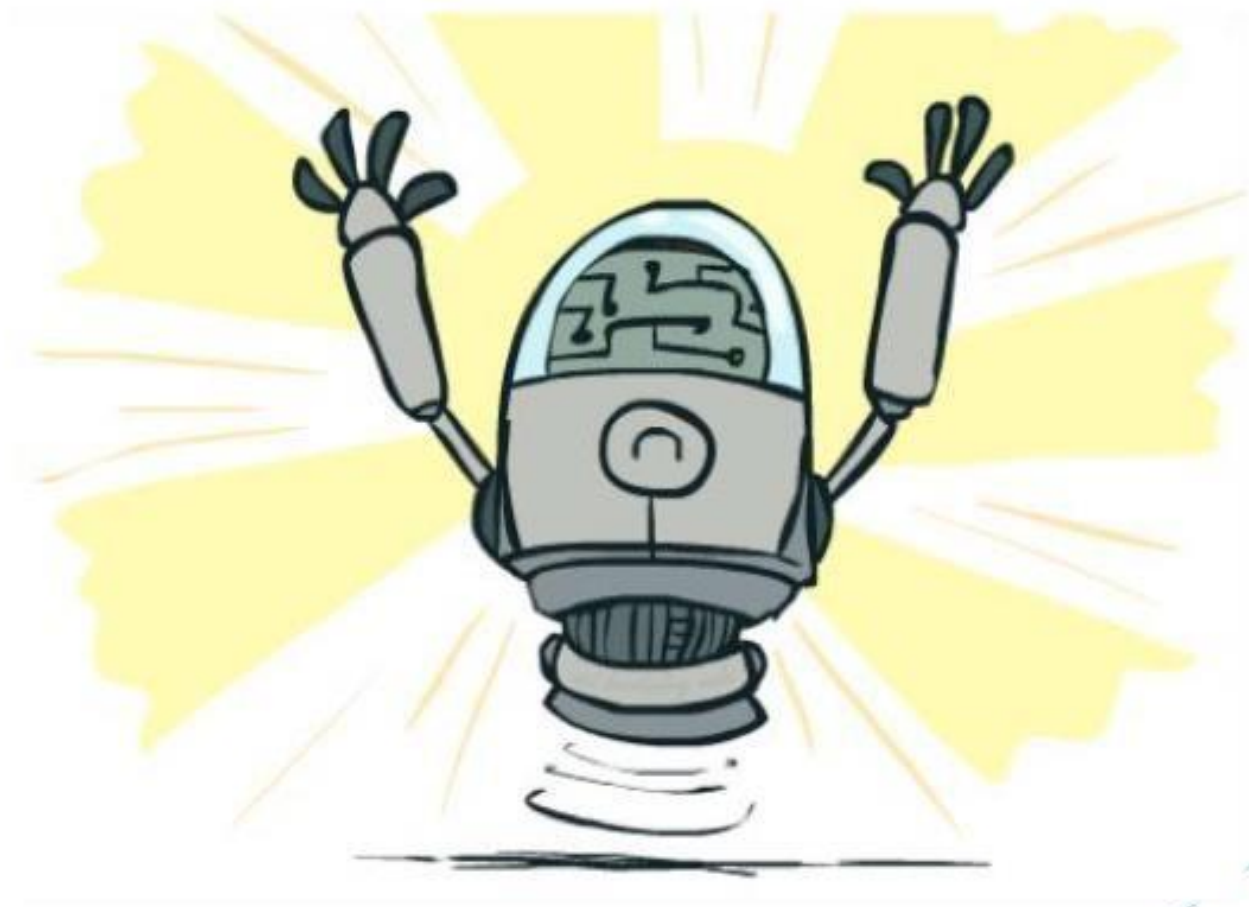


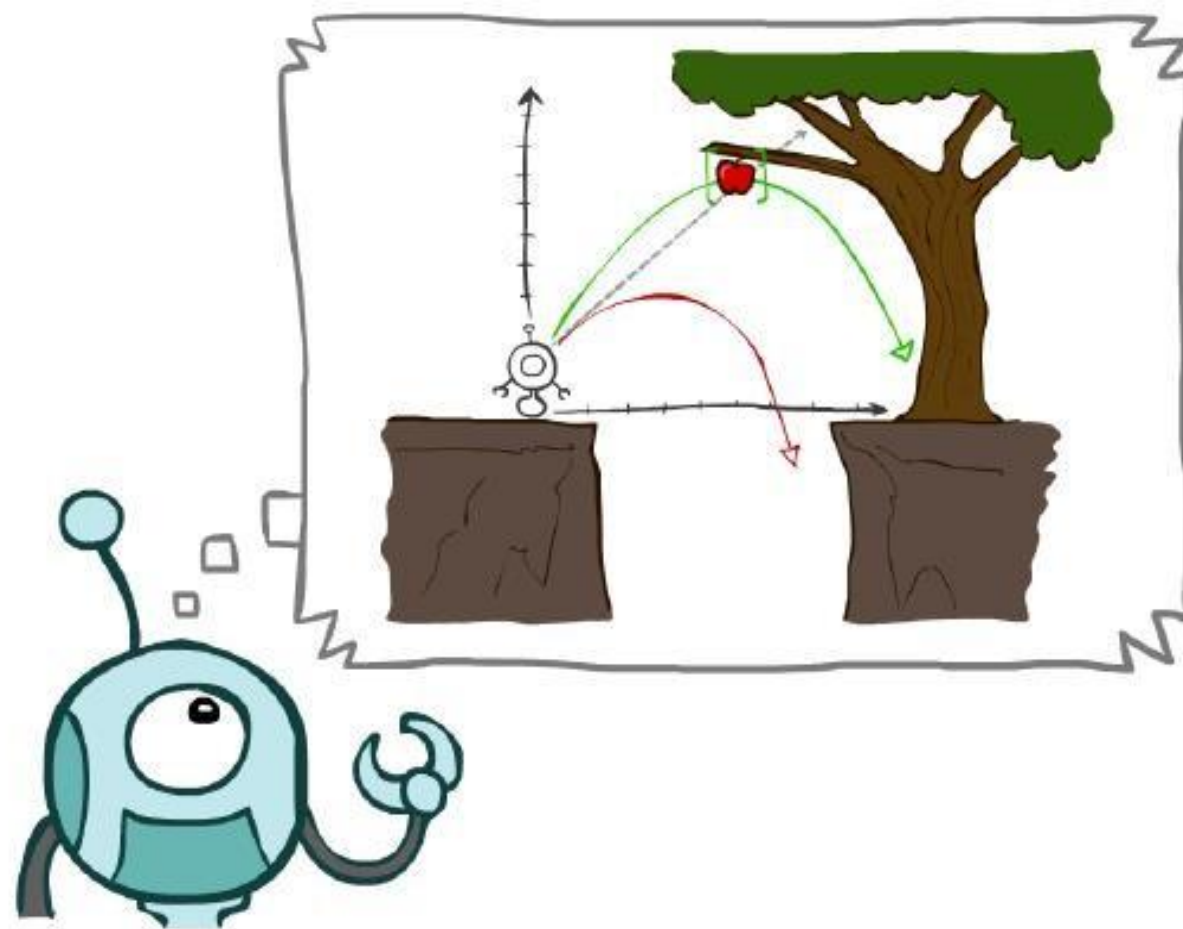
# Artificial Intelligence



- *What is artificial intelligence?*
- *What can AI do?*
- *What do you expect to learn from this course?*

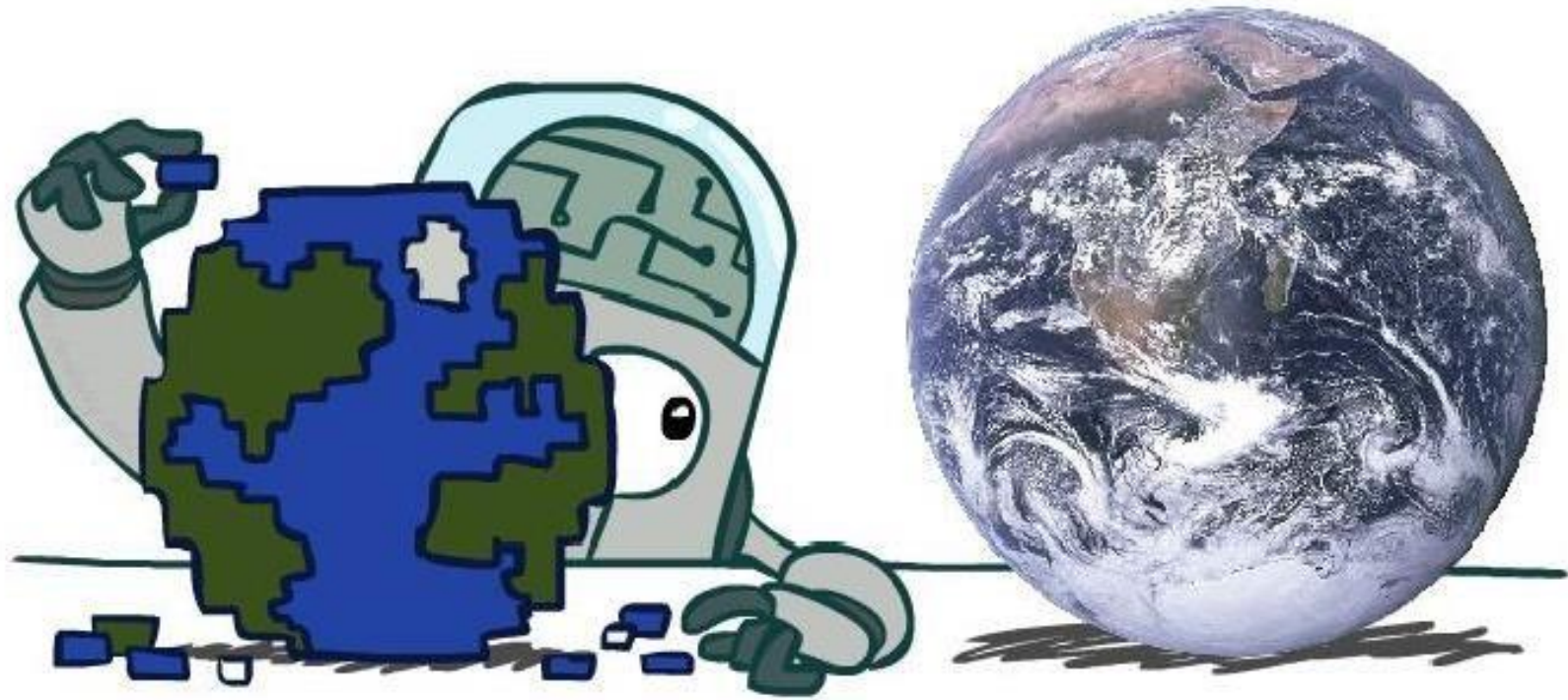


# Agents that solve Problems

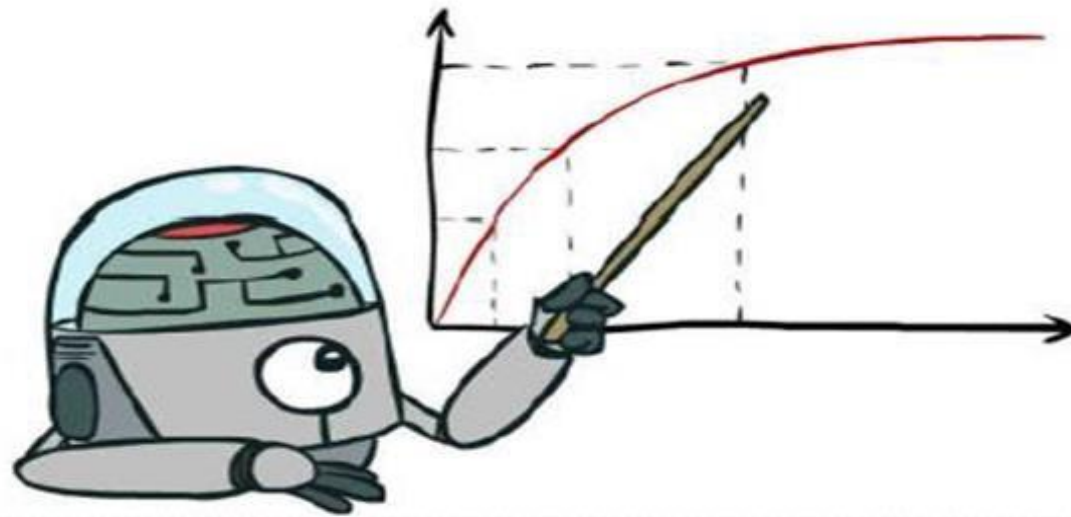




# Problems Are Models



# Optimization



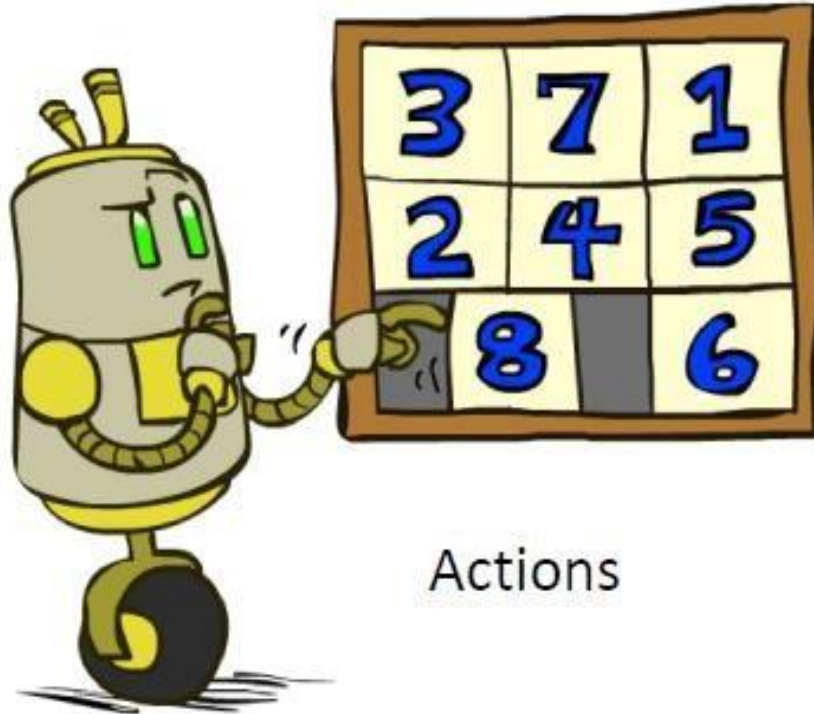
***Maximize Your Expected Utility...***  
**Maximally achieving your goals.**



# Search Problems

7	2	4
5		6
8	3	1

Start State

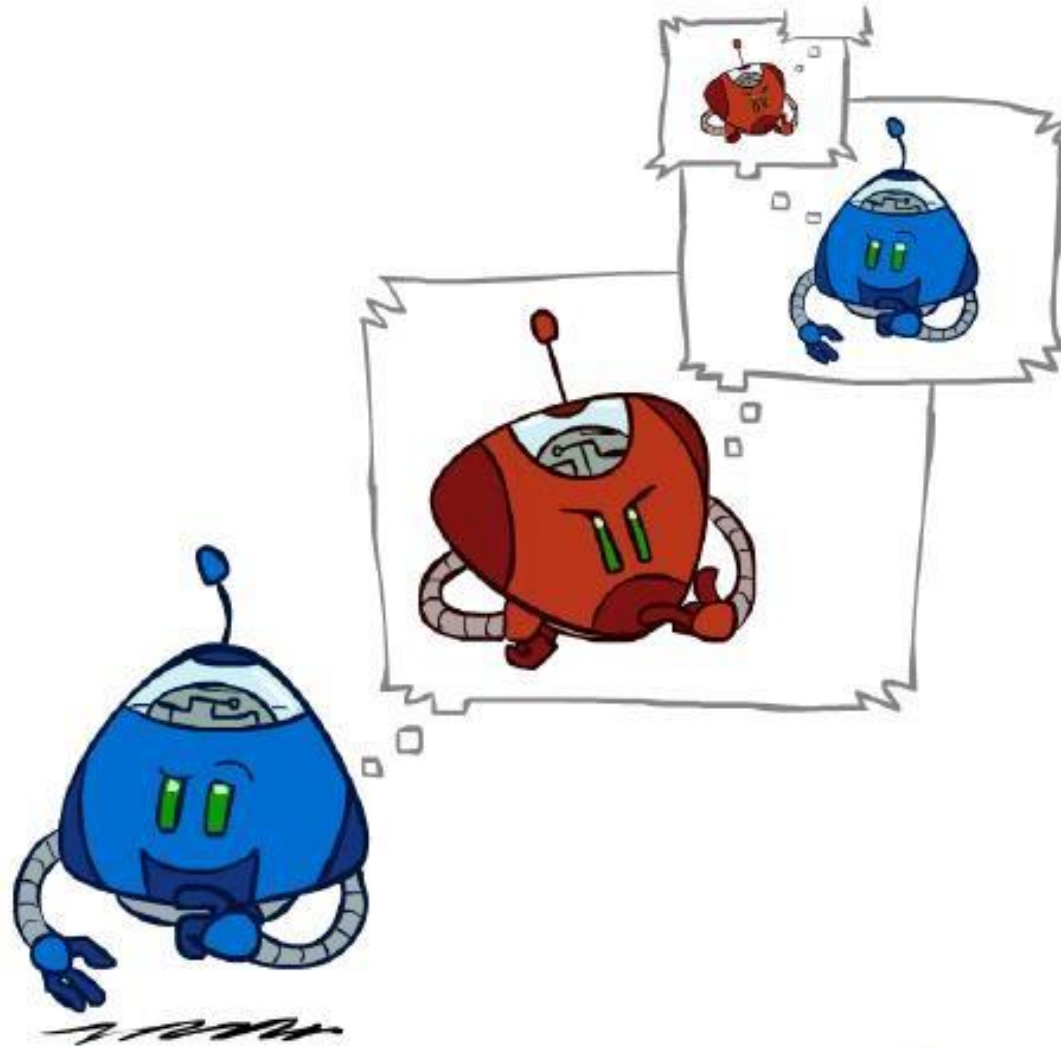


Actions

	1	2
3	4	5
6	7	8

Goal State

# Adversarial Search

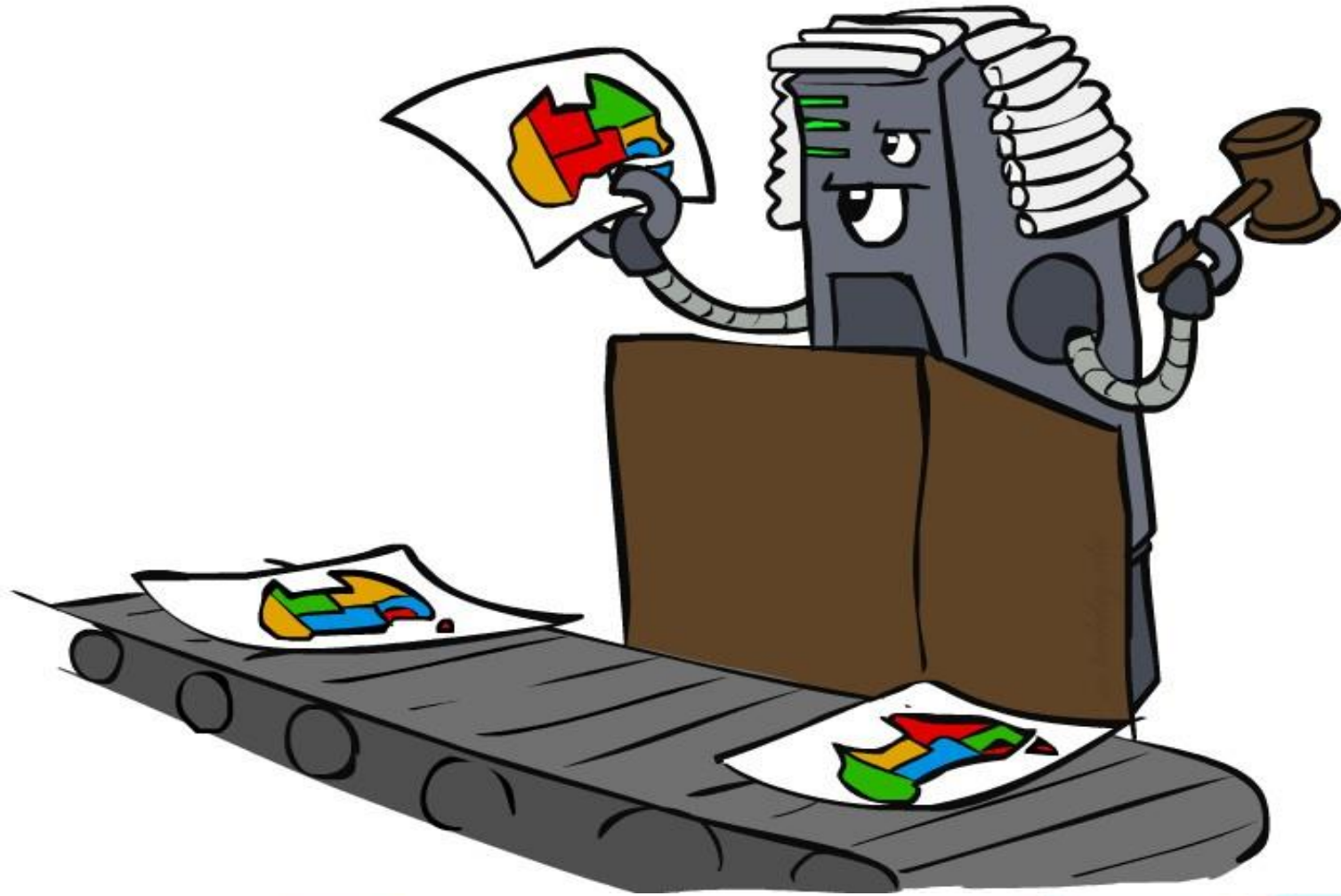


# Constraint Satisfaction Problems

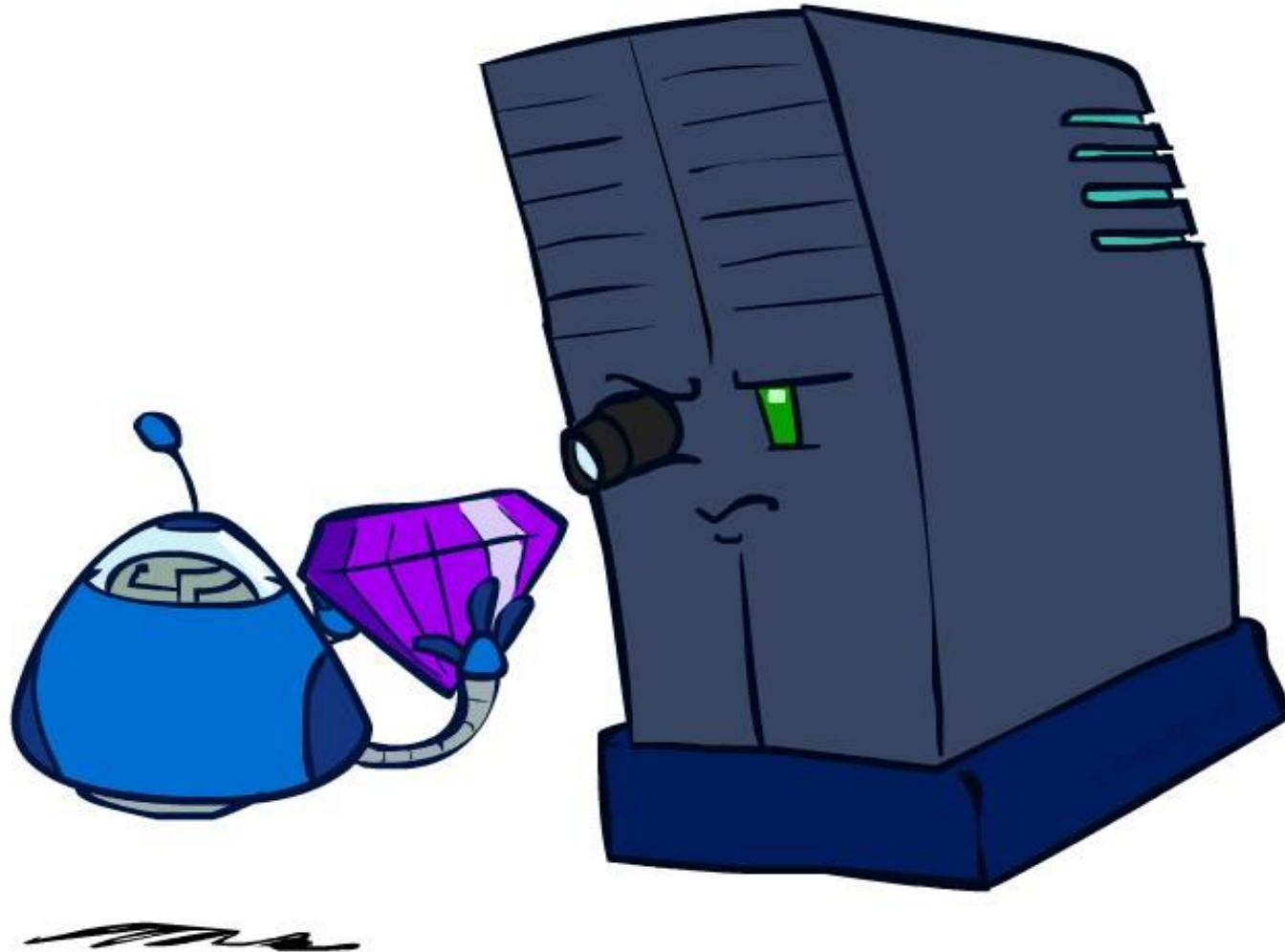




# Constraint Satisfaction Problems



# Constraint Satisfaction Problems



# Evolutionary algorithms

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

5	8	9	4	2	3	5	7	5	8
---	---	---	---	---	---	---	---	---	---

=>

5	1	9	4	4	5	5	7	5	9
---	---	---	---	---	---	---	---	---	---

0	8	2	3	2	3	6	7	8	8
---	---	---	---	---	---	---	---	---	---

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

5	8	9	4	2	3	5	7	5	8
---	---	---	---	---	---	---	---	---	---

=>

0	1	2	4	2	3	6	7	8	9
---	---	---	---	---	---	---	---	---	---

5	8	9	3	4	5	5	7	5	8
---	---	---	---	---	---	---	---	---	---





Machine Learning

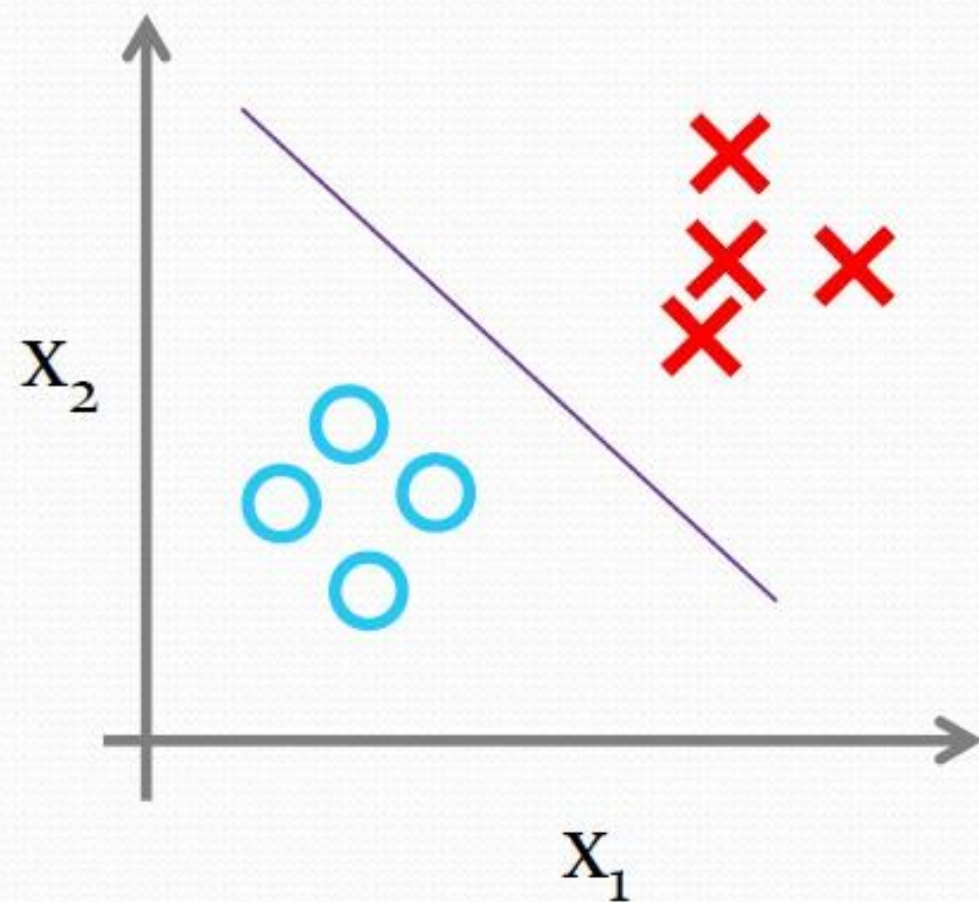
# What is machine learning?



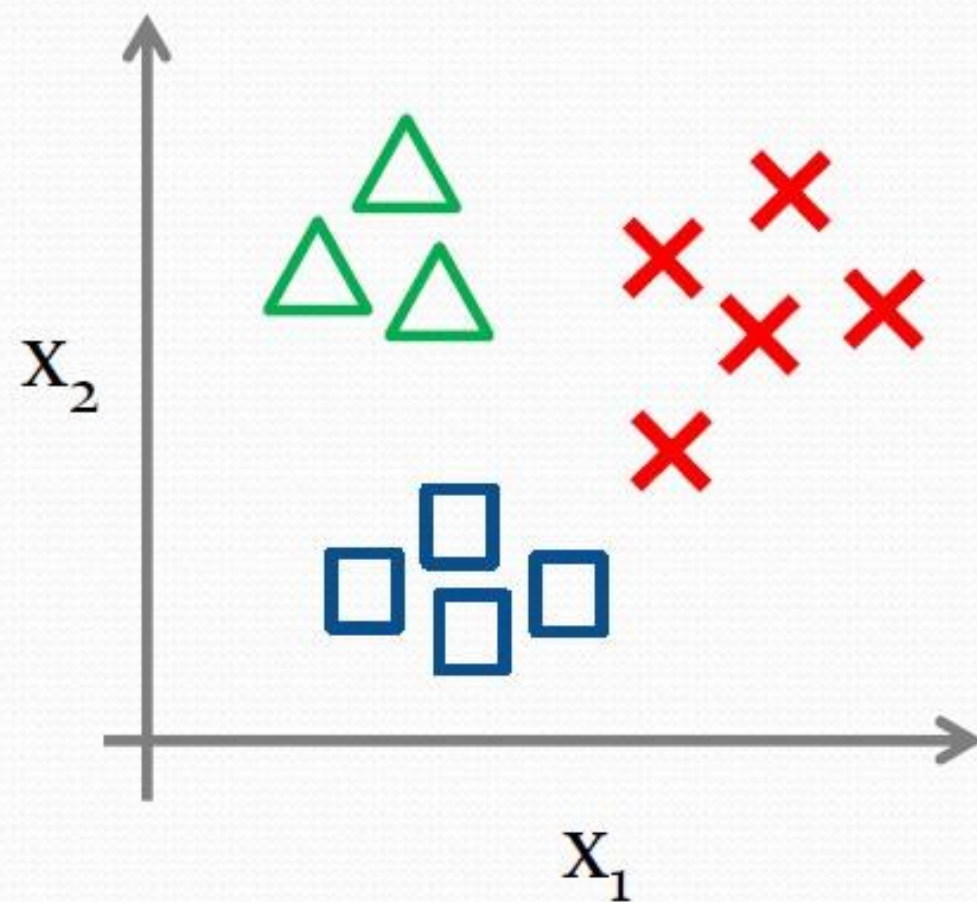
Machine Learning

# Supervised Learning

Binary classification:

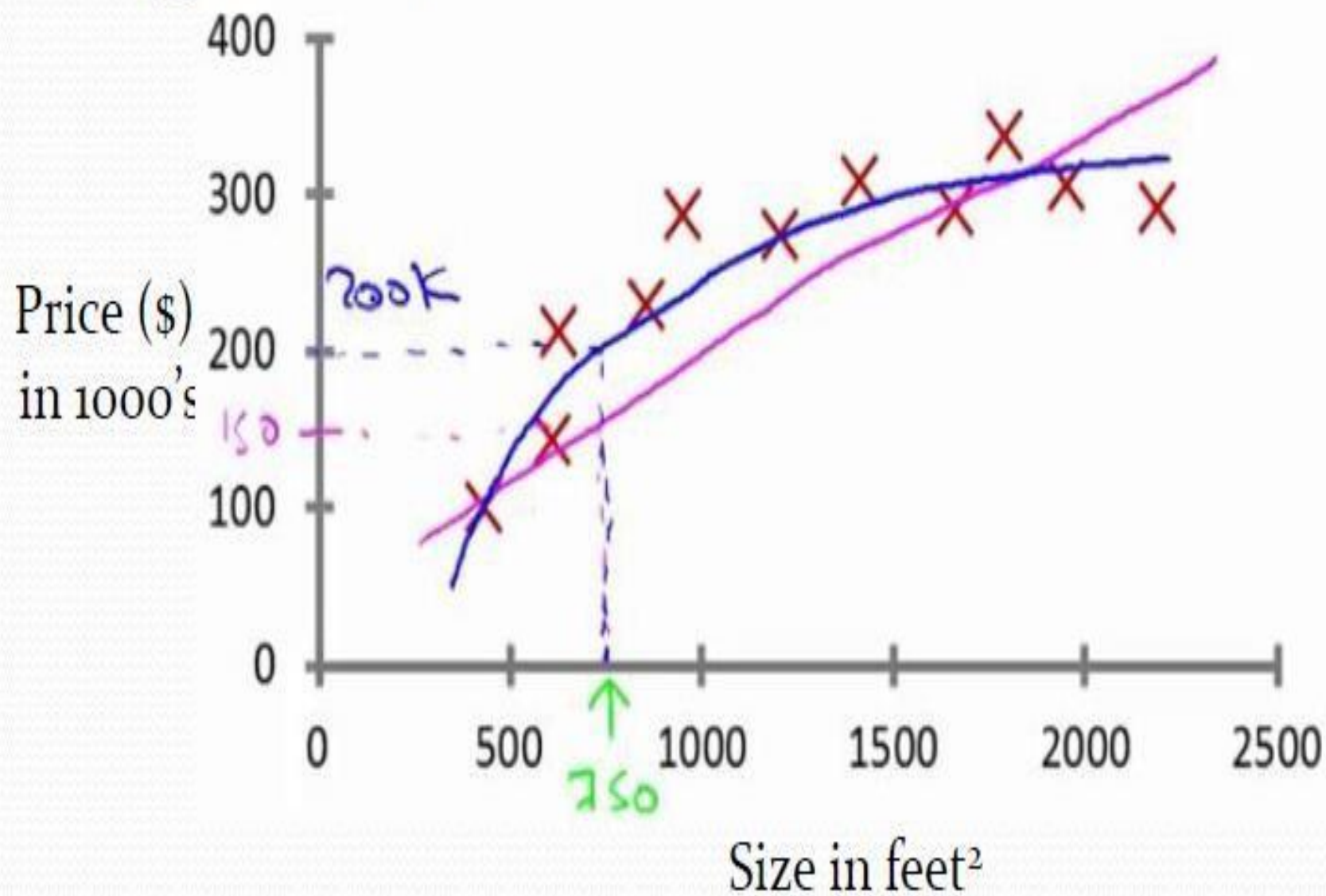


Multi-class classification:





# Housing price prediction.





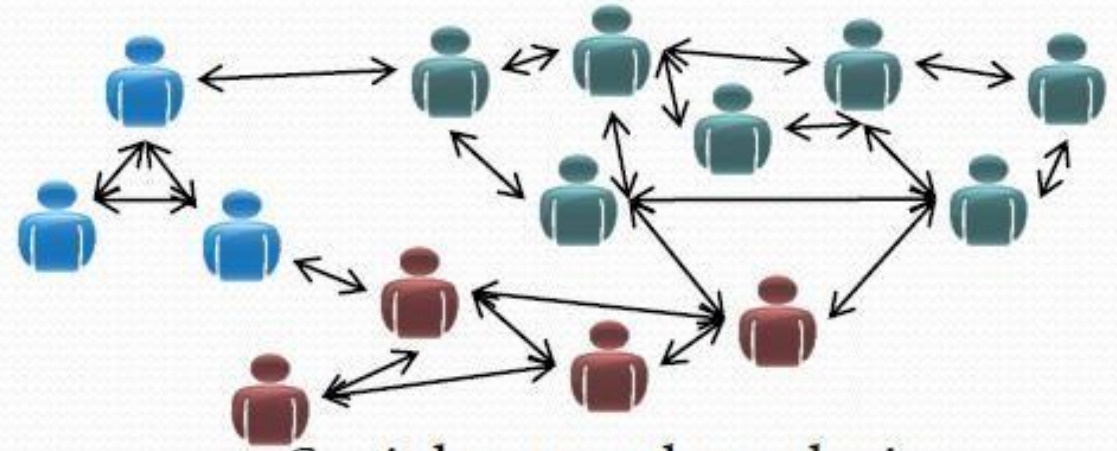
Machine Learning

# Unsupervised Learning

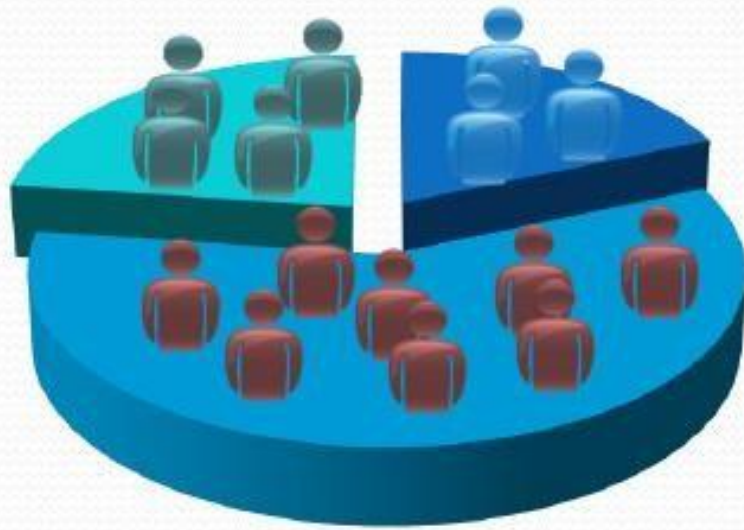




Organize computing clusters



Social network analysis



Market segmentation

Dr Sherin ElGokhy

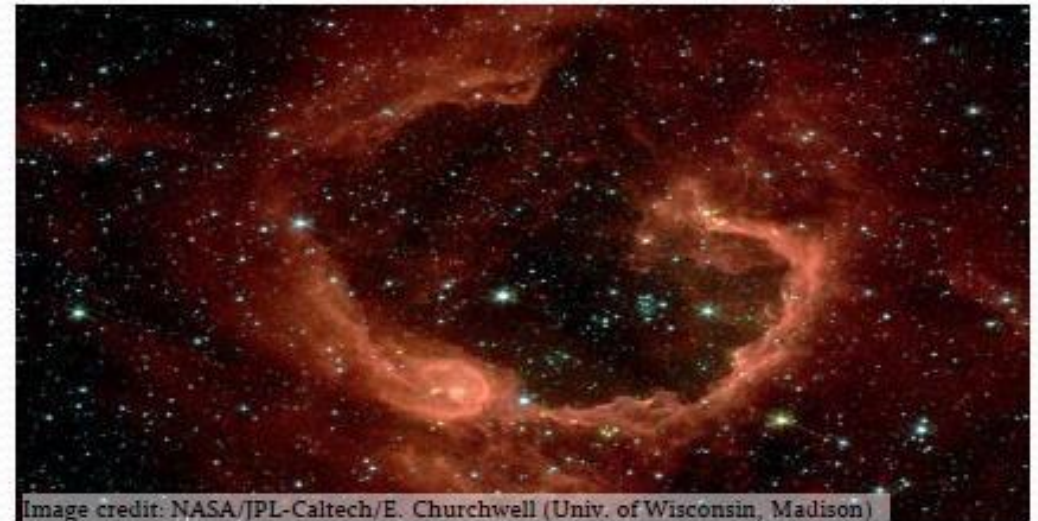
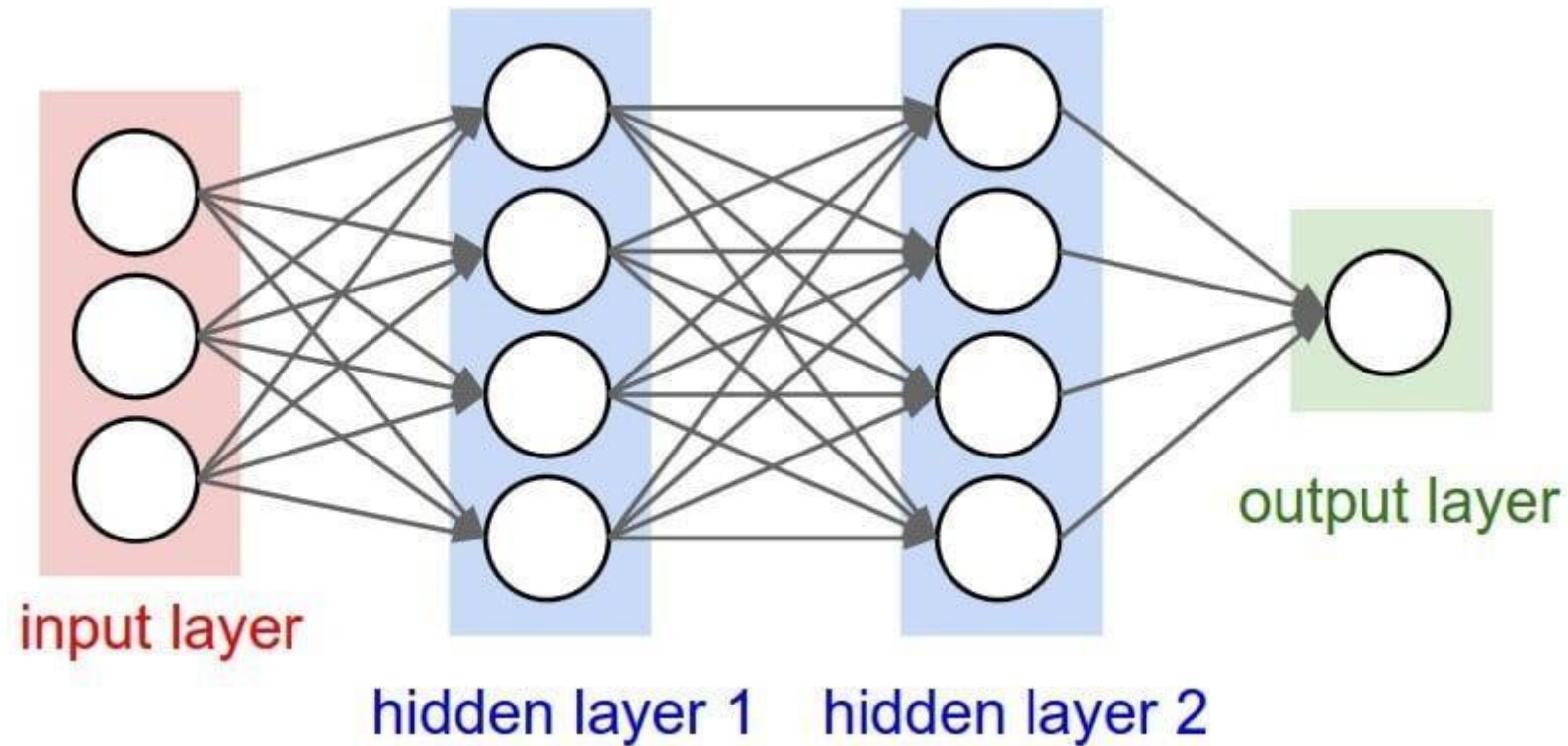


Image credit: NASA/JPL-Caltech/E. Churchwell (Univ. of Wisconsin, Madison)

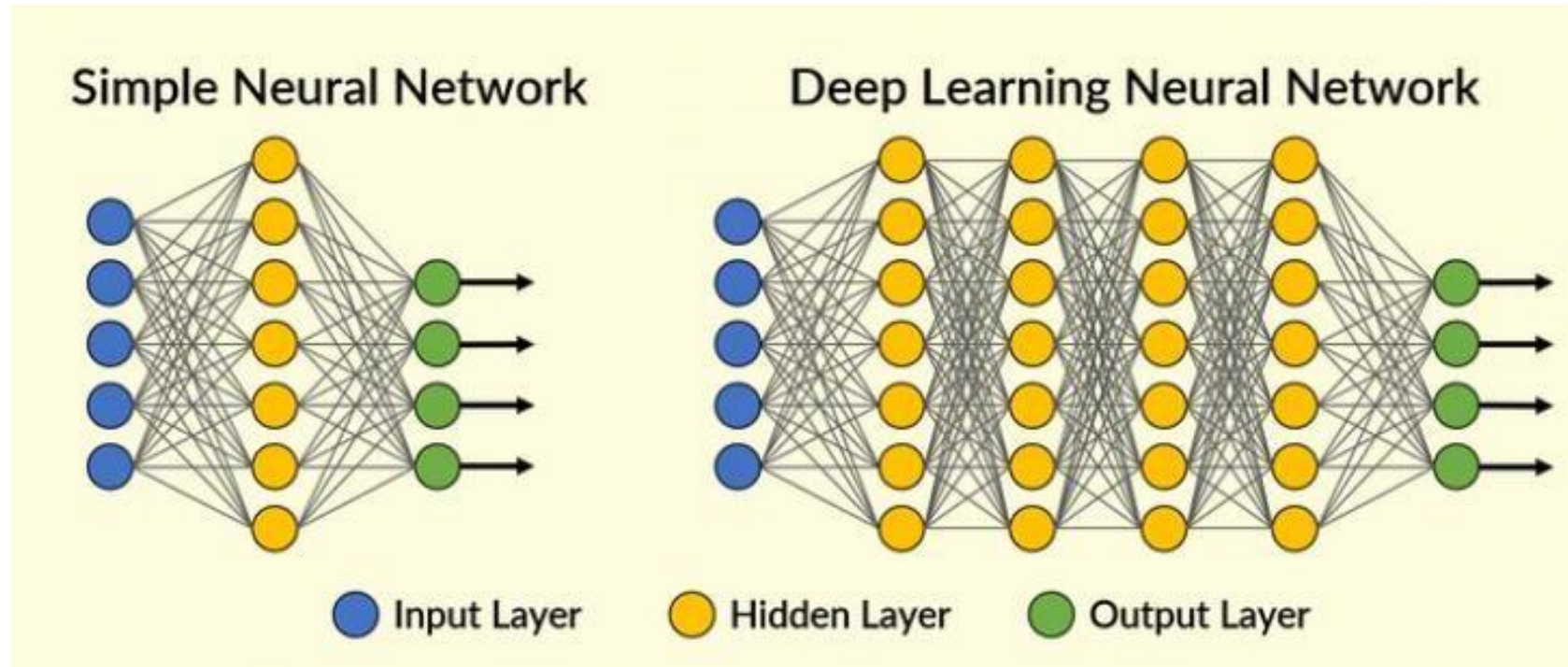
Astronomical data analysis



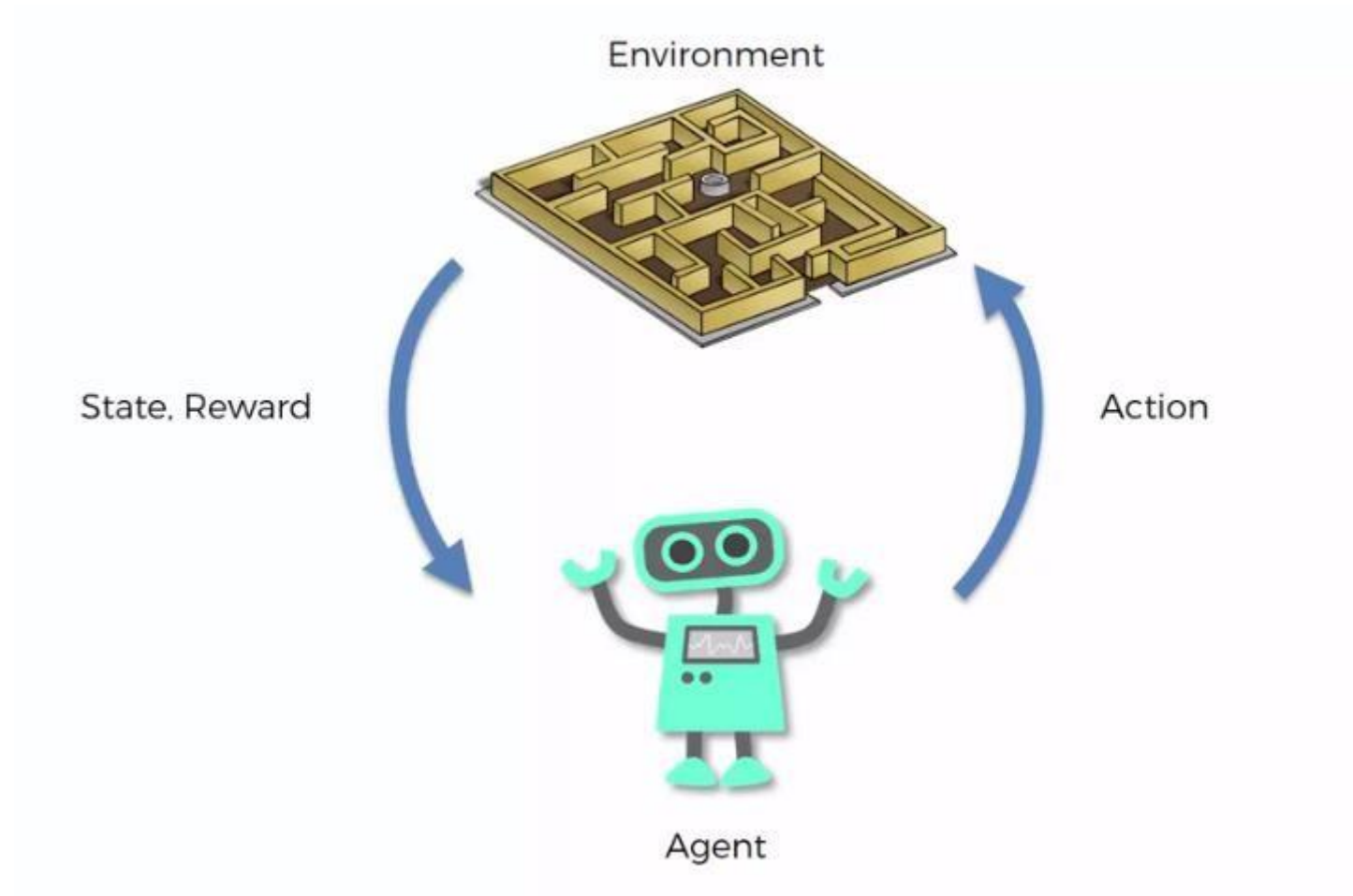
# Artificial Neural network



# Deep learning

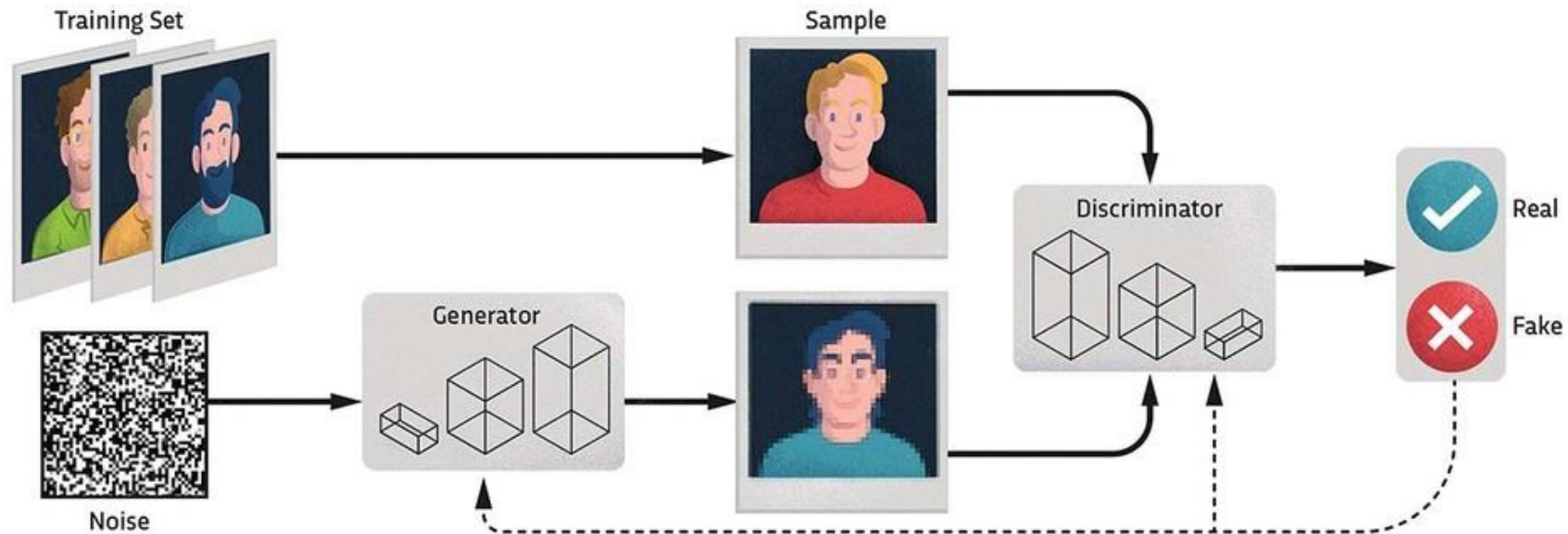


# Reinforcement learning

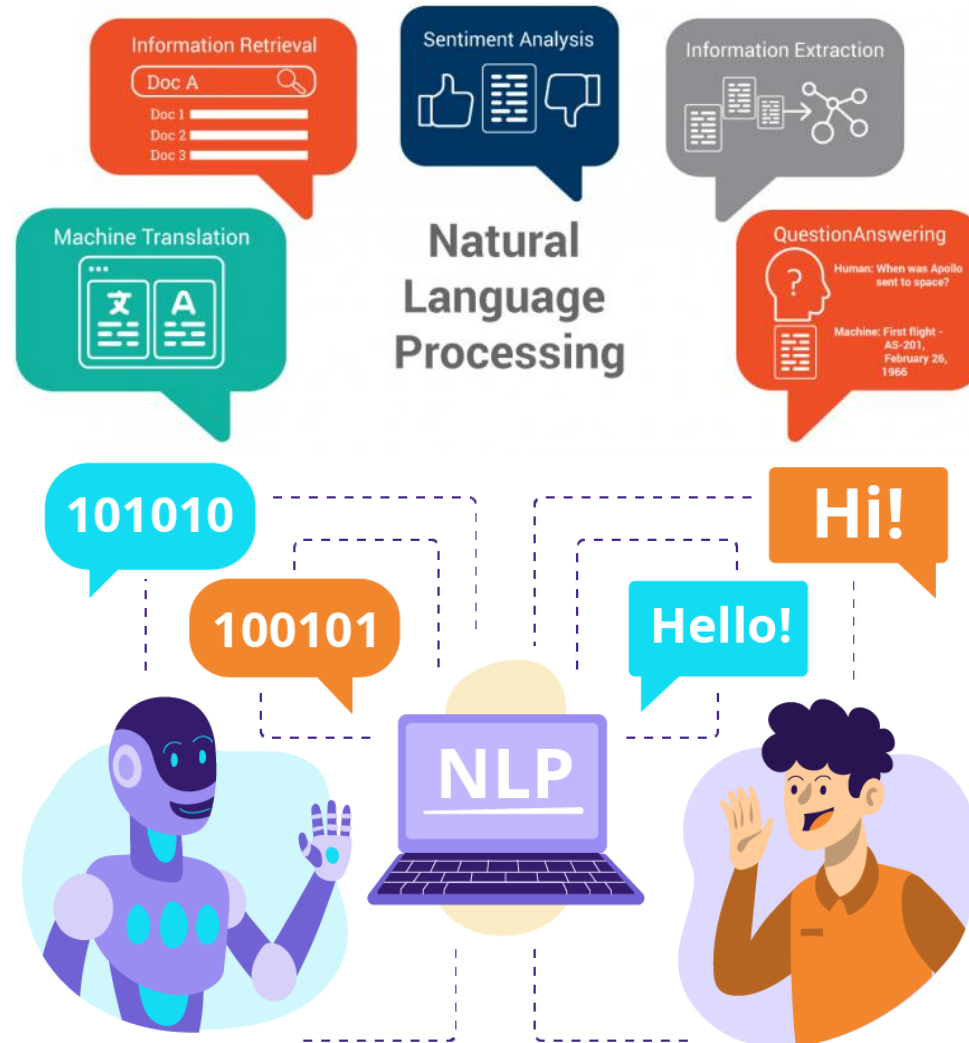




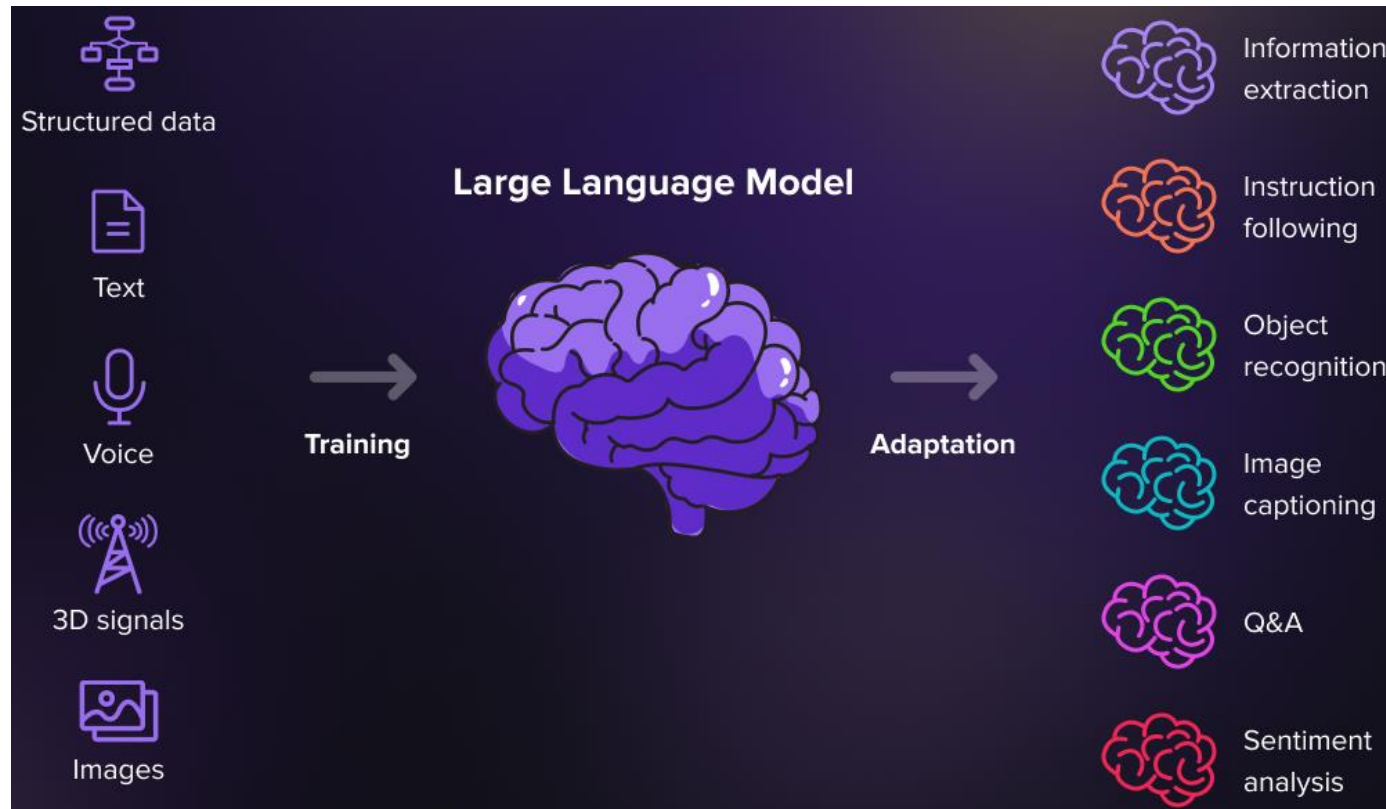
# Generative Adversarial Networks (GANs)



# Natural Language Processing (NLP)



# Large Language Models (LLM)



**Ex:** ChatGPT, BERT, Lamda, Llama, .....





# Thanks

*Dr Sherin ElGokhy*