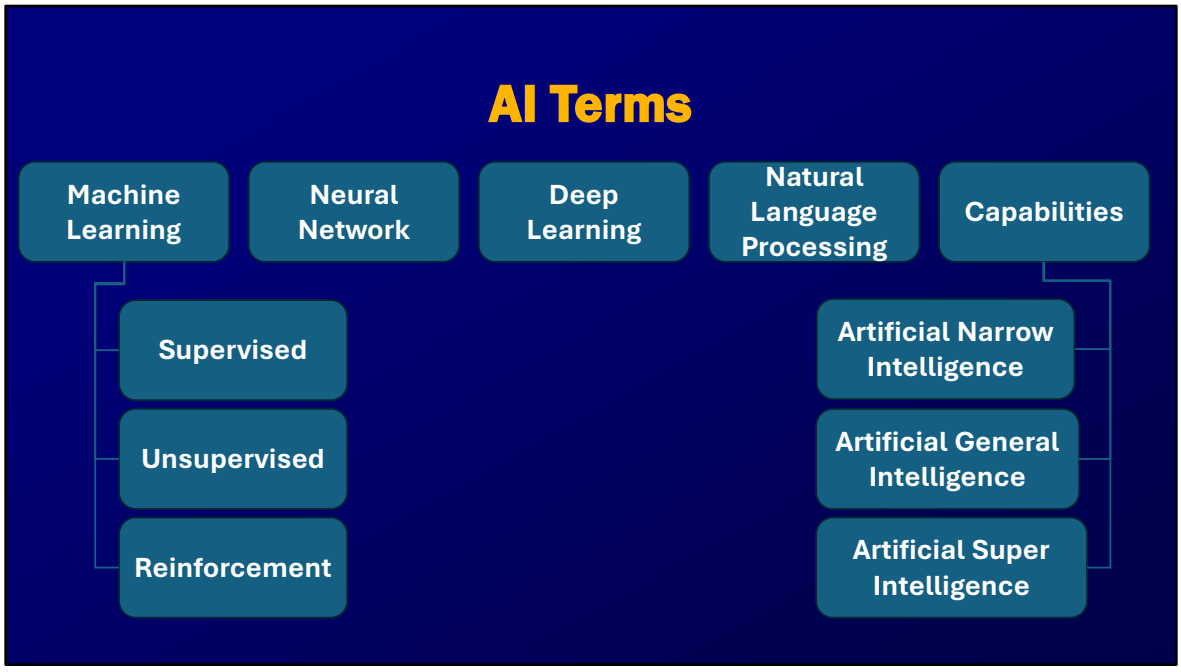
2020 – GPT-3. An advanced language model was developed by the company OpenA. It demonstrated significant advancements in natural language understanding and generation, and has influenced many AI applications. In 2023 a later model is generally considered to be the first, but not for sure.



Hal and Dave are next

2001 video, 7 seconds– Hal, open the pod bay doors

The line comes from the 1968 film *2001: A Space Odyssey*.



Machine learning can be broadly classified into three main types.

1. **Supervised Learning**:

- The model is trained on labeled data, where the input data is paired with the correct output. The model learns to map inputs to outputs based on the examples it has seen.

- Image Classification: The model learns to identify objects in images, such as recognizing cats and dogs, based on labeled training images.

2. **Unsupervised Learning**:

- The model is given unlabeled data and must find patterns and relationships within the data without explicit instructions on what to predict. The focus is on uncovering hidden structures.

- Clustering: Grouping customers based on purchasing behavior to identify market segments.

3. **Reinforcement Learning**:

Involves training a program to make a sequence of decisions by rewarding it for good actions and penalizing it for bad actions. The model learns to maximize cumulative rewards over time.

- Game Playing: Training an AI to play games like chess or Go by rewarding it for winning moves.

Neural Networks: Computing systems vaguely inspired by the biological neural networks that constitute our brains. They are used to recognize patterns and interpret data.

Deep Learning: A subset of machine learning where neural networks with many layers (hence "deep") recognize and extract relevant features from raw data to make decisions.

Natural Language Processing (NLP): The ability of a computer program to understand and process human language as it is spoken.

Capabilities: AI is commonly categorized into three levels based on its capabilities. Here are some examples using a personal assistant.

1. **Narrow AI (Weak AI)**:

- A Narrow AI personal assistant can manage specific tasks like setting reminders, sending messages, or playing music. It follows predefined commands and can handle repetitive, routine tasks efficiently. **Think of digital assistants** like Siri or Alexa—they're excellent at performing their designated functions but cannot generalize beyond them.

2. **General AI (Strong AI)**:

- A General AI personal assistant can understand and perform a wide range of tasks beyond simple commands. It can learn from your habits, adapt to new tasks, and even make decisions based on past interactions. **For example,** it could help you plan a trip, suggest personalized itineraries, manage your schedule across different contexts such as work, personal life, health and fitness, and learning and development; and

even engage in meaningful conversations on various topics.

3. **Superintelligent AI**:

- A Superintelligent AI personal assistant goes beyond mere assistance. It anticipates your needs before you even express them, optimizes your daily routine for maximum efficiency, and provides insights and solutions that far surpass human capabilities**. For example,** it could predict future trends in your industry, help you make strategic life decisions, and continuously improve itself to serve you better.

https://www.msn.com/en-us/news/technology/artificial-intelligence-mankind-s-last-invention/vi-BB1mNp2F?ocid=msedgdhp&pc=U531&cvid=76b3c46eae8b4fb8a48a1391b6970223&ei=21

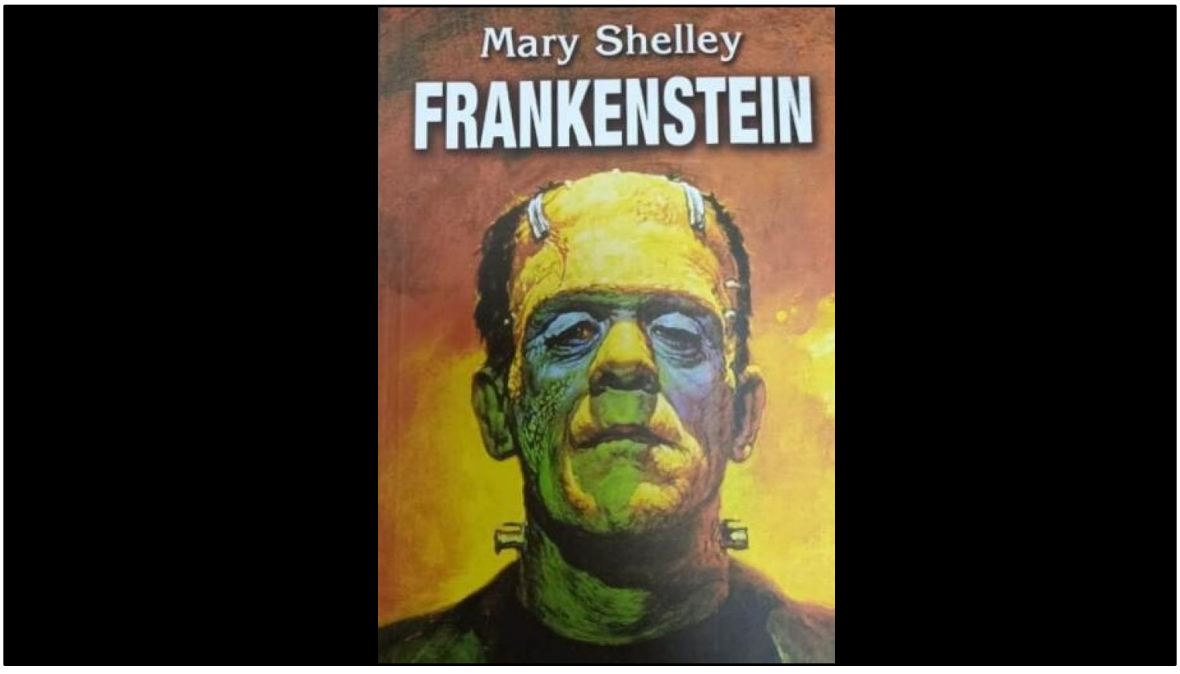
Conclusion (18:52)

I'm going to conclude the AI portion of the presentation with this
19-minute video.

https://www.youtube.com/watch?v=Pls_q2aQzHg
20 minute video about AI starting with a Go game

The Book from 1818?

First SF novel. A scientist who creates something that he didn't fully understand and didn't know how to control.


Mary Shelley
FRANKENSTEIN

AI in Photo Editing

Transforming Images with Artificial Intelligence

Pixels

- Pixels are picture elements
- Typical image has 10 megapixels
- Each pixel can be 16,777,216 different colors

Video, 24 seconds
Zooming on the picture to show individual pixels

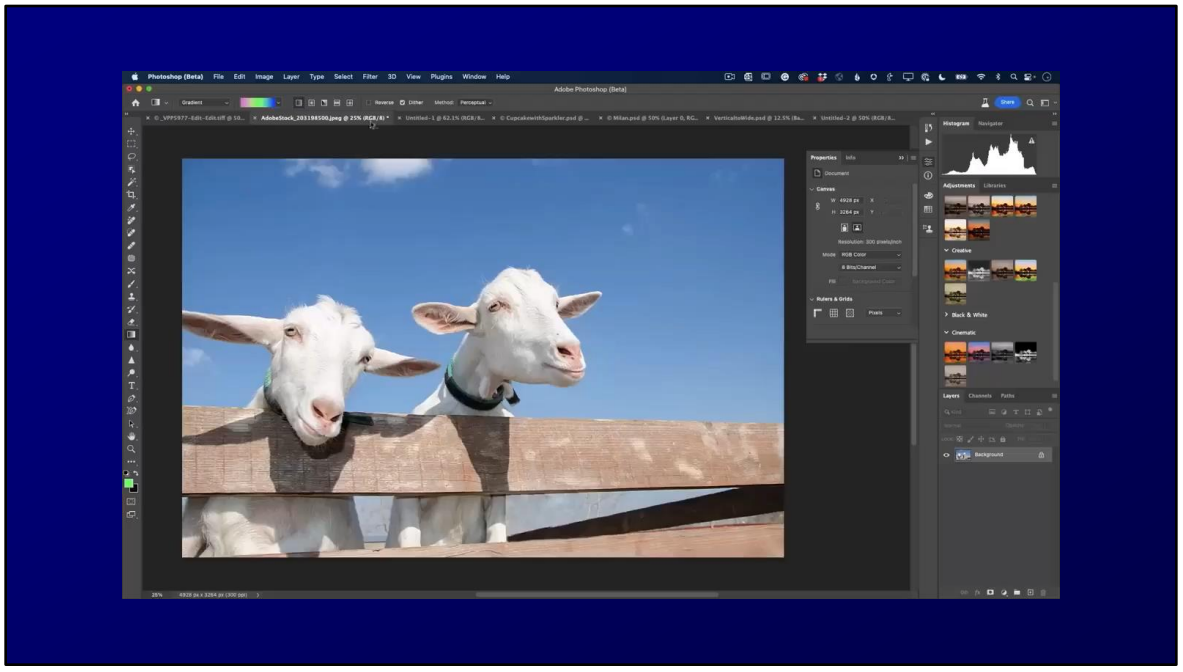
Common Photo Editing Tasks

- Changing tones (brightness, contrast) and color (hue, saturation)
- Removing or moving objects
- Adding objects
- Sharpening
- Replacing the sky
- Isolating subjects from the background
- Repairing old or damaged photos
- Tagging and organizing photos by identifying faces

Common Photo Editing Tasks

- Changing the overall photo
- Changing specific parts

Terry White Video next


Photoshop (Beta)
File
Edit
Image
Layer
Type
Select
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3D
View
Plugins
Window
Help
Adobe Photoshop (Beta)
Share
Histogram
Navigator
Properties
Info
Document
Canvas
Rulers & Grids
Adjustments
Libraries
Creative
Black & White
Cinematic
Layers
Channels
Paths
Background

What We've Looked At

AI Brief Overview

- What is human intelligence
- What is AI intelligence
- AI timeline of events
- AI terms
- Video – AI, Mankind's last invention???

AI in Photo Editing

- What is a pixel?
- Common photo editing tasks
- Video – AI features in Photoshop

Questions?