Artificial intelligence

A helpful taxonomy

Jason Stanley
Element AI

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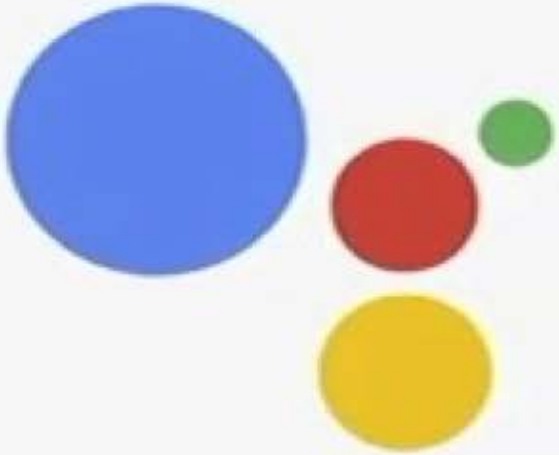
FREIGHTLINER
010



“Hi, I'm calling to book a women's haircut for a client.”

AI is “the study and design of intelligent agents

where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success.”

—Peter Norvig and Stuart Russell

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How

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~~How~~ Big data

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~~How~~ ~~Big data~~ Human

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~~How~~ ~~Big data~~ ~~Human~~

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~~How~~ ~~Big data~~ ~~Human~~

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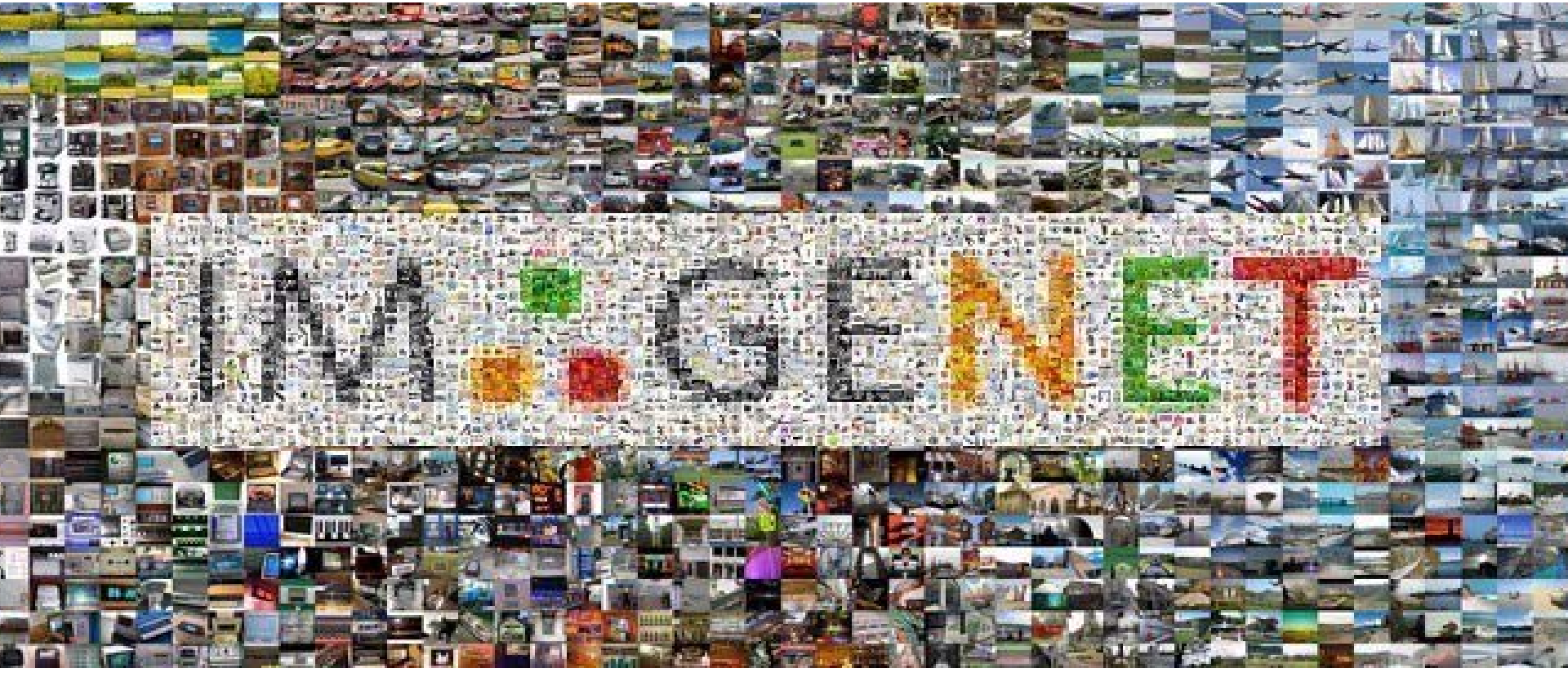
DIGITAL

Data Science

Machine Learning

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Data Science

The field of computational techniques used to extract insights from data.

Machine Learning

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The field of computational techniques used to extract insights from data.

Machine Learning

The field of computational techniques used to create machines that learn from data to perform a task.

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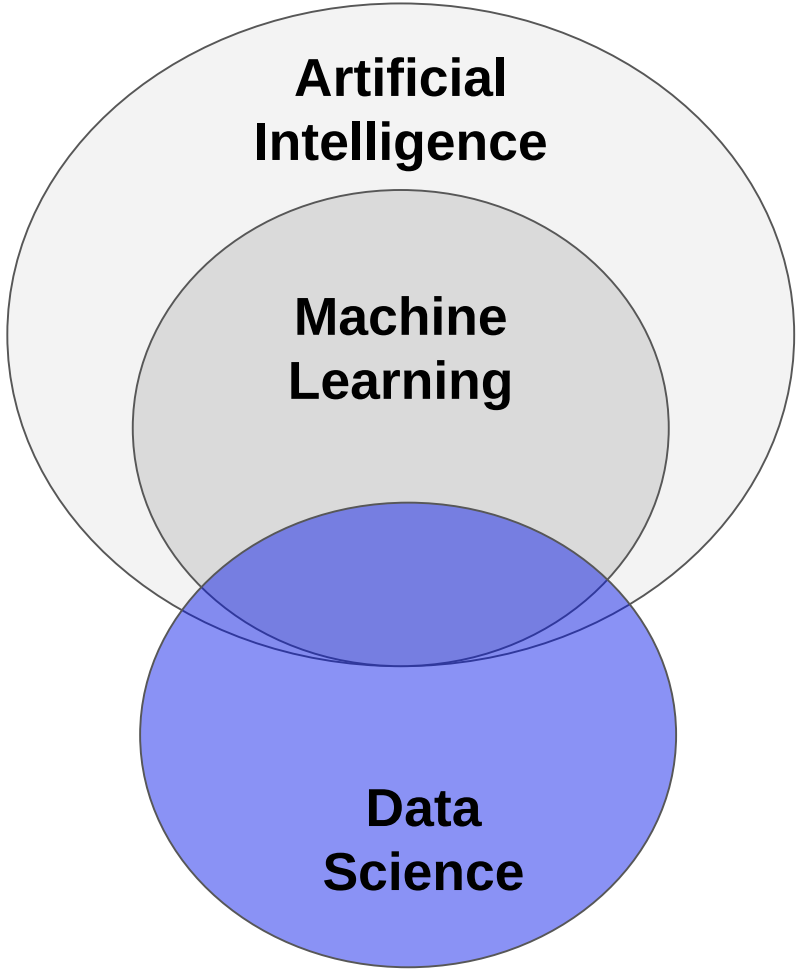

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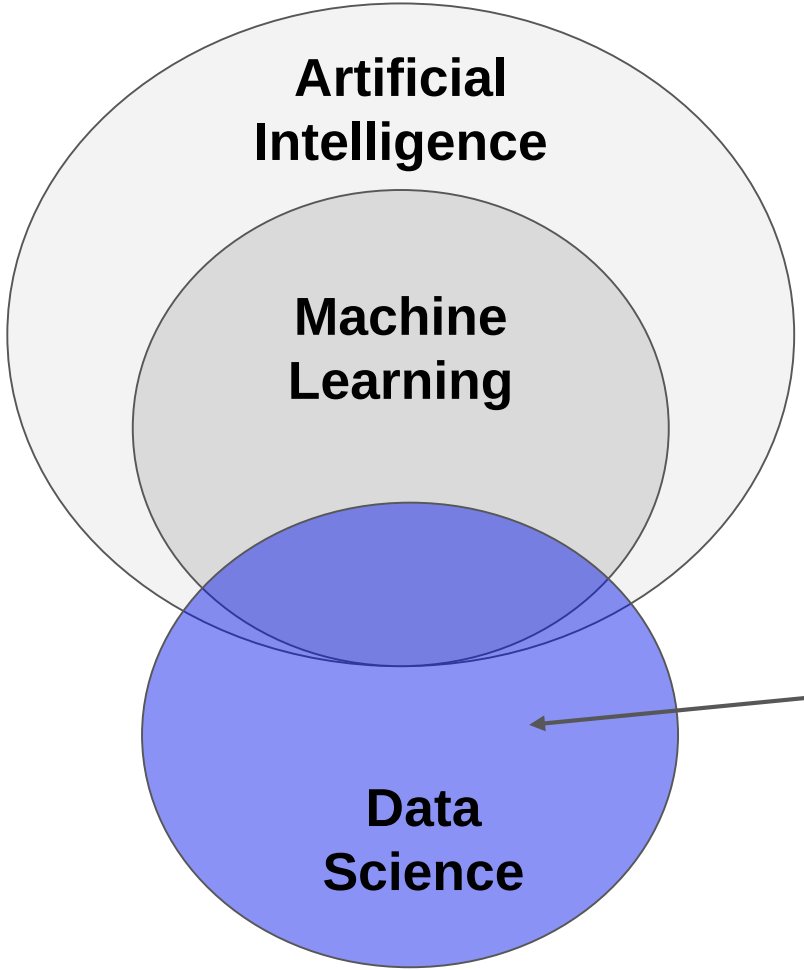

Clean
Validate
Analyze
Visualize
Communicate

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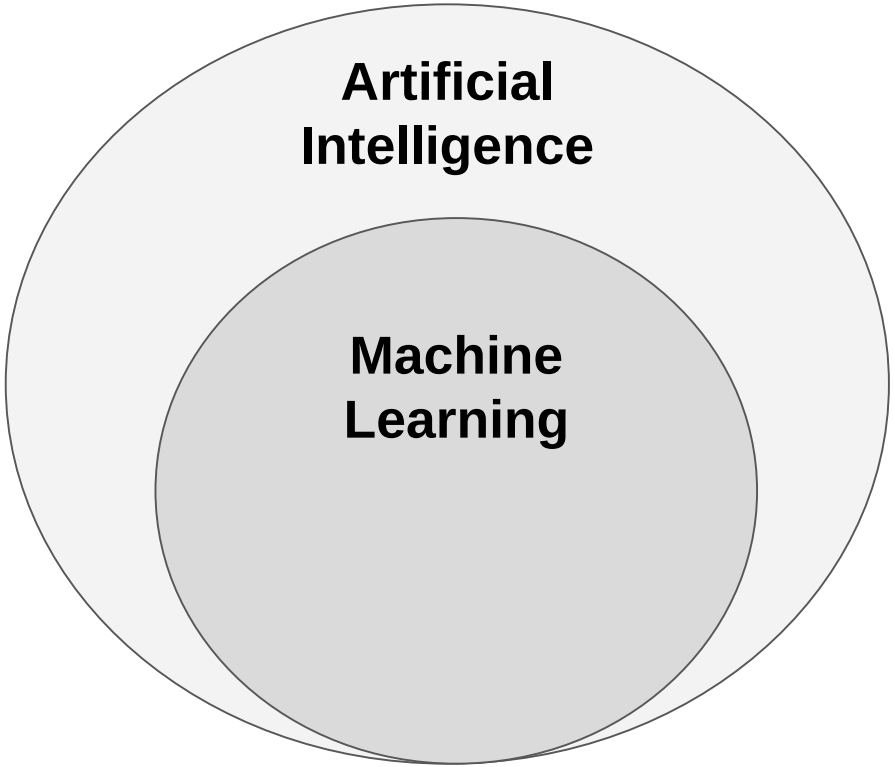

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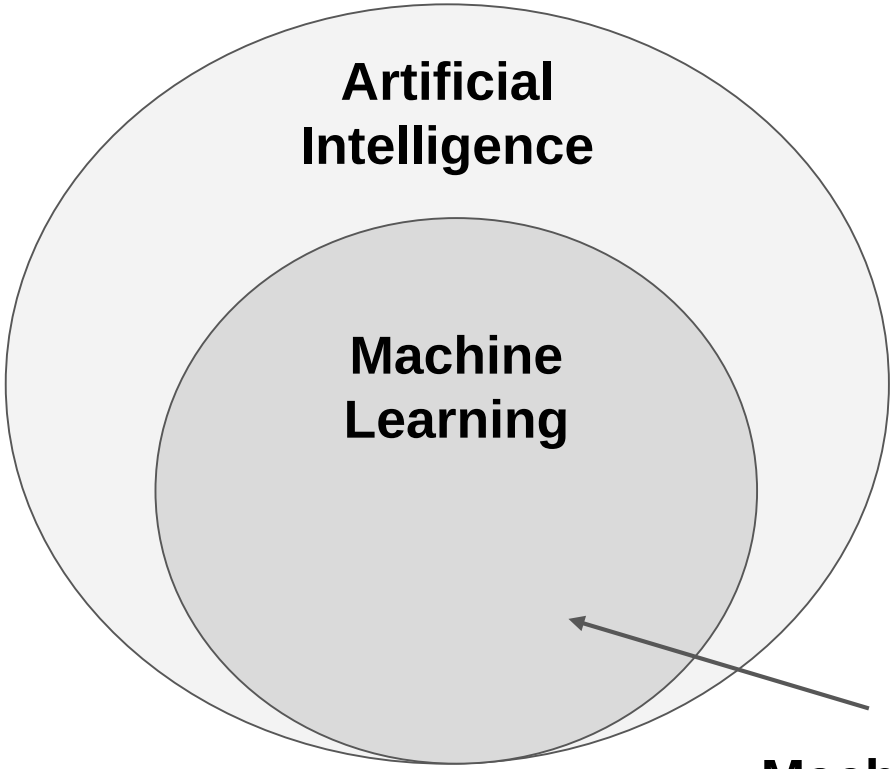

Machines that learn from data

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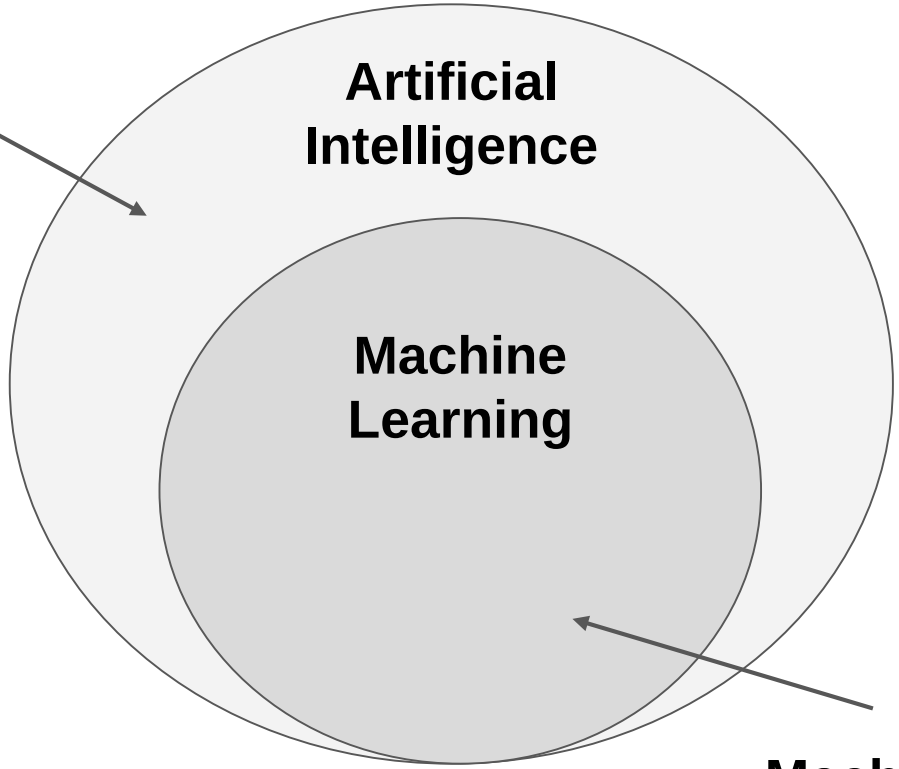
Symbolic AI

Expert system
Knowledge base



Machines that learn from data

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Machine translation

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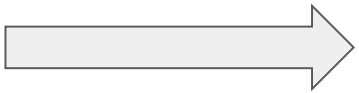
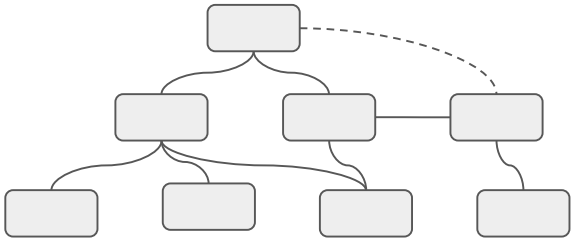
Machine translation

Good old-fashioned AI approach:

‘Expert’ Knowledge



Rule-Based System



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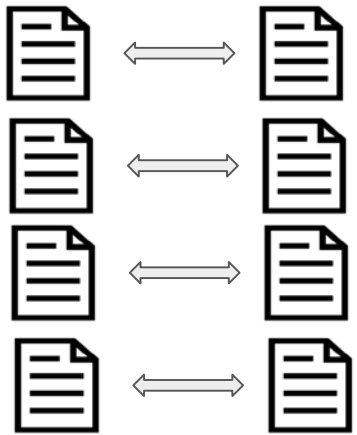
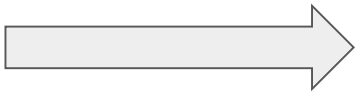
Machine translation

Machine learning approach:

Existing text corpus





Machine learning model

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Deep Learning

Machine learning that uses deep neural networks to learn from data to perform a task.

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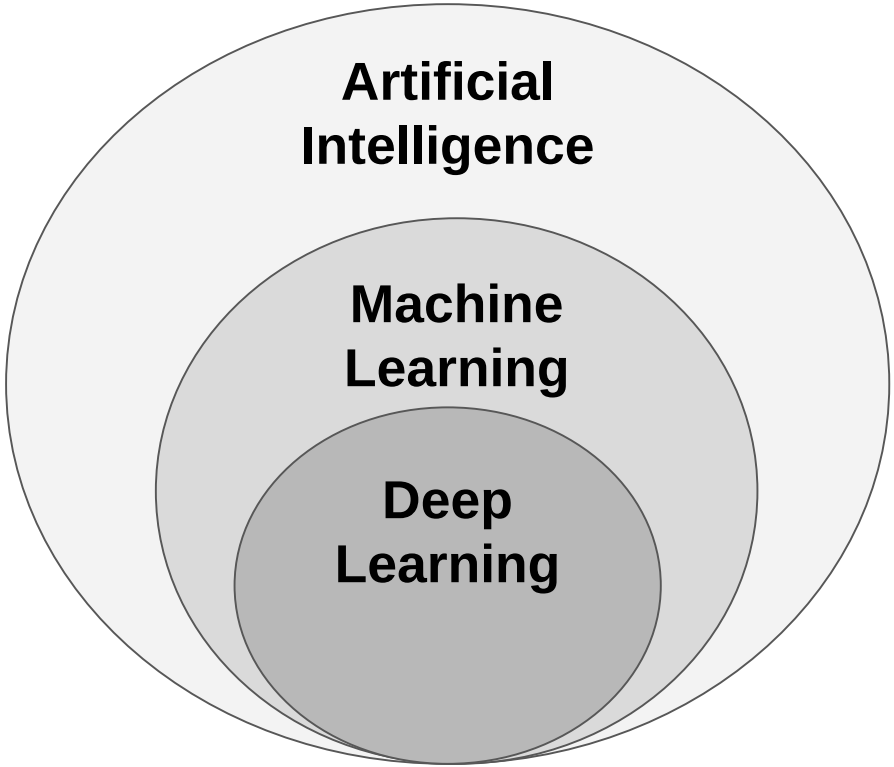

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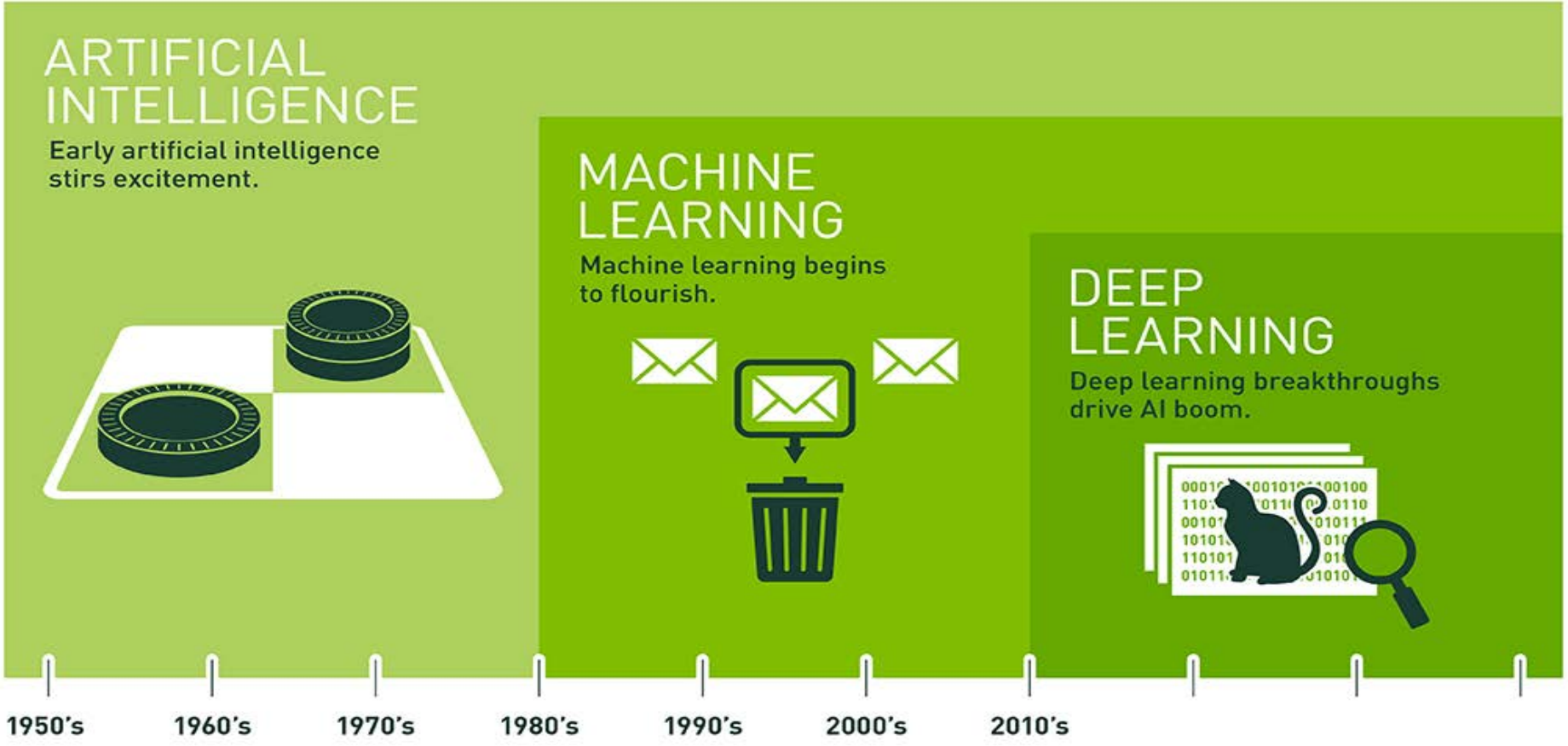
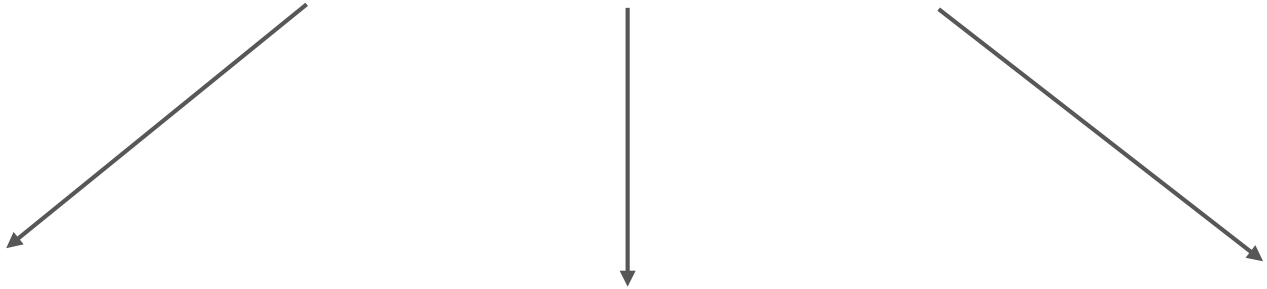
https://blogs.nvidia.com/blog/2016/07/29/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/



Machine Learning



Supervised Learning

Unsupervised Learning

Reinforcement Learning

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Supervised Learning

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Supervised Learning

apple

grapes

orange

grapes

apple

orange

orange

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Supervised Learning

apple

grapes

orange

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apple

orange

orange

???

APPLE

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Supervised Learning

apple

grapes

orange

grapes

apple

orange

orange

???

APPLE X

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Unsupervised Learning

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Unsupervised Learning

Name	Age	Children	Avg monthly spend on alcohol	Avg monthly spend on meats	Avg monthly spend on veg
John	25	0	300	200	100
Mary	43	0	50	75	200
Sarah	48	2	45	100	300
...	...	...	...	...	...

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Unsupervised Learning

Name	Age	Children	Avg monthly spend on alcohol	Avg monthly spend on meats	Avg monthly spend on veg
John	25	0	300	200	100
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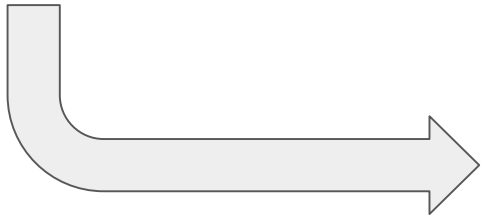

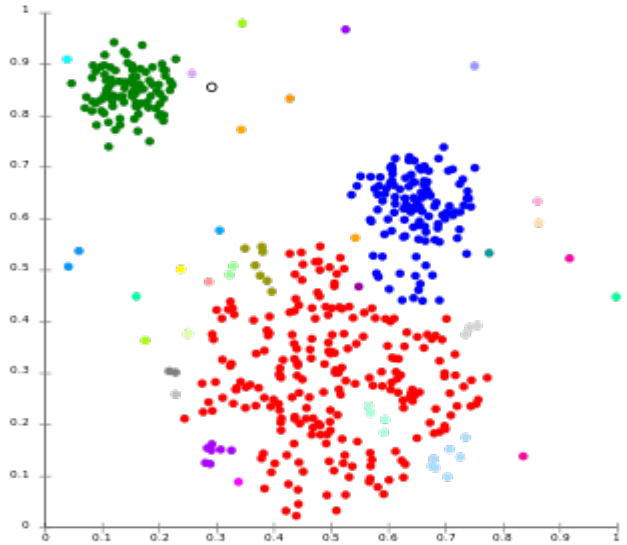

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Reinforcement Learning

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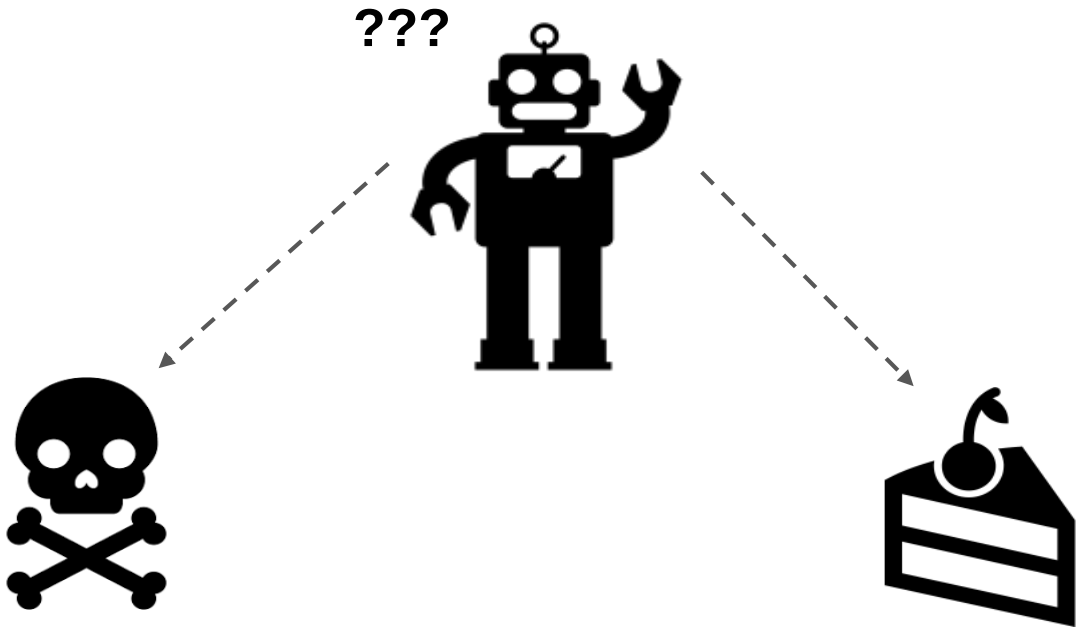
Reinforcement Learning

1. **Observe environment**



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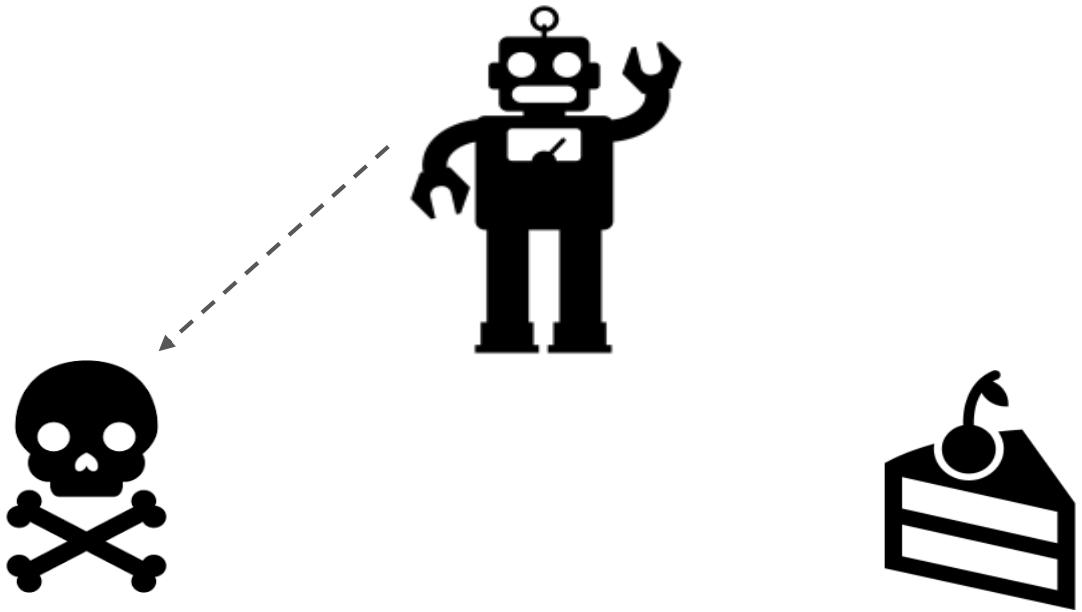
Reinforcement Learning

1. **Observe environment**
2. **Select action based on policy**



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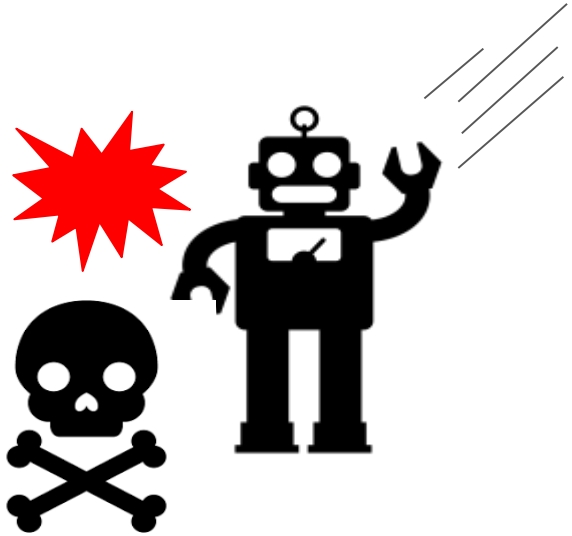
Reinforcement Learning

1. **Observe environment**
2. **Select action based on policy**
3. **Take action**



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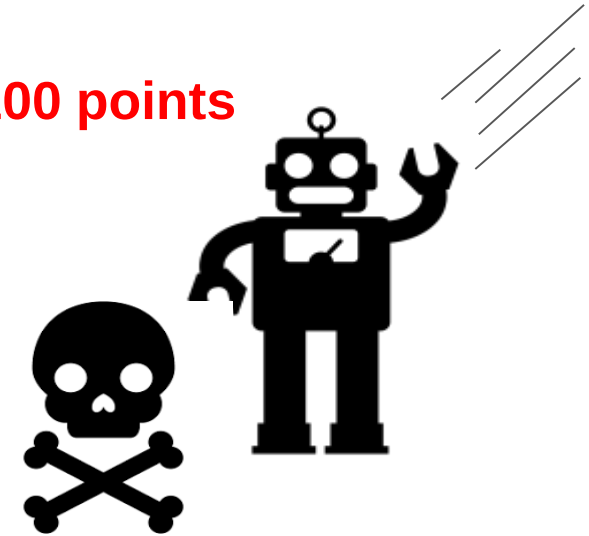
Reinforcement Learning

1. Observe environment
2. Select action based on policy
3. Take action
4. Process reward or penalty

-100 points



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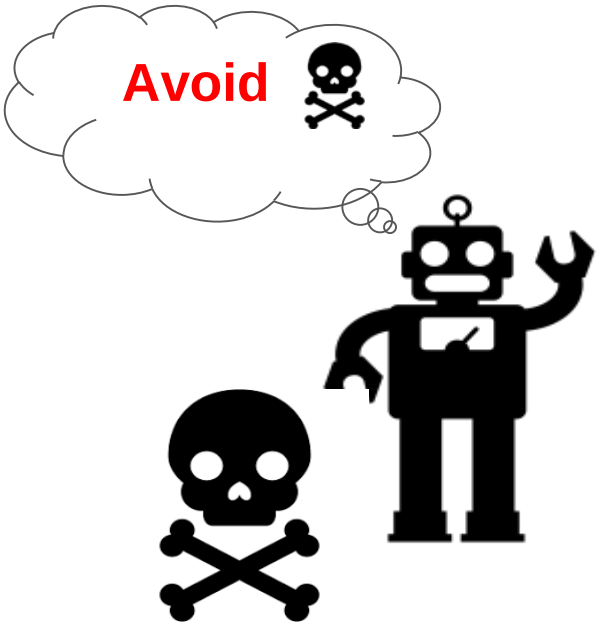
Reinforcement Learning



1. Observe environment
2. Select action based on policy
3. Take action
4. Process reward or penalty
5. Update policy

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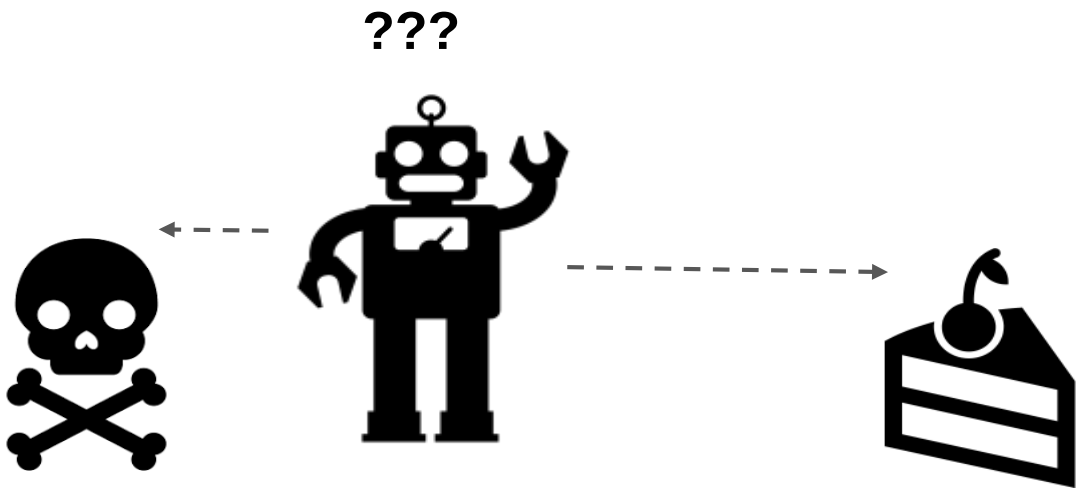
Reinforcement Learning

1. Observe environment
2. Select action based on policy
3. Take action
4. Process reward or penalty
5. Update policy
6. Iterate until optimal policy is discovered



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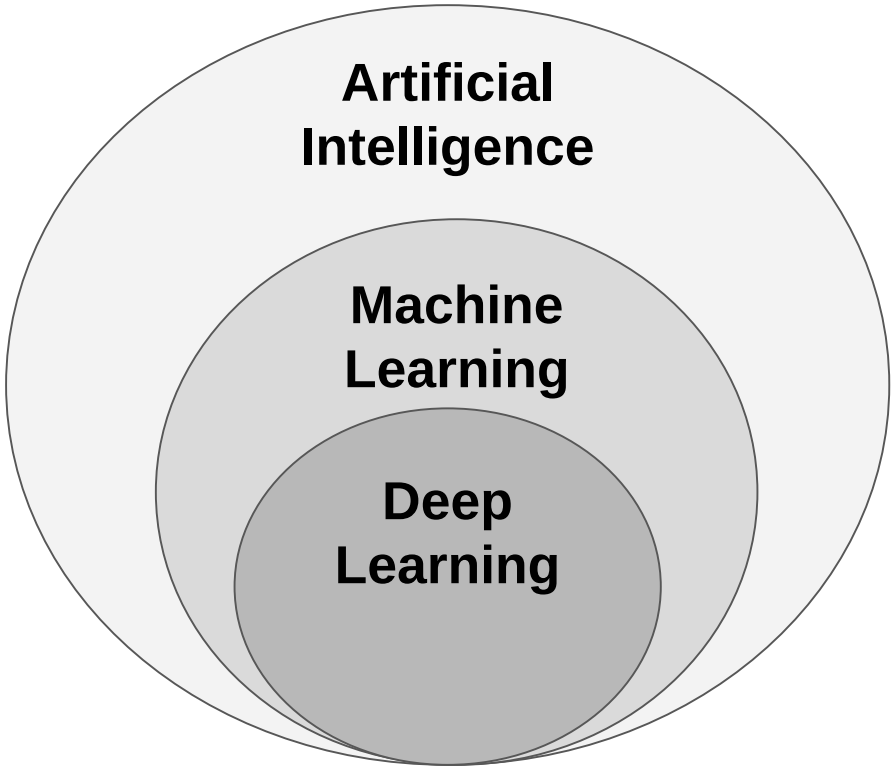
Supervised
Unsupervised
Reinforcement



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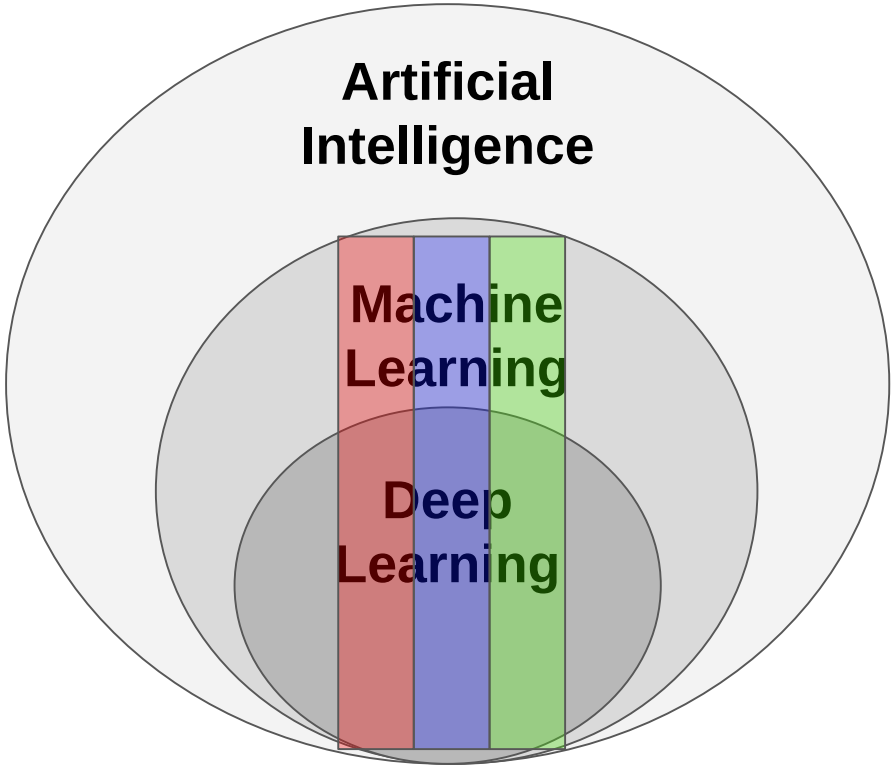
Supervised
Unsupervised
Reinforcement



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Typical Machine Learning Pipeline

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Typical Machine Learning Pipeline

- Private
- Public
- Synthetic

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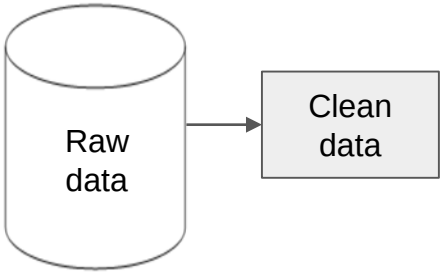
Typical Machine Learning Pipeline



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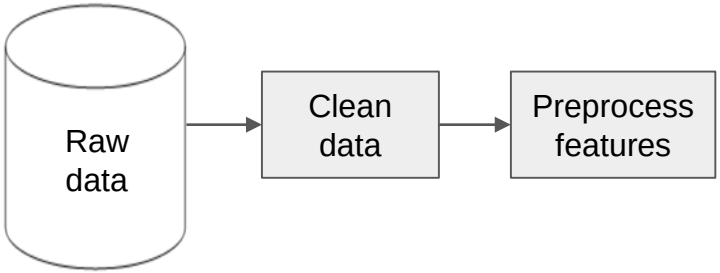
Typical Machine Learning Pipeline



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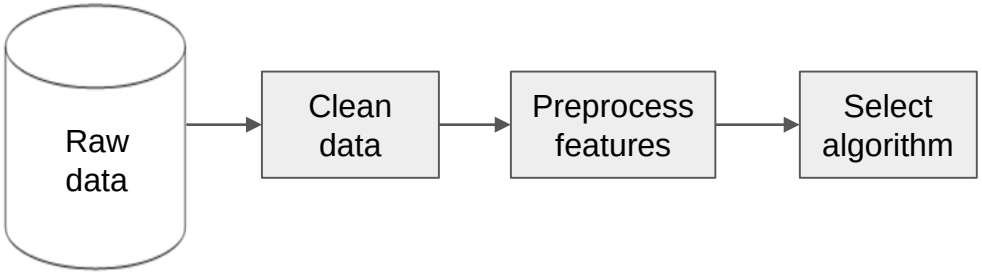

- Off-the-shelf
- Custom

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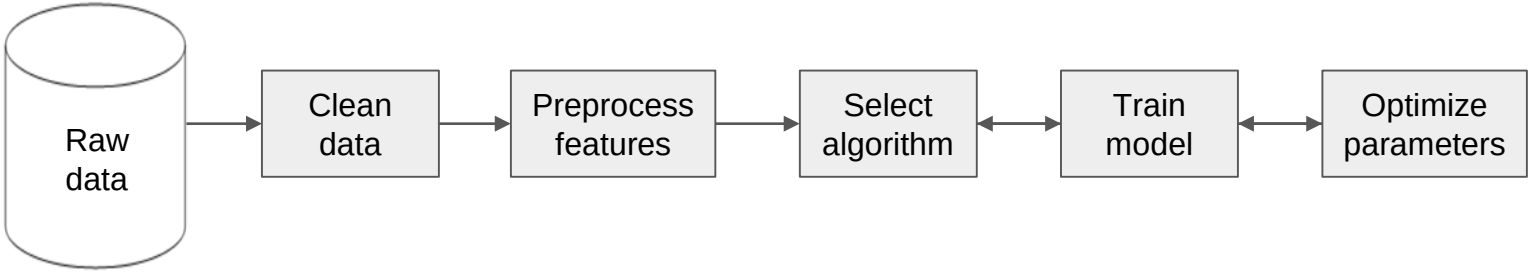
Typical Machine Learning Pipeline



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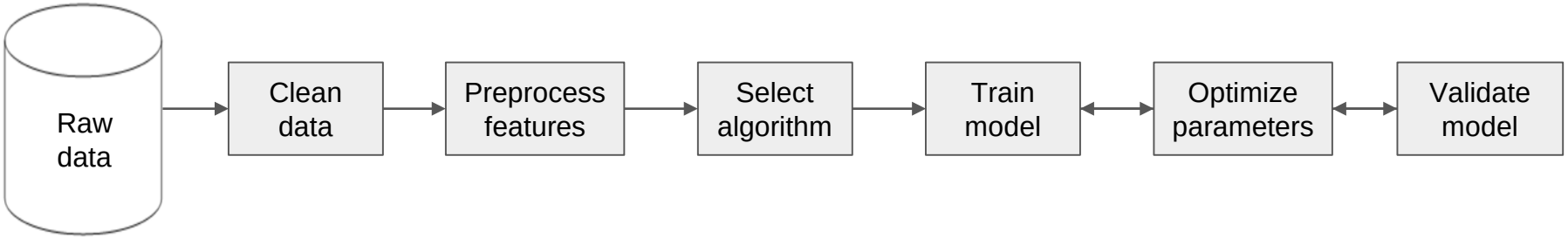

- Trained model ready to deploy

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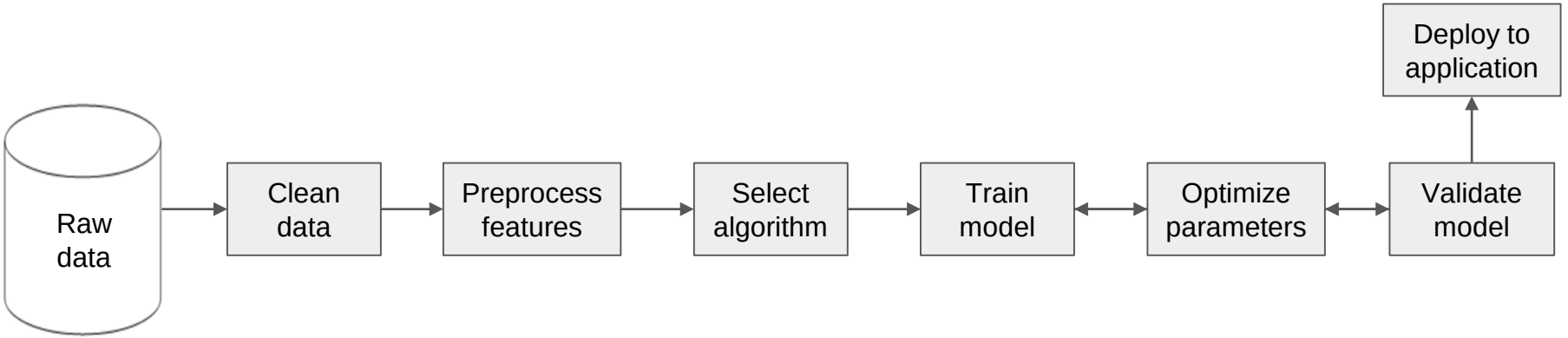
Typical Machine Learning Pipeline



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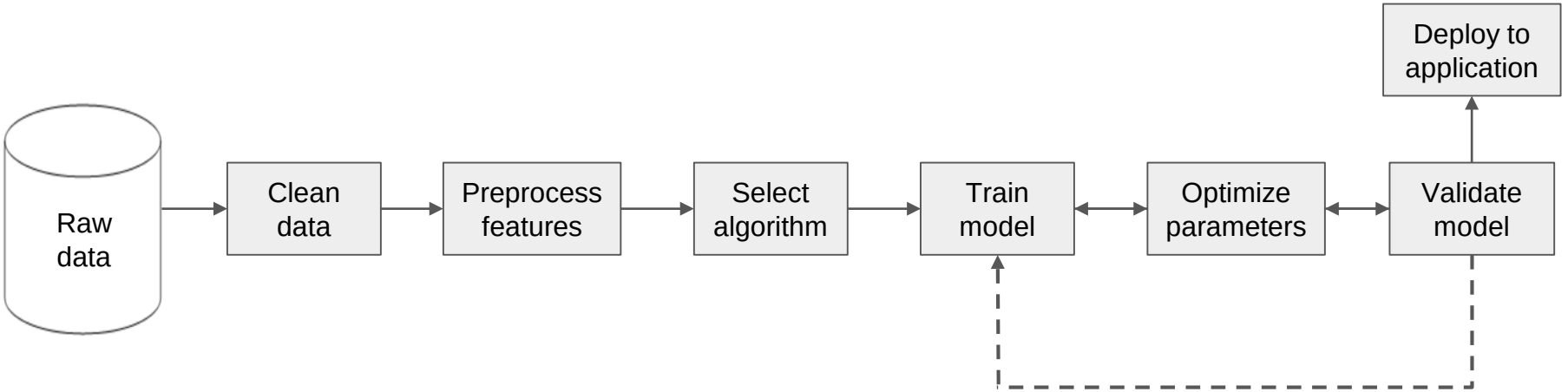

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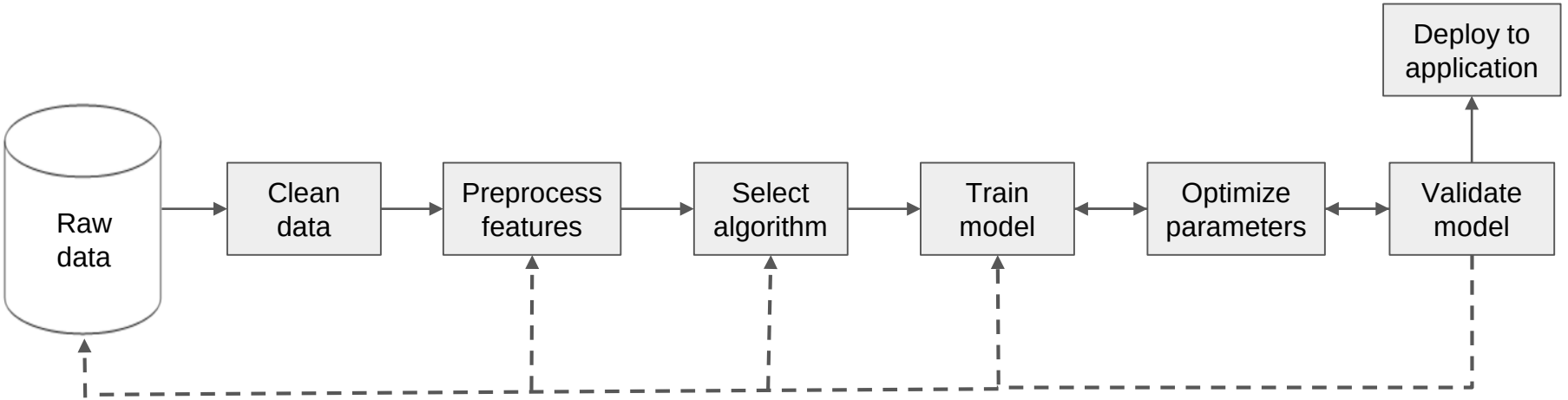
Typical Machine Learning Pipeline



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