



# REVOLUTION OF AI PHILOSOPHIES OF CS & AI,

Fundamentals of Artificial Intelligence

Session 03

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## What is AI?

❑ Views of AI fall into four different perspectives --- two dimensions:

- ❖ Thinking versus Acting
- ❖ Human versus Rational

	Human-like Intelligence	"Ideal" Intelligent/ Pure Rationality
Thought/ Reasoning ("modeling thought" "brain")	2. Thinking Humanly	3. Thinking Rationally
Behavior/Actions "behaviorism" "mimics behavior"	1. Acting Humanly	4. Acting Rationally

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## Agenda



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## AI is Controversial



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## AI is Controversial

### Conscious Killer Robots to 'bide their time' to Enslave humans

Killer robots with a conscience may become so advanced they could enslave the human race before killing our species, a leading expert has warned.

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## AI is Controversial

AI poses  
"vastly more risk than North Korea".



*Elon Musk is 'exactly wrong'  
about A.I.  
because he 'doesn't understand'!*



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“

*AI poses “vastly more risk than North Korea,”*

*“Competition for AI superiority at national level most likely cause of WW3,”*

*“AI is a fundamental risk to the existence of human civilization,”  
Governments “will obtain AI developed by companies at gunpoint, if necessary,”*

*“AI is far more dangerous than nukes”?*

”

**Elon Musk**

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“

*So, I think that Elon is exactly wrong, he doesn't understand the full ramifications of the potential of artificial intelligence.*

*And he is wrong because he doesn't understand the benefits that this technology will provide to making every human being smarter.*

*And the fact of the matter is that AI and machine learning are so fundamentally good for humanity.*

*Over and over again, making people smarter is a net good.*

*He is concerned about the possible misuse of this technology and I am too. But today, the overwhelming benefit of this is positive!*

”

**Eric Schmidt**

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## AI is Controversial

- ❑ AI Winter – too much promised
  - ❖ 1966: The failure of machine translation,
  - ❖ 1970: The abandonment of connectionism,
  - ❖ 1971–75: DARPA's frustration with the Speech Understanding Research program at Carnegie Mellon University
  - ❖ 1973: The large decrease in AI research in the United Kingdom in response to the Lighthill report,
  - ❖ 1973–74: DARPA's cutbacks to academic AI research in general,
  - ❖ 1987: The collapse of the Lisp machine market,
  - ❖ 1988: The cancellation of new spending on AI by the Strategic Computing Initiative
  - ❖ 1993: Expert systems slowly reaching the bottom
  - ❖ 1990s: The quiet disappearance of the fifth-generation computer project's original goals,
- ❑ AI may cause
  - ❖ Social ills,
  - ❖ Unemployment
  - ❖ End of humanity

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Technology is not Neutral!

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## Uncanny Valley: Being Human in the Age of AI

- ❑ “Technology is changing our world, with artificial intelligence both a new frontier of possibility but also a development fraught with anxiety”
  - Thomas P Campbell, Director and CEO of the Fine Arts Museums of San Francisco
  
- ❑ “As our lives are increasingly organized and shaped by algorithms that track, collect, evaluate, and monetize our data, the uncanny valley has grown to encompass the invisible mechanism of behavioral engineering and automation”
  - Claudia Schmuckli, Curator in Charge of Contemporary Art and Programming at the Fine Arts Museums of San Francisco

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## Uncanny Valley: Being Human in the Age of AI

- ❑ “**Uncanny valley**” : a metaphor introduced by Japanese robotics engineer Masahiro Mori in 1970
  - ❖ A terrain of existential uncertainty that humans experience when confronted with autonomous machines that mimics their physical and mental properties
  - ❖ Chart human’s comfort-discomfort spectrum with a robot based on its degree of resemblance
  
- ❑ But at the dawn of the “**Industry 4.0**”, the uncanny valley is defined by addictive mechanisms that draws people to the screens like fireflies
  
- ❑ The exhibition examines the current applications of AI as a challenge to traditional understandings of the human-machine relationship and how AI’s mechanisms are reshaping the human-machine integration through an artistic lenses
  
- ❑ It fundamentally alters our mode of existence, giving rise to a newly expanded uncanny valley

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## Not Neutral!

Technology is not neutral!

Computers are not neutral!

Search Engines are not neutral!

Facial Recognition is not neutral!

**Body postures and facial expressions are not proof enough that a person is likely to commit a crime!**

- ❑ All of these things are designed by human beings
- ❑ Are increasingly pervade our culture
- ❑ Will shape society moving forward
- ❑ Humans are biased too
  - ❖ Humans working in the tech field, earning tech salaries, are privileged in ways that lend themselves to specific biases
  - ❖ Do have a huge impact on the rest of society

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## AI is Already Dangerous...

- ❑ Lynn Hershman Leeson's **Shadowstalker** asks you to enter your email address
  - ❖ Instantly pulls up as much information about you as it can find and displays it for the whole room to see
- ❑ Where you live,
- ❑ What your social media handles are,
- ❑ Who else you know in the system...
- ❑ It's all at the computer's "fingertips"
- ❑ How carelessly one might give out personal information without any regard for who will use it and how

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## AI is Already Dangerous...

### ❑ Stolen Faces:

- ❖ Use of facial recognition in predicting crime and determining who might be a criminal.
  - ❖ As part of booking process, authorities are taking black-and-white mug shots of accused and convicted criminals
  - ❖ No consent needed,
  - ❖ Artificial Intelligence systems then study this data set to get a sense of what human face might be a threat.
- ❑ One day, you could be walking down the street when a camera sees your face, determines that you match the profile of a likely criminal, and alerts the authorities even though you've never committed a crime.
- ❑ We all know that certain people are more likely than others to be arrested in our society, so the existing mug shots in the system reinforce that bias
- ❑ AI multiplies and magnifies that bias with predictive technology

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**"Data is not neutral." "Dirty Data."**

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## What Does it Mean to be Human?

- ❑ If we create machines that can look and act like human beings then what does it mean to be human?
- ❑ Lawrence Lek's *AIDOL*,
- ❖ There is a film about an AI creature named Geo who wants to become an artist
  - ❖ There is a human singer named Diva who suffers from artist's block and can't seem to write her next song
  - ❖ Ultimately, Geo mines her past songs for all of the best parts and uses computer technology to come up with a new song that is a huge hit
- ❑ We like to believe in the idea that art is unique to humanity, that the drive and ability to create is a human trait that we will retain and machines will never obtain

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## Disciplines that Contribute Ideas, Viewpoints, and Techniques

Philosophy

Mathematics

Economics

Control Theory and Cybernetics

Neuroscience

Linguistics

Computer Engineering

Psychology

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AI by Numbers

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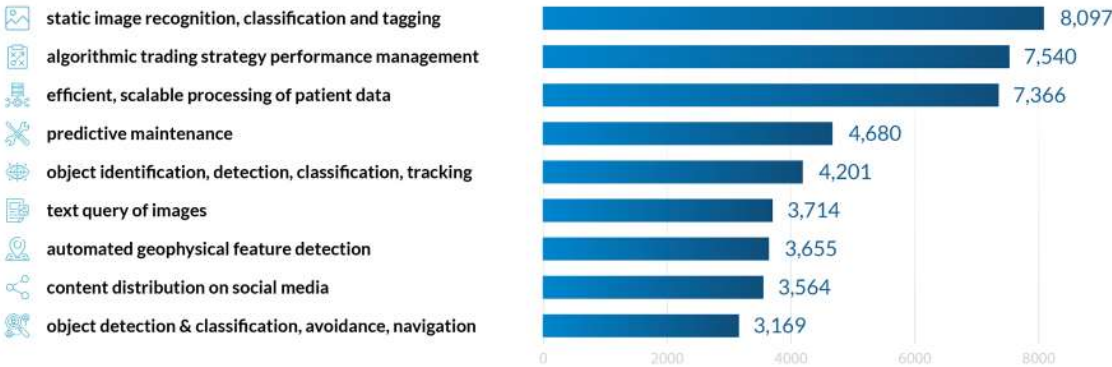
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Projected Growth of AI

Global AI revenue forecast by 2025, ranked by use case in millions US dollar

Source: Statista



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Functional Area

Organizations deploying AI, by functional areas



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Penetration within Computer Science Community

Penetration of artificial intelligence skills by country

Source: Dun & Bradstreet

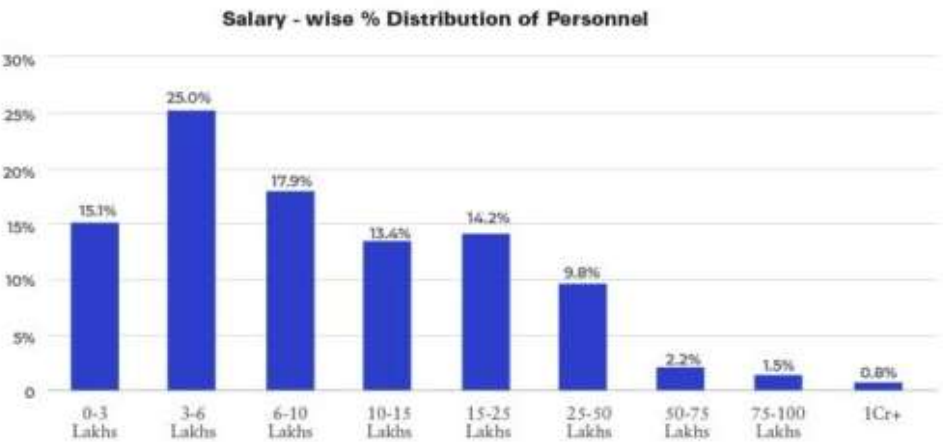


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Salaries - India



The median salary of Artificial Intelligence professionals is INR 14.7 Lakhs  
Most of the employees are in competence building phase only

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## Top 10 Companies



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## Top 10 Companies



- Subsidiary of Alphabet Inc. , Founded in September 2010, acquired by Google in 2014
- Created a neural network that learns how to play video games better than humans, Neural Turing machine, or a neural network that may be able to access an external memory like a conventional Turing machine, resulting in a computer that mimics the short-term memory of the human brain
- Made headlines in 2016 after its AlphaGo program beat a human professional Go player Lee Sedol, the world champion, in a five-game match.
- AlphaZero, beat the most powerful programs playing go, chess and shogi (Japanese chess) after a few days of play against itself using reinforcement learning.
- In 2020, DeepMind made significant advances in the problem of protein folding.

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## Top 10 Companies



- Long term AI research focused Google Brain team members set their own research agenda, with the team as a whole maintaining a portfolio of projects across different time horizons and levels of risk.
- Reddit AMA 2017, creating machines that learn how to learn.
- Use artificial intelligence to transform Google Translate
- How machine learning is poised to reinvent computing itself.



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## Top 10 Companies



- Tools for Advancing the World's AI: PyTorch , ONNX, Tensor Comprehensions, Glow, etc ([https://ai.facebook.com/tools?utm\\_source=hp#frameworks-and-tool](https://ai.facebook.com/tools?utm_source=hp#frameworks-and-tool))
- Research: Computer Vision, Conversational AI, Integrity, Natural Language Processing, Ranking & Recommendations, Systems Research, Speech & Audio, Human & Machine Intelligence, Reinforcement Learning ([https://ai.facebook.com/research?utm\\_source=hp](https://ai.facebook.com/research?utm_source=hp))
- Controversies : Cambridge Analytica data scandal, political manipulation (as with the 2016 U.S. elections), mass surveillance, psychological effects such as addiction and low self-esteem, and content such as fake news, conspiracy theories, copyright infringement, and hate speech.
- Accused of willingly facilitating the spread of such content and also exaggerating its number of users in order to appeal to advertisers

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## Top 10 Companies



- OpenAI is an AI research laboratory consisting of the for-profit corporation OpenAI LP
- A competitor to DeepMind, conducts research in the field of AI with the stated goal of promoting and developing friendly AI in a way that benefits humanity as a whole
- Founded in San Francisco in late 2015 by Elon Musk, Sam Altman, and others, who collectively pledged US\$1 billion
- Musk resigned from the board in February 2018 but remained a donor
- In 2019, OpenAI LP received a US\$1 billion investment from Microsoft
- Better known for ChatGPT now!

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## Top 10 Companies

- Meaning "a hundred times" or "a hundred degrees", little known outside China
- The holding company of the group is incorporated in the Cayman Islands
- The platform enables users to find information online, including Webpages, news, images, documents and multimedia files, through links provided on its Website.
- AI research lab investing in range of AI – from automated personal assistants to autonomous cars and healthcare like Google.
- Baidu Research was headed by chief scientist Andrew Ng.



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## Top 10 Companies



- Defending DRAM for data safety and security in the cloud
- Auto ML and the future of self-managing networks
- Neural architecture search, imitation learning and the optimized pipeline
- Responsible AI
- Going deep on deep learning
- Data science and ML for human well-being
- Inside AR and VR, a technical tour of the reality spectrum
- Cryptography for the post-quantum world

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## Top 10 Companies



- Siri is a virtual assistant that is part of Apple Inc.
- Facial Recognition technology from security and reaction of users to ads, messages, social media messages, etc.
- For detailed research papers visit <https://machinelearning.apple.com/>

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## Top 10 Companies

- As part of IBM Watson® Studio, IBM Watson Machine Learning helps data scientists and developers accelerate AI and machine learning deployment on IBM Cloud Pak® for Data.
- Deploy AI models at scale across any cloud on an open, extensible architecture
- Uses AI to extract meaning from photos, videos, text, speech.

 OpenAI

 Baidu 百度

 Microsoft

 IBM

 amazon

 NVIDIA

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## Top 10 Companies

- Looked at items Amazon offers on their website then you've most likely had an interaction with their advanced AI algorithms.
- Beginning with product recommendations, Amazon started using machine learning algorithms as part of their core offerings, and over time they have quietly built strong AI and ML capabilities broadly across the whole organization.
- There is no single AI group at Amazon. Rather, every team is responsible for finding ways to utilize AI and ML in their work.

 Microsoft

 IBM

 amazon

 NVIDIA

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- GPUs are used in deep learning, artificial intelligence, and accelerated analytics
- GPU-based deep learning to approach problems like cancer detection, weather prediction, and self-driving vehicles
- Earlier involved in many Tesla vehicles
- GPUs "work well for deep learning tasks because they are designed for parallel computing and do well to handle the vector and matrix operations that are prevalent in deep learning
- Was involved in what was called the "big bang" of deep learning, "as deep-learning neural networks were combined with Nvidia graphics processing units (GPUs)".
- Andrew Ng determined that GPUs could increase the speed of deep-learning systems by about 100 times.

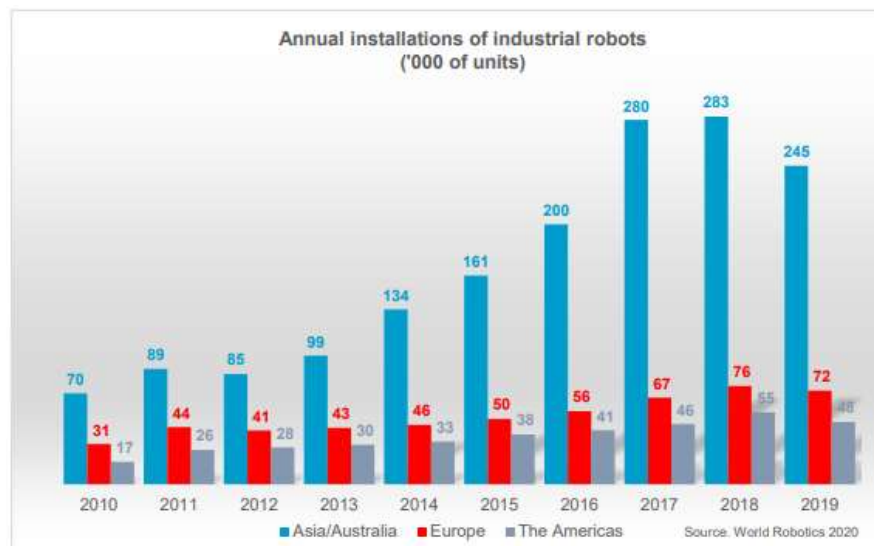


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## World Robot Population



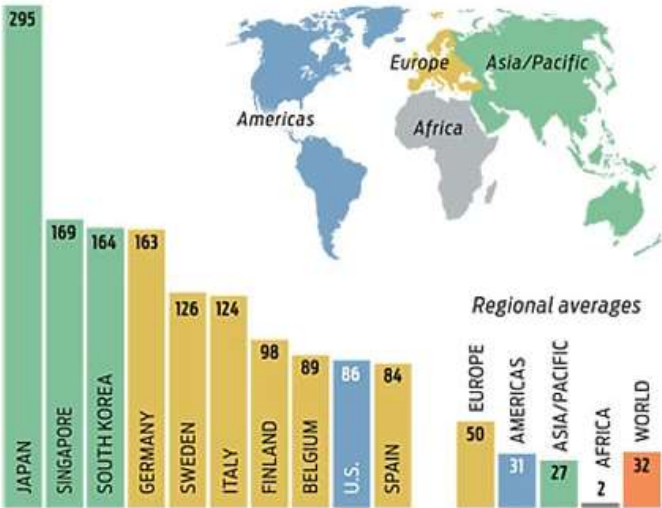
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# World Robot Population

## TOP 10 COUNTRIES BY ROBOT DENSITY (Industrial robots per 10 000 manufacturing workers)

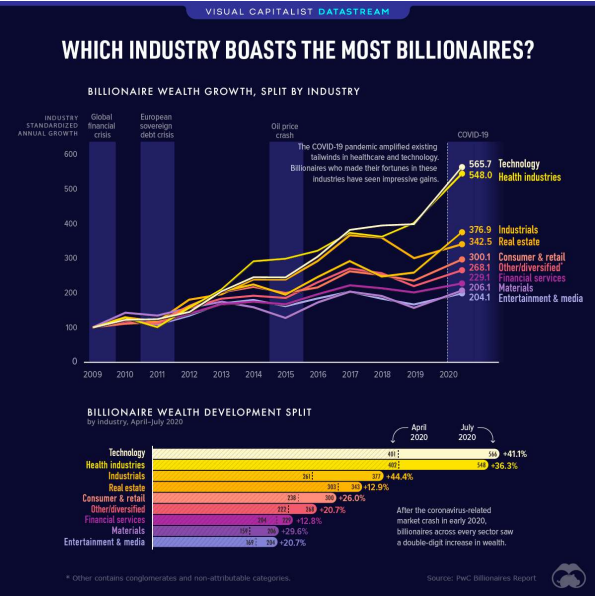


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# What We Know



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## Reflect...

- ❑ Elon Musk said “Competition for AI superiority at national level most likely cause of WW3,”
- ❑ “So, I think that Elon is exactly wrong, he doesn’t understand the full ramifications of the potential of artificial intelligence” - Eric Schmidt
- ❑ AI is Controversial
- ❑ Technology, Computers, Search Engines and Data are not neutral
- ❑ A terrain of existential uncertainty that humans experience when confronted with autonomous machines that mimics their physical and mental properties
- ❑ It is possible to dig out one’s complete details just from one’s email ID.
- ❑ AI multiplies and magnifies “*that bias*” with predictive technology
- ❑ Generic solution is under fitted and specific solutions are over fitted

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## Open Forum

- ❑ Technology is not neutral!

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## Next Session...



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