

# AI: Unleashing the Power of Large Language Models

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# Contents



# Welcome

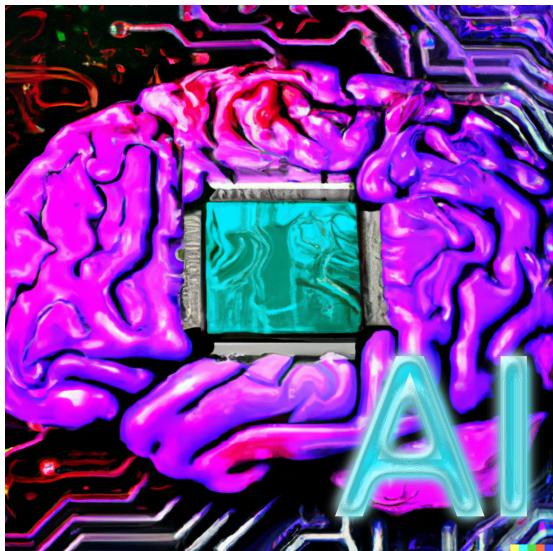
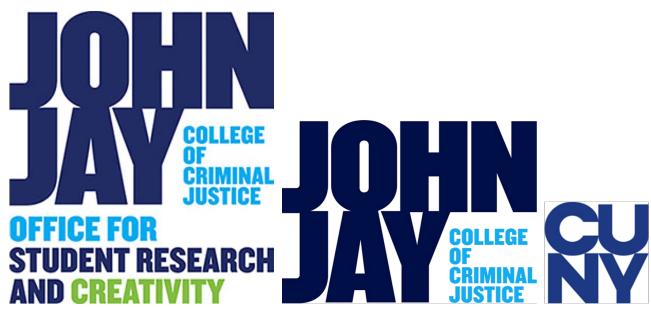


Figure 1: Generated by DALL-E



The rapid advancement of Artificial Intelligence (AI) presents both challenges and opportunities for educators and students alike. Professors are confronted with the daunting task of addressing the emerging issue of academic dishonesty

fueled by AI technology. With tools that can generate essays, solve problems, and even mimic human responses, detecting plagiarism and ensuring the authenticity of students' work becomes increasingly complex. This challenge compels educators to adapt their teaching methodologies, implement innovative assessment techniques, and employ AI-powered plagiarism detection tools to maintain academic integrity and uphold the value of education.

## Overview

### 1 Introduction to Artificial Intelligence (AI)

1. Brief history and evolution of AI
2. Types of AI: Narrow AI vs. General AI
3. AI applications in various industries

### 2 Understanding Large Language Models

1. What are large language models?
2. How do they work? (Transformer architecture)
3. GPT (Generative Pre-trained Transformer) models overview

### 3 Exploring ChatGPT

1. Introduction to ChatGPT and its capabilities - Use cases of ChatGPT in real-world scenarios

### 4 Exploring to LLaMA-v2

1. Introduction to LLaMA-v2 and its capabilities - Use cases of LLaMA-v2 in real-world scenarios

### 5 Exploring to Bard

1. Introduction to Bard and its capabilities - Use cases of Bard in real-world scenarios

### 6 Applications with Large Language Models

1. Natural language understanding and generation - Sentiment analysis and opinion mining

2. Text summarization and content generation
3. Image generation

## 7 Ethics and Challenges

1. Bias in AI and language models
2. Mitigating bias and ensuring fairness
3. Ethical considerations in deploying AI models

## 8 Showcase Activity: Using Chatgpt, Bard, and other LLM

1. Participants will work in groups to create a simple AI-powered chatbot using ChatGPT or similar technology
2. They will design conversation flows, train the model, and integrate it into a user interface
3. Each group will present their chatbots to the rest of the participants

## 9 Future Trends and Beyond

1. Ongoing advancements in large language models
2. Impacts on industries such as healthcare, education, customer support, and more - The role of human-AI collaboration in the future
3. Adapting methodologies in the classroom

## 10 Q&A and Wrap-up

1. Open discussion for participants to ask questions and share insights - Recap of key takeaways from the workshop



# Introduction to Artificial Intelligence (AI)

## Brief history and evolution of AI

### The Computer

Computers have existed for hundreds of years , with one of the earliest inventions being the abacus which it's thought to have been invented around the 2nd century BC.

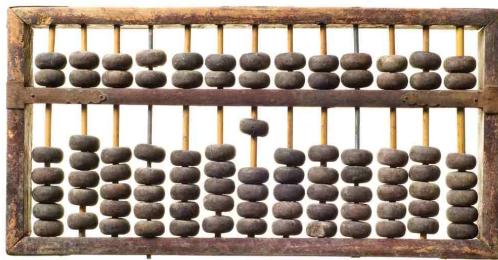


Figure 2: Chinese abacus-suanpan <https://enthu.com/blog/abacus/who-invented-the-abacus/>

The first computers were mechanical computers. This computers were designed to solve complex number intensive problems. Later, it evolved to computers with electronic components. Below a brief timeline on computers(?):

- **1801:** Weaving machine using wooden cards to craft designs automatically onto fabrics
- **1821:** Charles Babbage builds the “difference engine” which is a steam-driven calculator

- **1848:** Ada Lovelace, writes first computer program.
- **1853:** First printing calculator
- **1890:** Punch card system to calculate 1890 U.S Census
- **1931:** Differential Analyer- General purpose mechanical analog computer
- **1936:** Alan Turing, a British scientist and mathematician, introduce the principle of a universal machine, “The Turing Machine” (?) .
- **1937:** John Vincent, proposes to build a first electric-only computer at Iowa State University.
- **1941:** Konrad Zuse completes the Z3, the world’s first electromechanical, programmable computer, in Germany.
- **1945:** The Electronic Numerical Integrator and Computer (ENIAC), the first general-purpose electronic computer, becomes operational in the United States, marking a pivotal moment in computing history.
- **1951:** UNIVAC I, the first commercially produced computer, is delivered to the U.S. Census Bureau, demonstrating the potential for computing in data processing.
- **1969:** ARPANET, the precursor to the internet, is established, connecting four U.S. universities and heralding the digital age.(?)
- **1971:** Intel releases the first commercially available microprocessor, the 4004, a milestone in the development of personal computers. (?)
- **1983:** The introduction of the IBM PC XT and the Apple Lisa popularizes personal computing, paving the way for desktop computing’s widespread adoption.
- **1991:** Tim Berners-Lee creates the World Wide Web, revolutionizing communication and information sharing on a global scale.
- **2007:** Apple releases the iPhone, ushering in the era of smartphones and mobile computing.
- **2011:** IBM’s Watson defeats human champions in Jeopardy!, showcasing the potential of artificial intelligence.
- **2019:** Quantum supremacy is achieved as Google’s quantum computer performs a task faster than traditional supercomputers, signaling a new frontier in computing. ### Birth of AI- 1950 {.unnumbered}

During this time, Alan Turing proposed that machines should be able to use information and reasoning to solve problems and make decisions. On his paper,

“Computing Machinery and Intelligence”(?), Turing discusses how to build this artificial intelligence machines.

However, at the time, machines were only able to execute commands but did not have the ability to store them for later use. Additionally, using a computer could cost up to \$200,000 per month. Thus, there was a need to show investors why AI was worth pursuing

## Proof of Concept - The Logic Theorist

The Logic Theorist, often referred to as the “LT,” was one of the earliest computer programs designed to simulate human problem-solving and mathematical reasoning. Developed by Allen Newell and Herbert A. Simon in 1955, the Logic Theorist was a pioneering artificial intelligence (AI) program.

The “LT” was presented at Dartmouth Summer Research Project on Artificial Intelligence (DSRPAI)(?) in 1956. Although the conference did not fulfill all expectations, many top researchers in various fields agreed upon the idea that artificial intelligence was achievable. (?)

## AI blooming - 1956- 1974

Programs developed during these years were staggering. Computers were being able to solve algebra word problems, proving theorems and even learning to speak. Many believed that fully intelligent machines would be built in less than 20 years which cause DARPA to fund these efforts as well.

## General Problem Solver: ELIZA (?)

- Created at MIT by Joseph Weizenbaum
- Simulated conversation using pattern matching
- Gave an illusion of understanding but lacked real comprehension
- Used separate “scripts” for language capabilities
- Notable script: DOCTOR, emulated psychotherapist
- Responded with non-directional questions
- One of the first chatterbots and Turing test attempts.
- Weizenbaum created ELIZA to explore human-machine communication.
- People attributed human feelings to ELIZA, surprising Weizenbaum.
- Hopes that ELIZA could help individuals with psychological issues and aid doctors.
- Despite its limitations, some believed ELIZA was intelligent and understanding.
- Original ELIZA source-code was missing for decades.
- Recently discovered in MIT archives and published online.

- Source-code showcases historical programming techniques and software layering.

```
Welcome to ELIZA
EEEEE LL IIII ZZZZZZ AAAA
EE LL II ZZ AA AA
EEEEE LL II ZZZ AAAAAAA
EE LL II ZZ AA AA
EEEEE LLLLLL IIII ZZZZZZ AA AA

Eliza is a mock Rogerian psychotherapist.
The original program was described by Joseph Weizenbaum in 1966.
This implementation by Norbert Landsteiner 2005.

ELIZA: Is something troubling you ?
YOU: Men are all alike.
ELIZA: What is the connection, do you suppose ?
YOU: They're always bugging us about something or other.
ELIZA: Can you think of a specific example ?
YOU: My boyfriend is one example.
ELIZA: Is it important to you that your boyfriend made you come here ?
YOU: He says I'm depressed much of the time.
ELIZA: I am sorry to hear that you are depressed.
YOU: It's true. I am unhappy.
ELIZA: Can you explain what made you unhappy ?
YOU:
```

Figure 3: Conversation with ELIZA <https://en.wikipedia.org/wiki/ELIZA>

### ELIZA on MacOS

If nowadays you want to run the ELIZA AI, you can do so on MacOS. It comes as an Easter egg on emacs.

**Step-by-Step Instructions** - Step 1: Open Terminal. Terminal can be found in the Applications folder in Finder, in Launchpad, or by searching in Spotlight.

- Step 2: Type ‘emacs’ followed by the return key.
- Step 3: Press the return key again.
- Step 4: Press the Esc and X keys at the same time.
- Step 5: Type ‘doctor’ followed by the return key.

To exit , you can simply click on the x.

### The AI Winter - 1974- 1980 and 1987-1993

AI faced a series of setbacks known as “AI winters” due to overhyped expectations and unmet promises. Funding and interest in AI waned during these periods.(?)

- 1966: Machine translation failure
- 1969: Perceptrons criticism
- 1971–75: DARPA’s Speech program frustration
- 1973: UK AI research decline