Autoencoders and Generative Models

CISC 7026: Introduction to Deep Learning

University of Macau

Agenda

1. Review
2. Unsupervised Learning
3. Compression
4. Autoencoders
5. Variational Models
6. Coding

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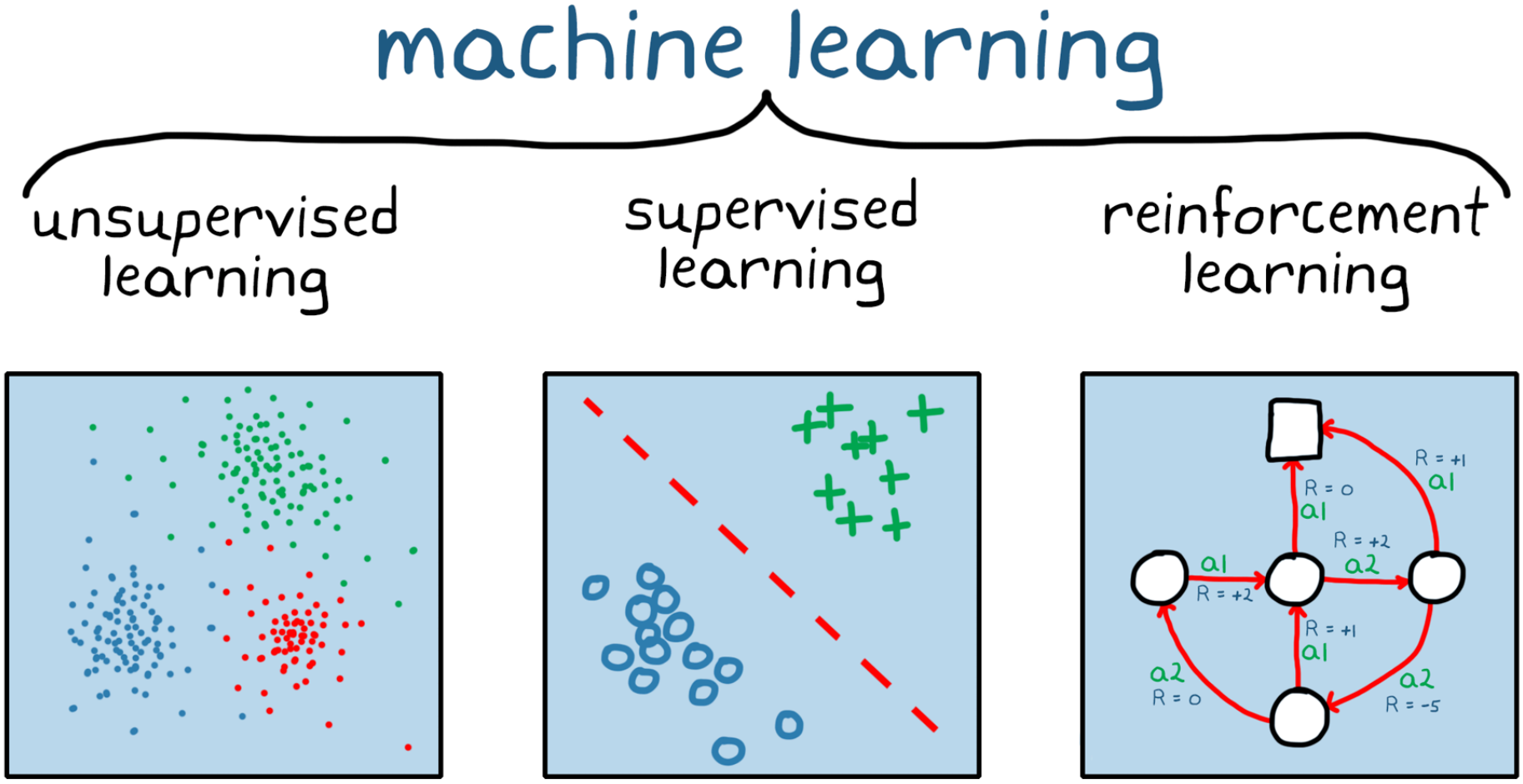
Unsupervised Learning



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Unsupervised Learning

In supervised learning, humans provide the model with a dataset containing inputs $\boldsymbol{X}$ and corresponding outputs $\boldsymbol{Y}$

$$\boldsymbol{X} = \begin{bmatrix} x_{[1]} \\ x_{[2]} \\ \vdots \\ x_{[n]} \end{bmatrix} \quad \boldsymbol{Y} = \begin{bmatrix} y_{[1]} \\ y_{[2]} \\ \vdots \\ y_{[n]} \end{bmatrix}$$

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In self-supervised learning, the outputs (and sometimes inputs) are **not** provided by humans

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The model learns without human supervision

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Unsupervised Learning

How do these models work?

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How do these models work?

They learn the structure of the data

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They learn the structure of the data

If the structure of the data is every picture in the world, they learn about the structure of the world