



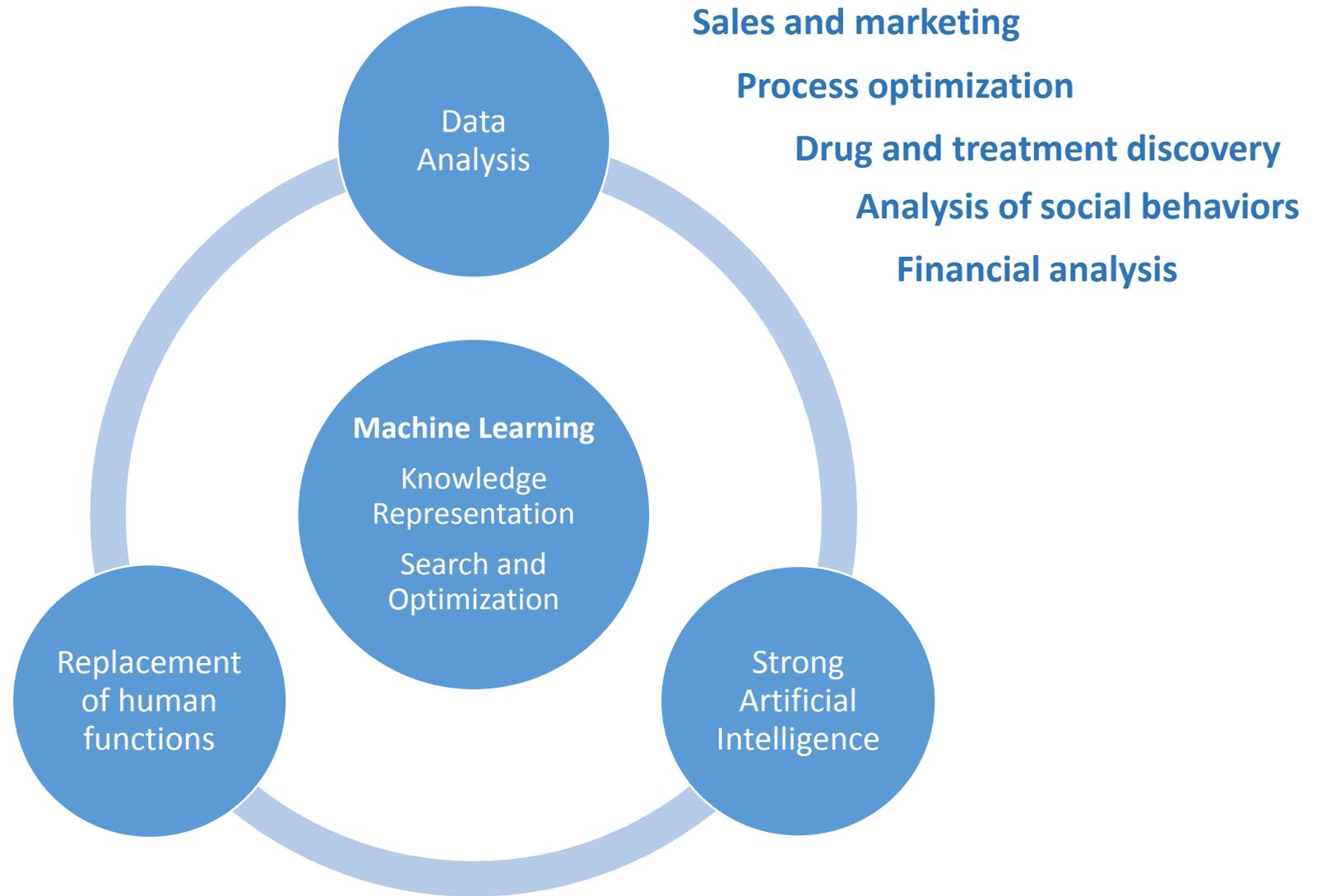
*Inteligência  
Artificial*

*Arlindo  
Oliveira*



# **Modern Artificial Intelligence**

# Artificial Intelligence

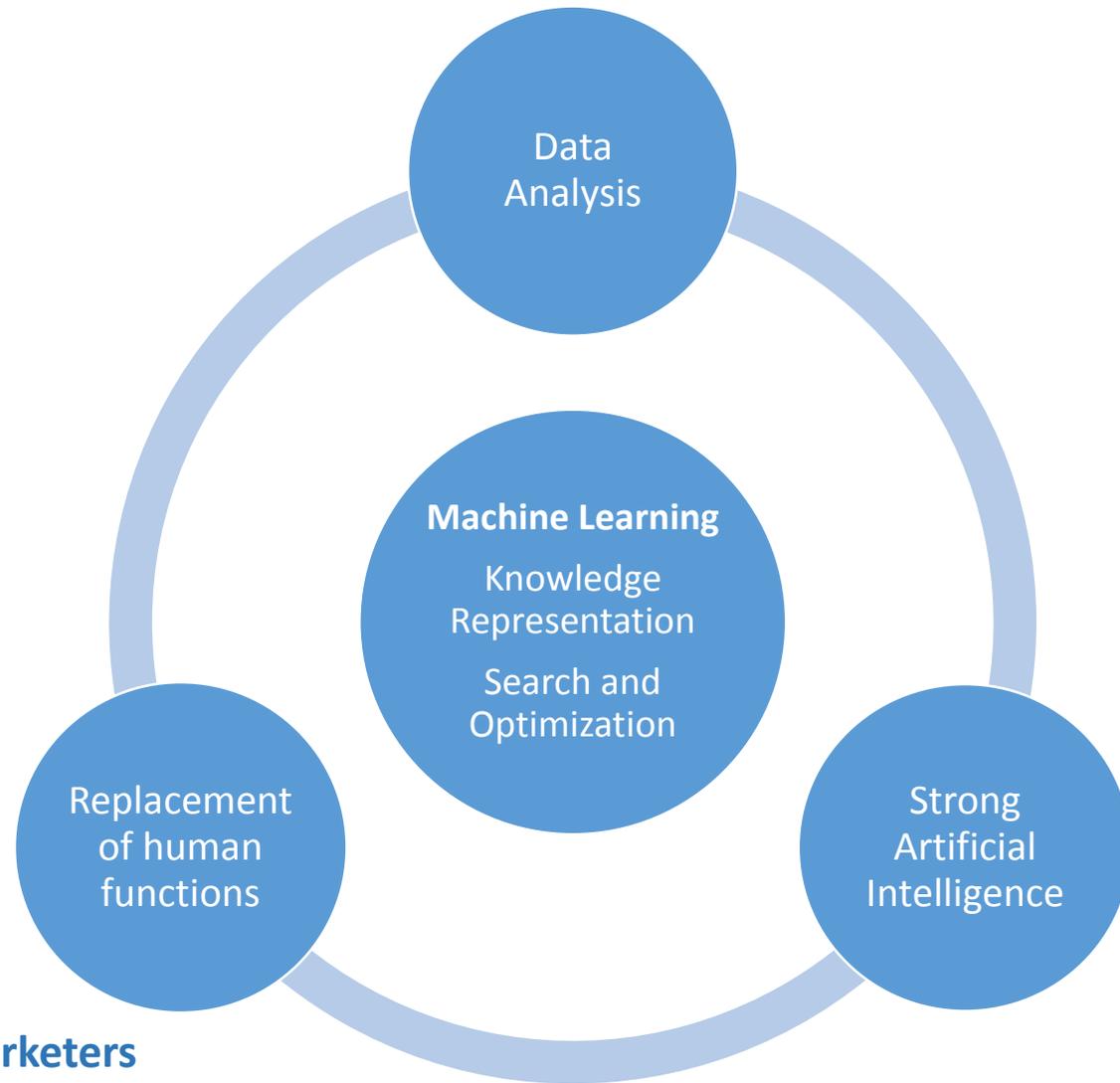


# Data Analysis



Credit: Swami Chandrasekaran

# Artificial Intelligence



**Telemarketers**

**Car and truck drivers**

**Personal assistants**

**Legal analysts**

**Radiologists**

# Replacement of Human Functions

**Your Future Doctor May Not be  
Human. This Is the Rise of AI in  
Medicine.**

by Abby Norman on January 31, 2018 🔥 17056

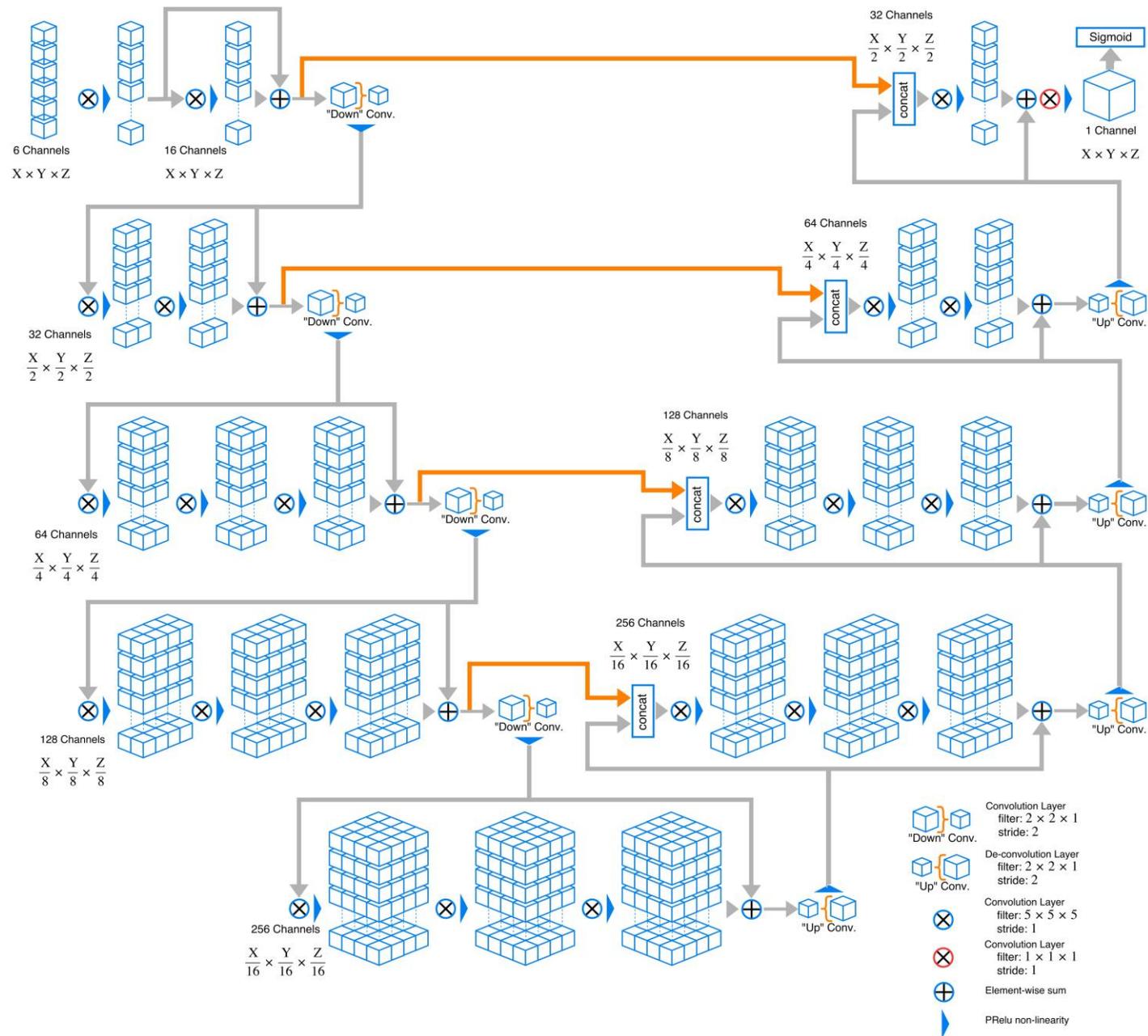
📷 Tag Hartman-Simkins

Artificial Intelligence

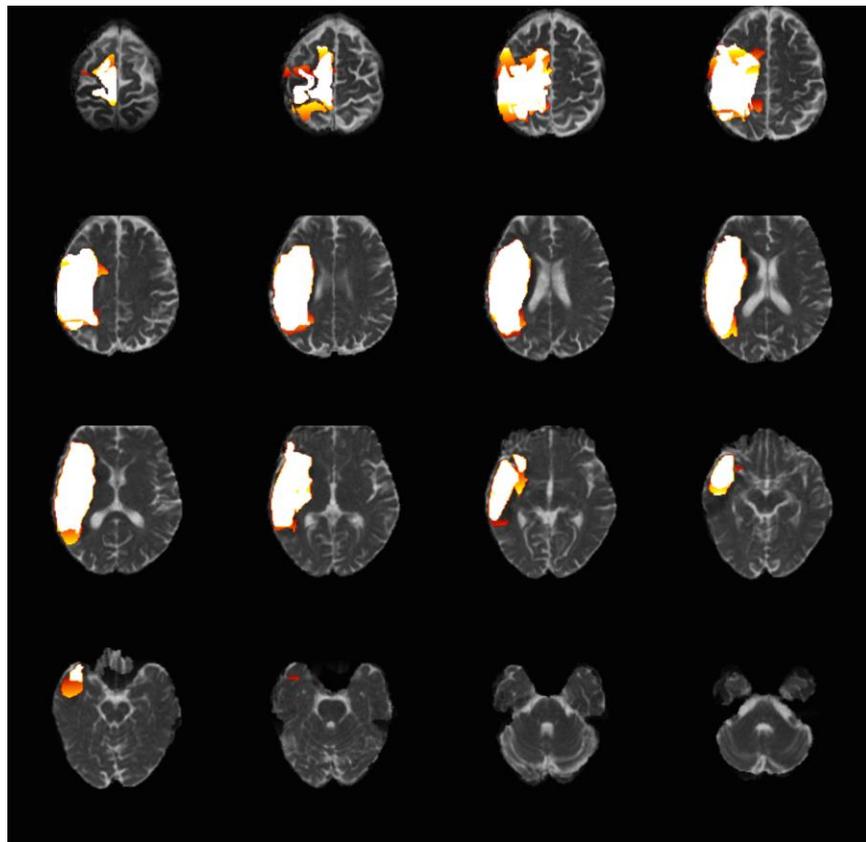
**AI Can Identify Skin Cancer As Well As Doctors**

**AI-Assisted Detection Identifies Colon Cancer  
Automatically and in Real-Time**

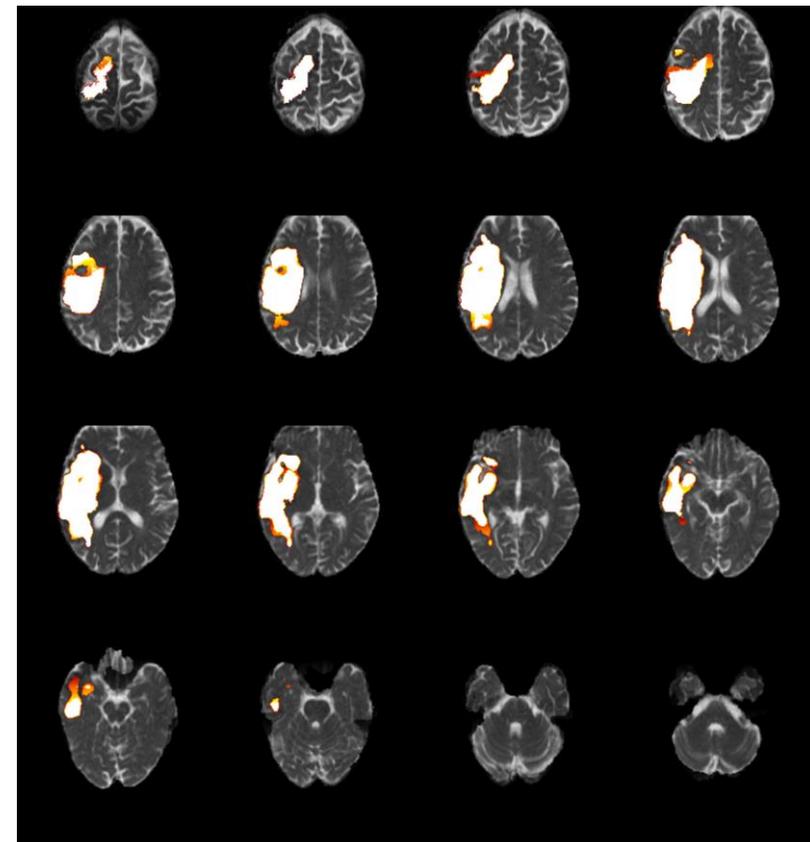
# Diagnosis of Ischemic Stroke



# Diagnosis of Ischemic Stroke

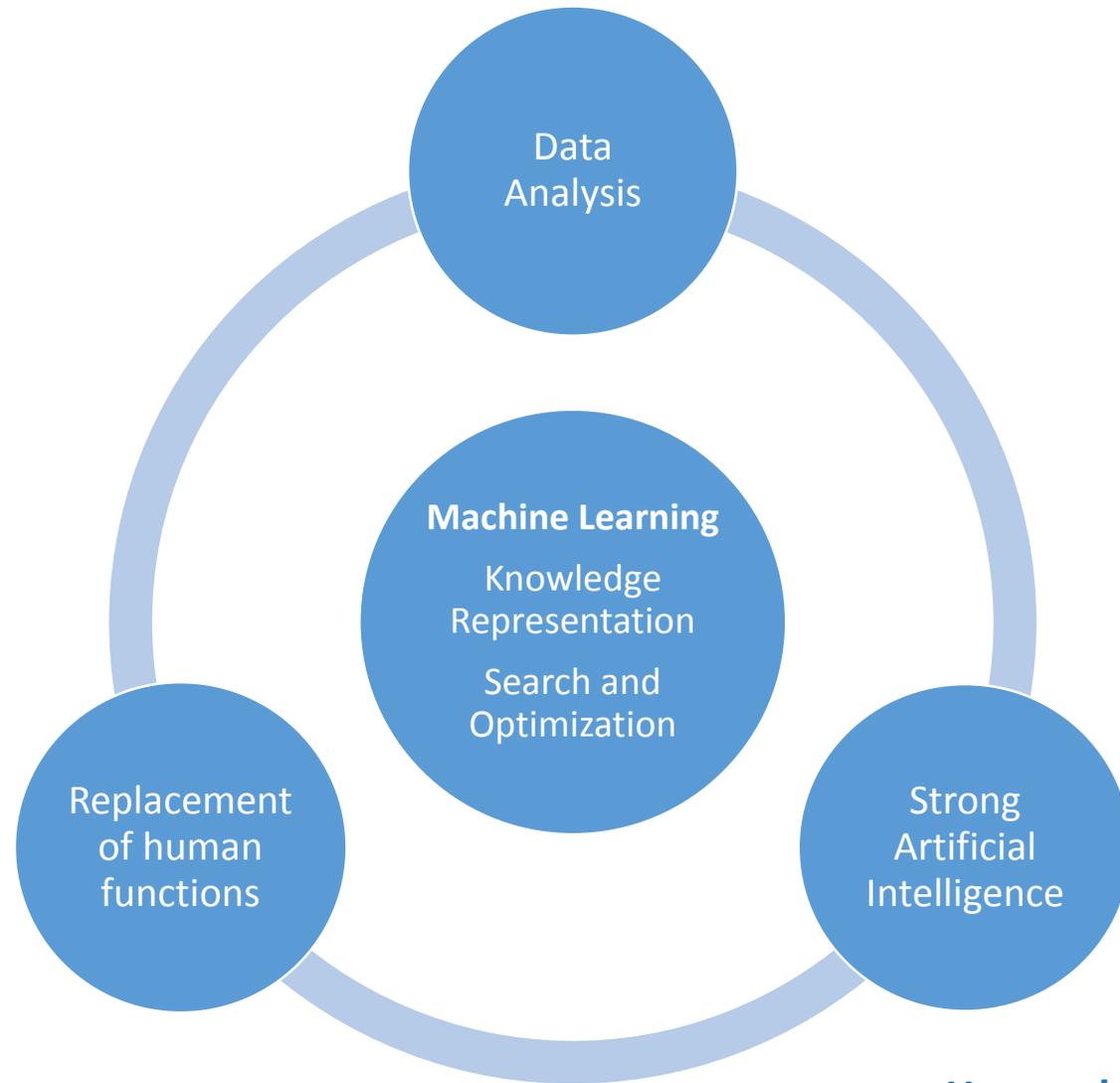


ground truth



predicted

# Artificial Intelligence



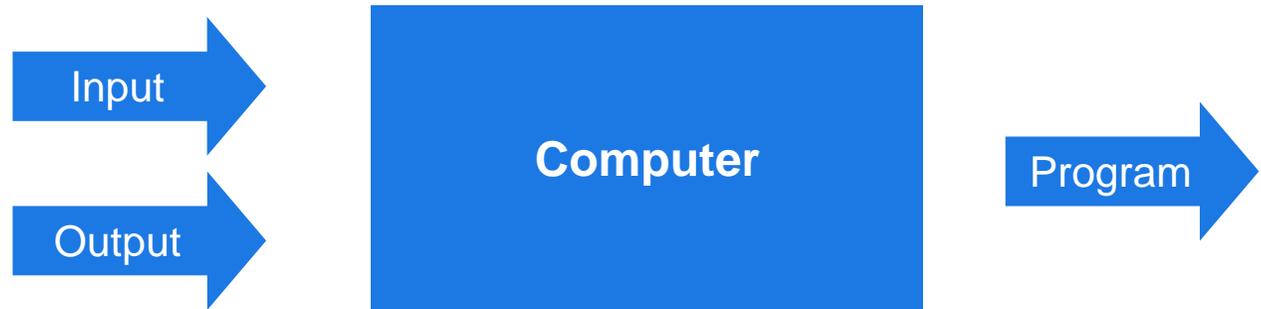
**Human level intelligence**  
**Flexibility and adaptability**  
**Open-ended possibilities**

# Machine Learning

## Traditional programming

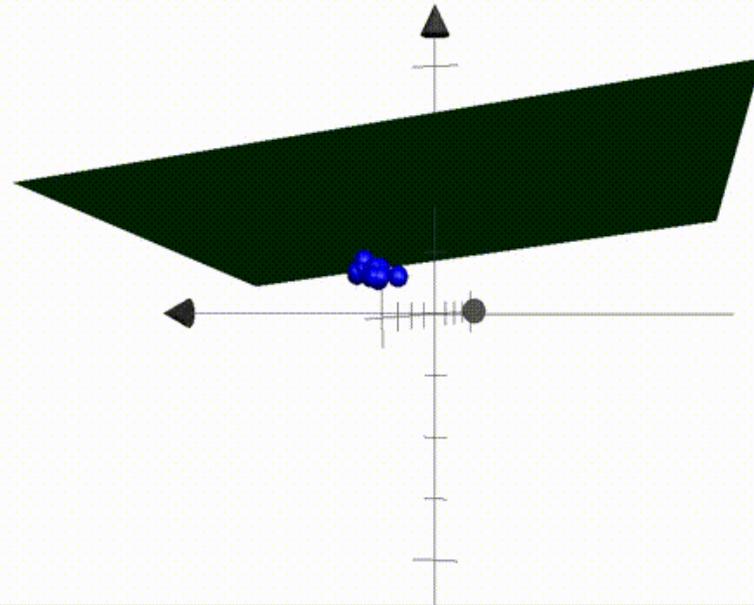
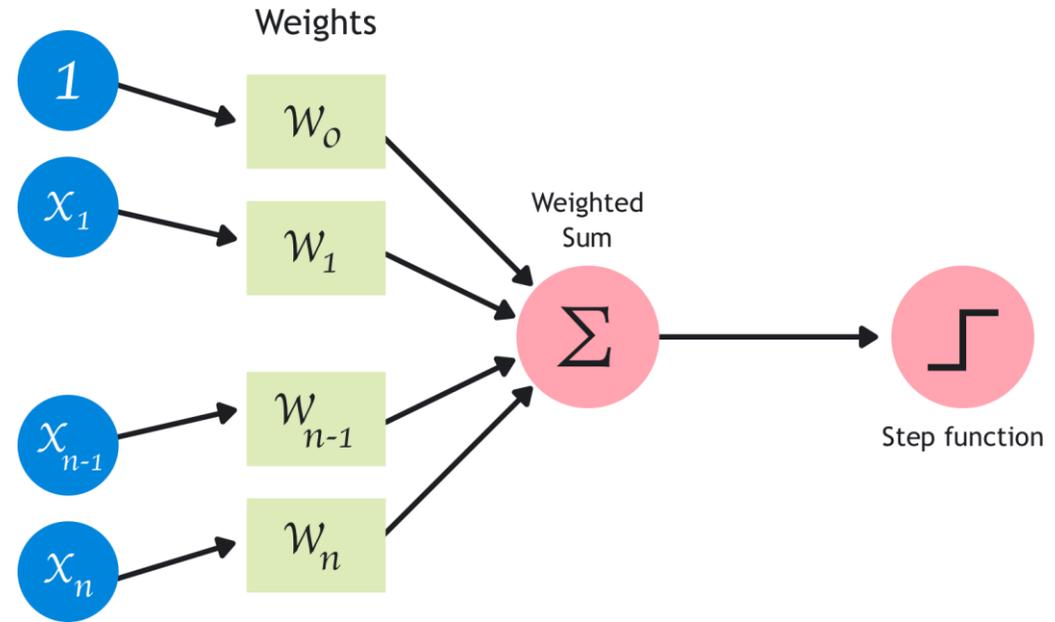


## Machine Learning



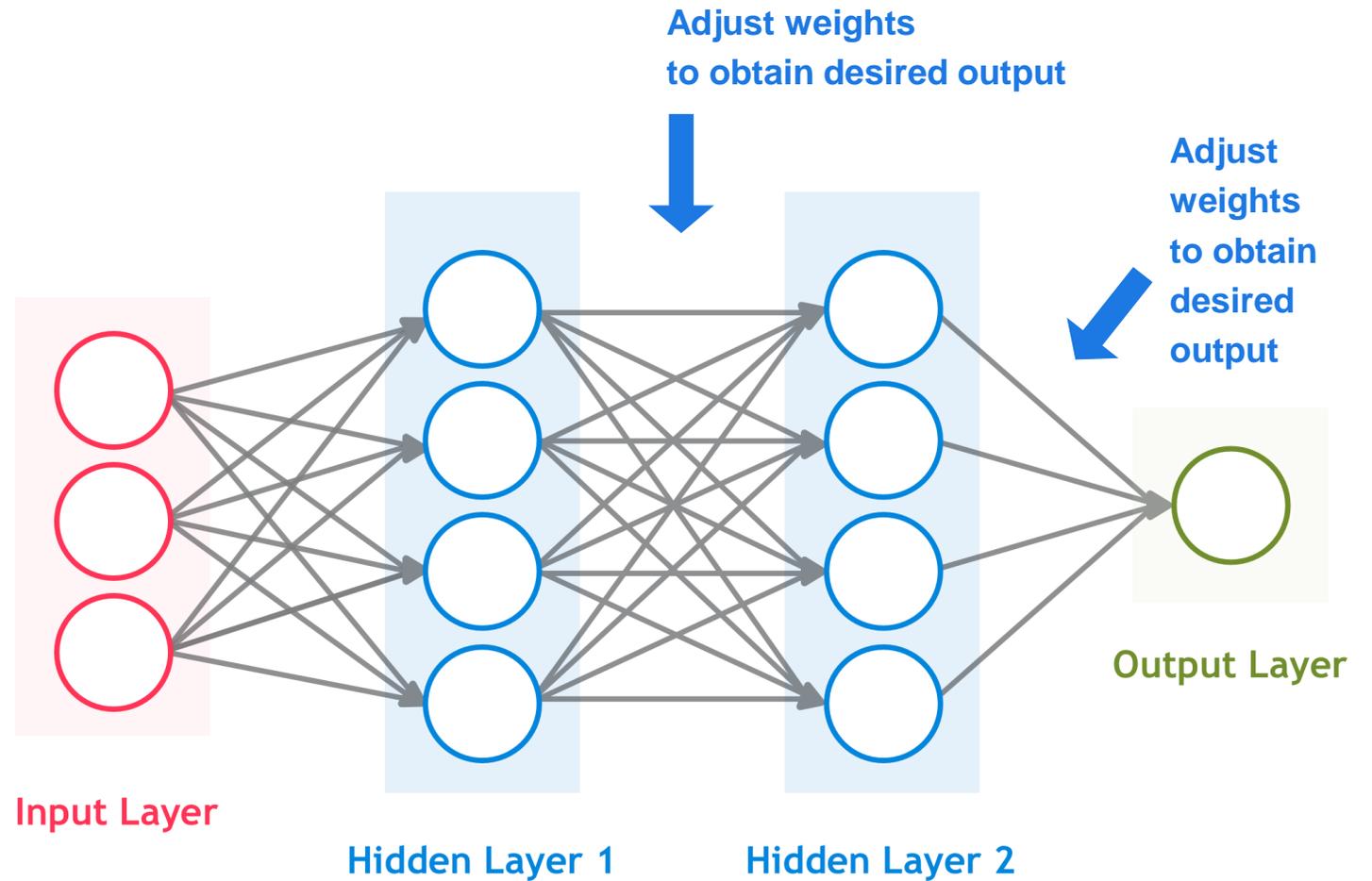
# Neural Networks

Artificial  
Neuron-Perceptron



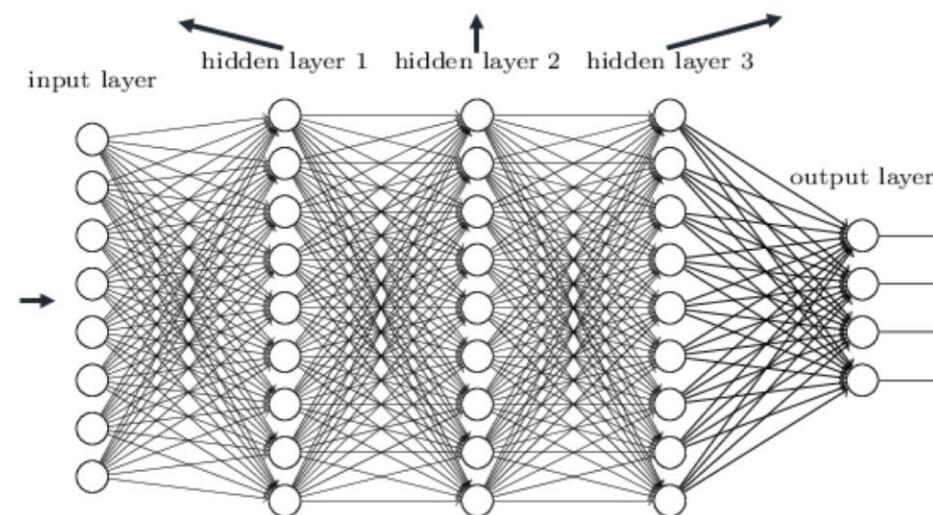
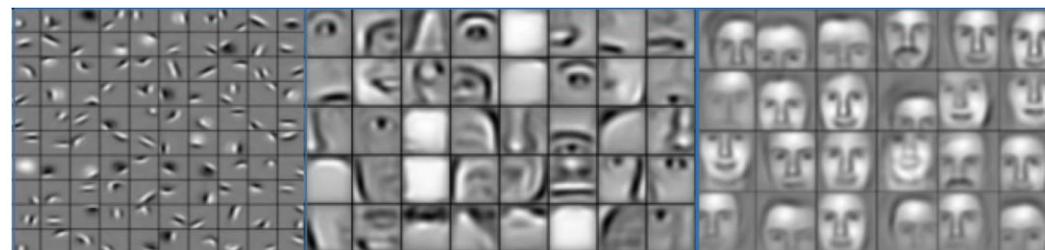
# Neural Networks

Multi Layer Perceptron



# Deep Neural Networks

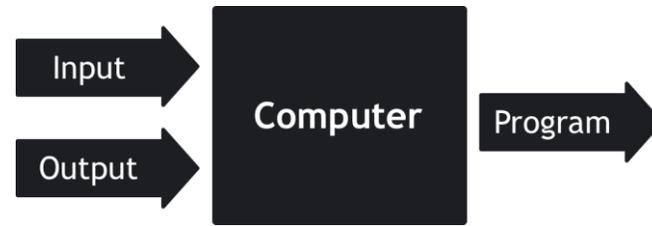
Deep Neural Networks  
learn hierarchical feature  
representations



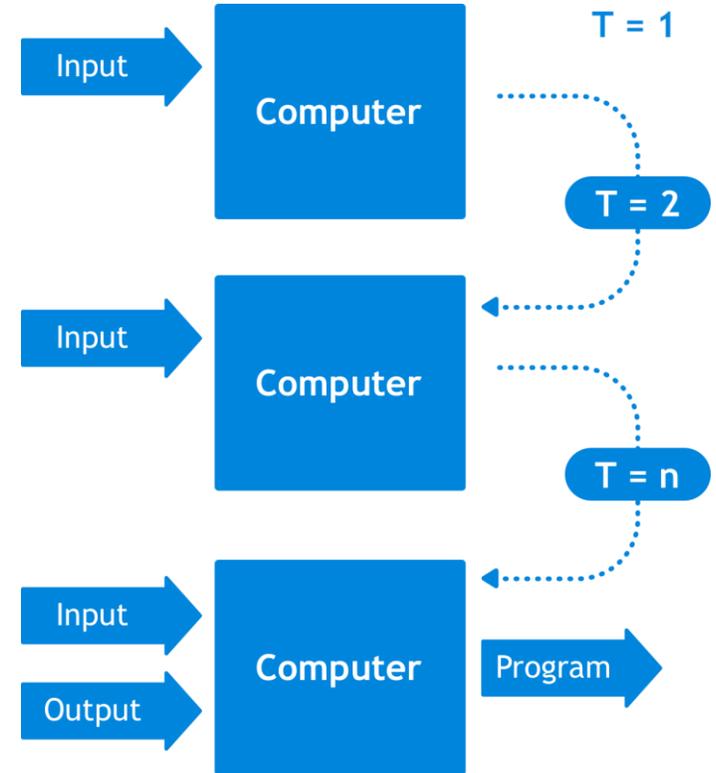


# More Machine Learning

## Supervised Learning



## Reinforcement Learning





# Synthetic AI

# Objections

- **The immortal soul objection:**  
Man is the sole owner of an immortal soul, and no machine can ever have one.
- **The consciousness objection:**  
Only humans can be conscious.
- **The technological impossibility objection:**  
It is outside the reach of human technology, forever.
- **The physical support objection:**  
Nervous systems are continuous, use quantum mechanics to function, are chaotic
- **The mathematical objection:**  
Brains are not Turing equivalent
- **Various disabilities objection**  
Cannot create anything new  
Cannot love or be loved  
Cannot feel pain or joy

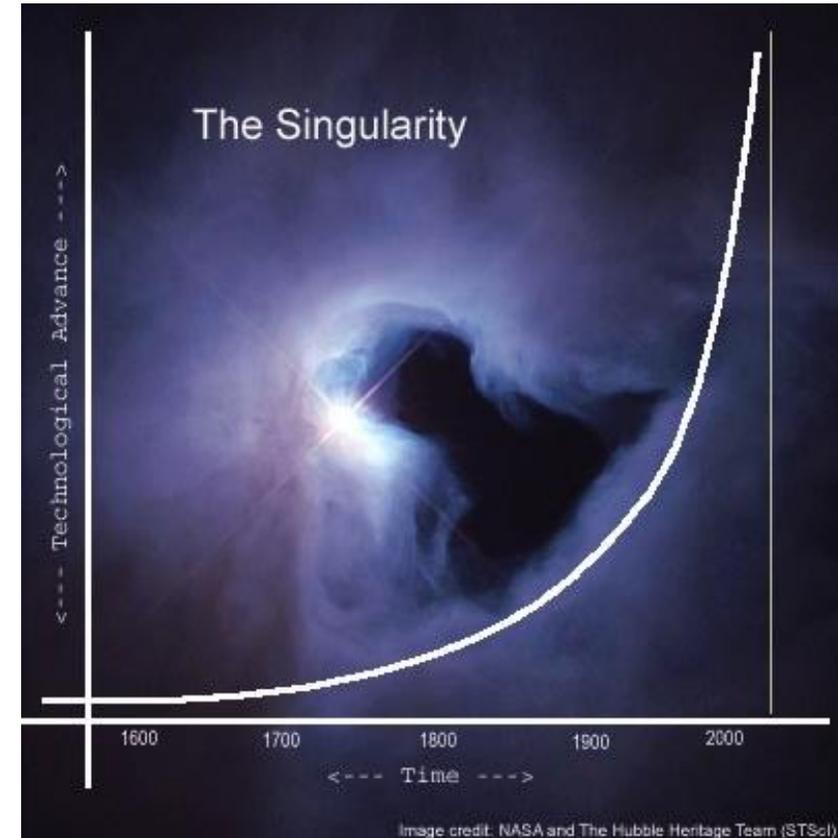
# Legal and Social Challenges

- “whereas, ultimately, robots’ autonomy raises the question of their nature in the light of the existing legal categories - of whether they should be regarded as natural persons, legal persons, animals or objects - or whether a new category should be created”
- “creating a **specific legal status for robots**, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons with specific rights and obligations...”
- “consideration should be given to the possible need to introduce corporate reporting requirements on the extent and proportion of the contribution of robotics and AI to the economic results of a company for the purpose of taxation and social security contributions; takes the view that **in the light of the possible effects on the labour market of robotics and AI a general basic income should be seriously considered**, and invites all Member States to do so;”
- “a system of registration of advanced robots should be introduced, and calls on the Commission to establish criteria for the classification of robots with a view to **identifying the robots that would need to be registered;**”

# Speculations

“The ever-accelerating progress of technology and changes in the mode of human life, which gives the appearance of approaching some essential **singularity** in the history of the race beyond which human affairs, as we know them, could not continue”

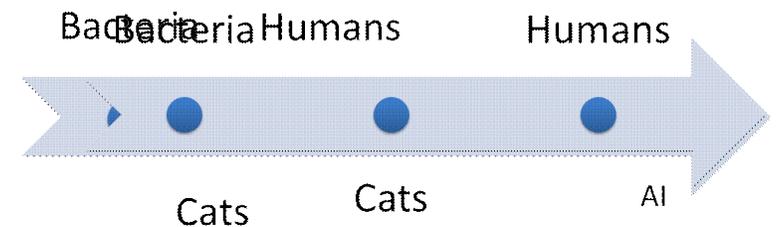
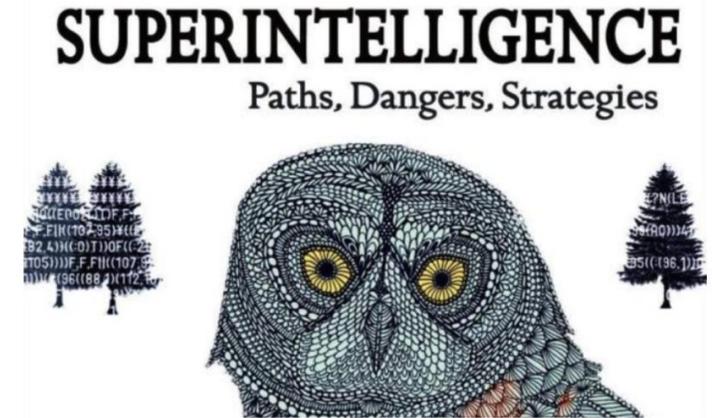
- Von Neumann, quoted by Stanislaw Ulam, 1952



# Speculations

Let an ultraintelligent machine be defined as a machine that can far surpass all the intellectual activities of any man however clever. Since the design of machines is one of these intellectual activities, an ultraintelligent machine could design even better machines; there would then unquestionably be an 'intelligence explosion', and the intelligence of man would be left far behind. Thus the first ultraintelligent machine is the **last invention** that man need ever make, provided that the machine is docile enough to tell us how to keep it under control.

- *Irving John Good, 1965*



# The Future of Intelligence

