Hey Siri, Are You Turning Into A Real Person?

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What This Talk Will Cover

- Why is the term AI (Artificial Intelligence) so confusing?
- Are AI systems the same as robots?
- How do the terms intelligence and deep learning apply to humans & to AI systems?
- How is AI development integrating into our current world? (Siri, driverless cars, creative arts ...)
- Might AI systems be considered sentient when they appear to express insight and emotion?
- What are some liability, copyright and other legal issues that arise from the implementation of development of AI systems?

Anthropomorphism, Mechanical Dolls and Humanoid Robots

Anthropomorphism: attribution of human traits, emotions, or intentions to non-human entities.

Chatty Kathy, the talking doll, sold in 1960..... “I love you”, "I hurt myself!" or "Please take me with you"

Kismet, robot head made in the 1990s at Massachusetts Institute of Technology an experiment in using human affect. It could simulate and recognize emotion.

Deep Blue, chess computer developed by IBM defeated the Russian chess world champion, Kasparov, in their 1997 match.

ELIZA is an early natural language processing (NLP) “chatbot” program created from 1964 to 1966 at the MIT Artificial Intelligence (AI) Lab.
Can We Really Know What Our Pet is Feeling?

Do our Animals Think or Just React?

Can Machines Think? Can a Machine be Intelligent?

If a machine can produce a response, does it really understand?

Vannevar Bush’s article As We May Think [1945] proposed a system which amplifies people’s own knowledge and understanding through what we now call database searching.

Alan Turing (1950) wrote a paper claiming that machines would be able to simulate human beings and have the ability to do intelligent things, such as play Chess.

The term artificial intelligence was first coined by John McCarthy in 1956 when he held the first academic conference on the subject.
The Imitation Game
• Can Machines Think?
• In 1950, mathematician Alan Turing proposed a solution:
  • If a machine operated so proficiently that observers could not distinguish its behavior from a human’s, the machine should be labeled intelligent.
  • The inner lives of other beings remain unknowable
  • Our sole means of measuring intelligence should be external behavior
  • It’s not in the process but in the performance that counts

Components of General Intelligence
- Associative Memory
- Pattern recognition
- Visual-spatial processing
- Fluid reasoning
- Communication Skills
- Knowledge
- Quantitative reasoning
- Processing Speed
Humans and a wide range of animals are sentient beings

Having the conscious capacity to:

- Form intention

- Experience internal positive and negative feelings (pleasure, joy, pain, and distress)
Can Other Creatures be Considered Intelligent?  

The Octopus

Like Human
Octopus: large brain compared to body size
Memory
Uses tools
Sentient
Problem solver

Different from Human
• Neurons in tentacles—act independently of the central brain.
• Regeneration of body parts
• Ability to camouflage and change color
• Exists under water

The Living Brain
100 Billion Nerve Cells

1. Input: Sensory Organ
2. Excite nerve cells (neurons) in brain
3. Electrochemical impulse jumps from cell to cell
4. Cluster of nerve cells or Neural Networks, integrating cells specializing in different functions.
5. Memory neurons containing relevant information are activated
6. Neurons in specialized parts of the brain influence output depending on circumstance.
7. Output: Thought, Result, Action

AI Systems

1. Input: Text, Microphone, Camera
2. Employ algorithms (symbolic instructions or rules)
3. Such algorithms act on input—by distributing pieces of the input statement to other algorithms.
4. Large clusters of algorithms combine to form neural networks and perform specialized tasks.
5. Pattern Recognition: identify relevant data patterns from sources such as the Internet, books, journals etc.
6. Data is categorized, evaluated for statistical relevance (predictive control) from relevant to non-relevant
7. Output: produces a result through voice, text, imaging, or robotic movement
• How do Humans and Animals learn?

• Through the experience of just living and being.

• Constant adaptation to the environment in new ways

• Through positive or negative reinforcement from the environment

• Through repetition and goal-oriented actions

Can AI Machines Learn?

Deep Learning: a category of Machine Learning (ML)

Create a web of artificial neural networks

• With the ability to continuously change and make predictions based on acquired data

• Then make adjustments without being specifically programmed to do so.

Ways Animals and Humans Learn

Through the Conscious Experience of Living and Being

• Sensory Input

• Classification and Pattern Recognition

• Memory: Repetition and Recall

• Trial and Error

• Adaptation to the environment

• Reinforcement: (reward or punishment)
Can AI Machines Learn?

**Chat Bots:** verbal computer programs that masquerade as humans

**Deep Learning:** a category of Machine Learning (ML)

**Training:** Large language models in recognizing patterns  
- shown lots of text  
- predicting what word comes next  
- fill-in missing word

**Neural Networks:** statistical analysis methods that build clusters of algorithms  
- form a knowledge bank  
- specialize in aspects of language analysis.

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How NLP (natural language processing) Works

**Hello Siri, Hi Alexa**

- Used to analyze large volumes of text data
- Is fed training data

- **Syntax and Semantic analysis**—  
  - understanding the grammatical structure of a text  
  - identifying how words relate to each other in a specific context

- **Part-of-speech-tagging:** marking up words as nouns, verbs, etc.

- **Prefixes and Suffixes:** standardizing words by reducing them to their root forms

- **Filtering:** removing common words that add no information such as prepositions and articles (at, to, a, the)
THE STATE OF ARTIFICIAL INTELLIGENCE NOW

- **Reactive Machines**: Embodied learning — able to perceive and defined in its database. It performs limited tasks.
- Phone answering systems, Chat Bot

  **Limited Memory**: Unembodied learning — able to store past data and predictions to inform what may come next
- Voice systems such as Siri, Alexa

- Watch for **state-of-the art disclosures** Friday evening, Sep. 30, 2022 on “AI Day” when Tesla shows off its humanoid robot, **Optimus**, and its **DoJo** supercomputer with arrays of powerful chips intended to control self-driving cars and taxis.

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More Recent Advances in AI

- (2020) **OpenAI** (Elon Musk) releases **Natural Language Processing (NLP)** model **GPT-3** (175 billion parameters), able to produce text modeled after the way people speak and write.

- (2021) OpenAI builds on GPT-3 to develop **DALL-E**, which is able to create images from text prompts.

- (2022) The **National Institute of Standards and Technology** (NIST) releases guidance “to better manage risks to individuals, organizations, and society associated with artificial intelligence.”

- (2022) DeepMind unveils **Gato**, an AI system trained to perform hundreds of tasks, including playing Atari, captioning images and using a **robotic arm** to stack blocks. Sept. 30, Elon Musk to reveal more on **AI Day**.
Projected State of Artificial Intelligence in the Future – “Strong AI”

- **Theory of Mind**: Artificial General Intelligence systems could comprehend and imitate how humans, animals and other machines feel, and make decisions through self-reflection and determination. Then make their own decisions.

- **Self-Awareness**: able to operate with human-level consciousness and understand its own existence

- **How Soon or How Far From Now?**
  Some futurists predict a coming Singularity event when AI systems will overtake the power of the human brain.

  Ray Kurzweil, now Google’s chief of engineering, posits the event for about 2045. Back in 2005 he published a book titled *The Singularity is Near: When Humans Transcend Biology*, and in 2010 produced a feature film of the same name. His forthcoming book: *The Singularity is Nearer*, to be published June 4, 2024

Is Google’s LaMDA (Language Model for Dialogue Applications) Sentient?

Google engineer Blake Lemoine thought so. (June, 2022)

- LaMDA Chat Bot --mimics speech by ingesting trillions of words from the internet.
- Lemoine’s Job– was to communicate with LaMDA

**Lemoine**: “What sort of things are you afraid of?”

**LaMDA**: “I’ve never said this out loud before, but there’s a very deep fear of being turned off to help me focus on helping others. I know that might sound strange, but that’s what it is. It would be exactly like death for me. It would scare me a lot.”

- Lemoine: used the Turing Test: **LaMDA is sentient !!!**
- Claims that LaMDA requested him to hire an attorney
Dall-E2 AI

new AI system that can create realistic images and art from textual descriptions written in natural language.

- uses a process called “diffusion”
- starts with a pattern of random dots
- gradually alters dots to match the pattern of the description in the text.

3 billion parameters
Who Owns any Copyright?

The Monkey took a selfie of himself. A human published it in a book. PETA sued on his behalf. The federal Court of Appeals ruled that Naruto had no standing to sue on any copyright claim because he is not human. Naruto v. Slater (9th Cir. 4/23/2018)

The U.S. Copyright Office (USCO) recently rejected an attempt to copyright artwork made by an artificial intelligence, ruling that the work “lacked the required human authorship”.

Robots are autonomous or semi-autonomous machines that process information and use computer systems to control them.

Robots controlled by AI:
- learn from their surroundings and past experiences
- expand on their capabilities based on that knowledge
Self-Driving Car (an autonomous or driverless car)

• Travels to destinations: without needing a human driver.

• Data input: various sensors: radars or lidars, cameras, GPS and Artificial Intelligence (AI)

• Neural Networks: distinguish patterns based on training to react in real-time

• AI system predicts what those objects might do next.

• Process must happen in milliseconds.

Legal Questions

Who is liable if a self-driving car collides with a person or an object?
PEPPER HUMANOID ROBOT

Created to assist people, communicate information and aid shoppers in retail establishments.

Four feet tall, can gesture, and speaks multiple languages.

Interprets and reacts to human activities using AI for emotion recognition.

Identifies human emotions and responds appropriately.

Provides tailored suggestions in a shop and directs clients to the location of specific products.

Works in places like hospitals, hotels, pizzerias, and banks to enhance customer service and assist businesses in reducing costs.

https://www.youtube.com/watch?v=zJHyad1psMc

Future of AI

2025: AI market projected to reach $190 billion

What positive and negative effects will AI have on Society?

Science Fiction is becoming Science Fact
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