Explainable AI and the brain

Characterizing heterogeneity in diverse clinical cohorts

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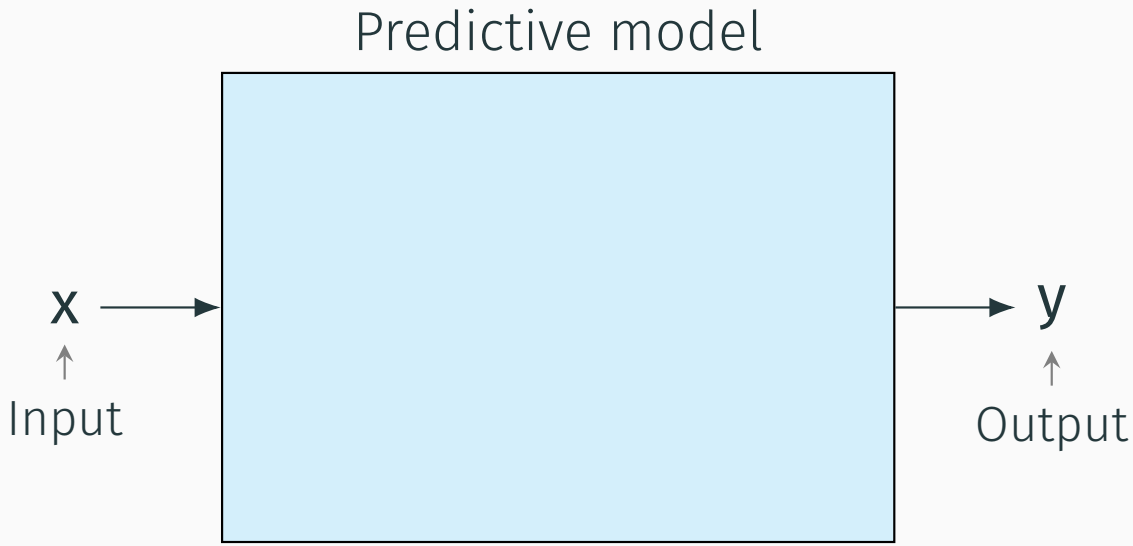
Outline

1. Theoretical background
    a. Artificial neural networks
    b. Explainable AI
2. Explainable AI and dementia
3. Explainable AI and brain age

Artificial neural networks



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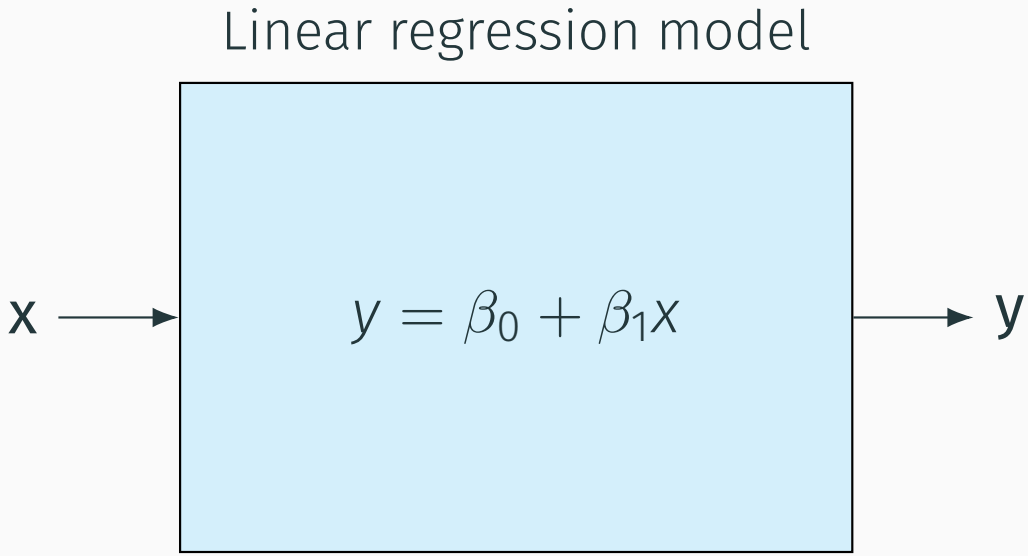

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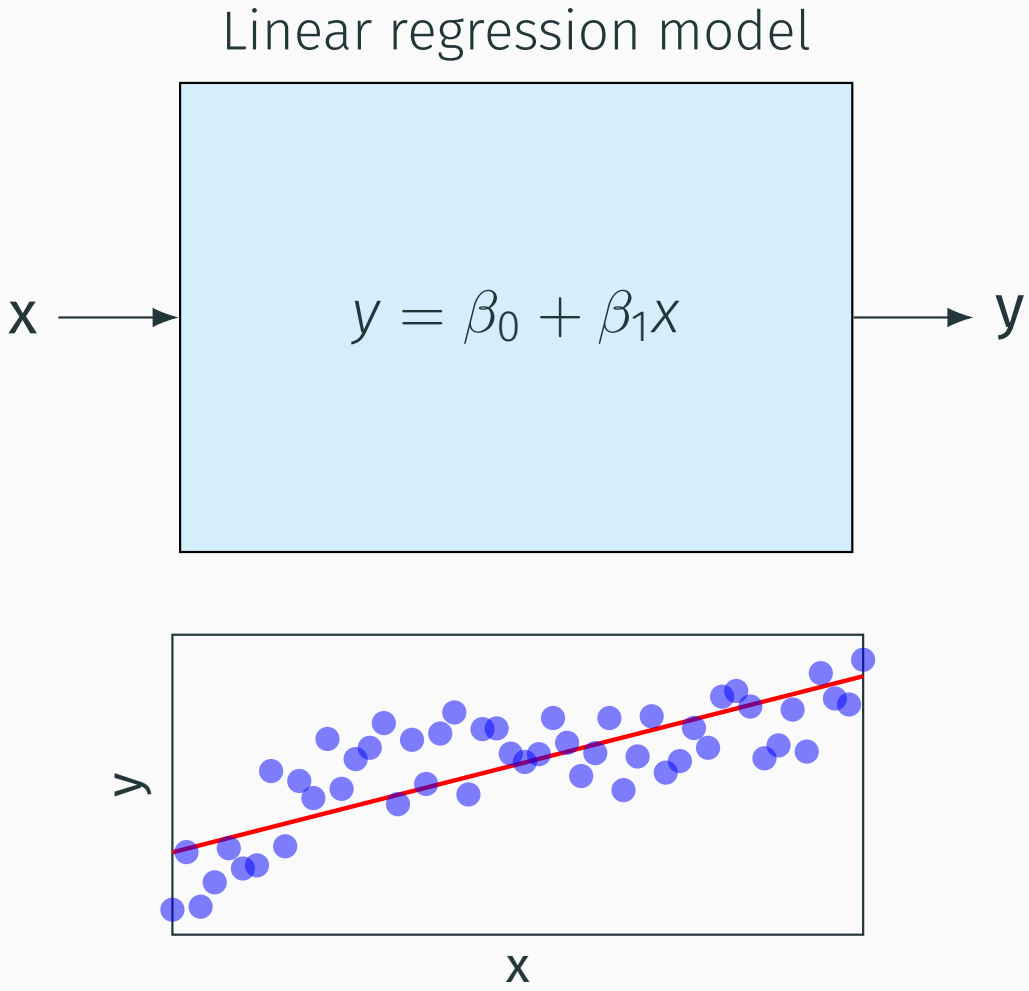

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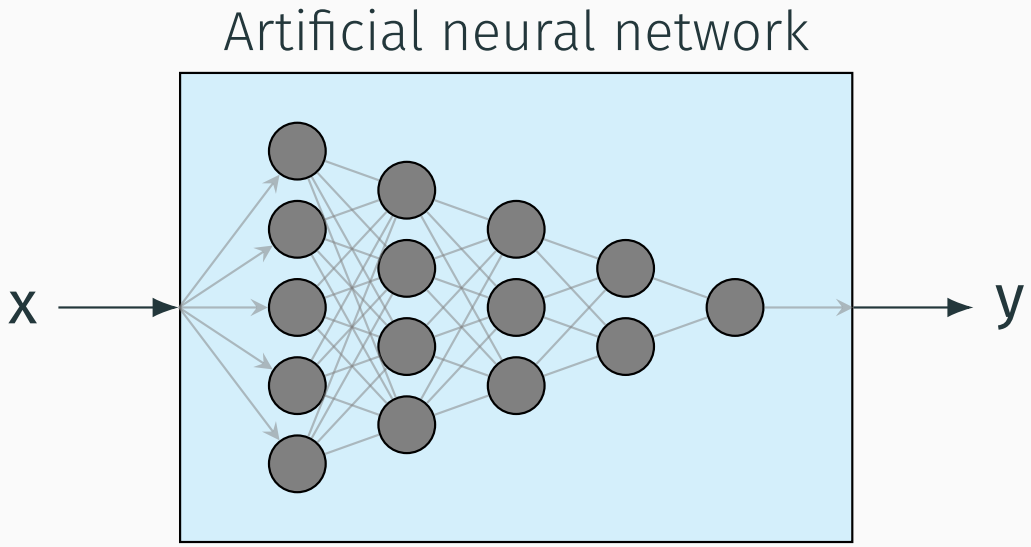

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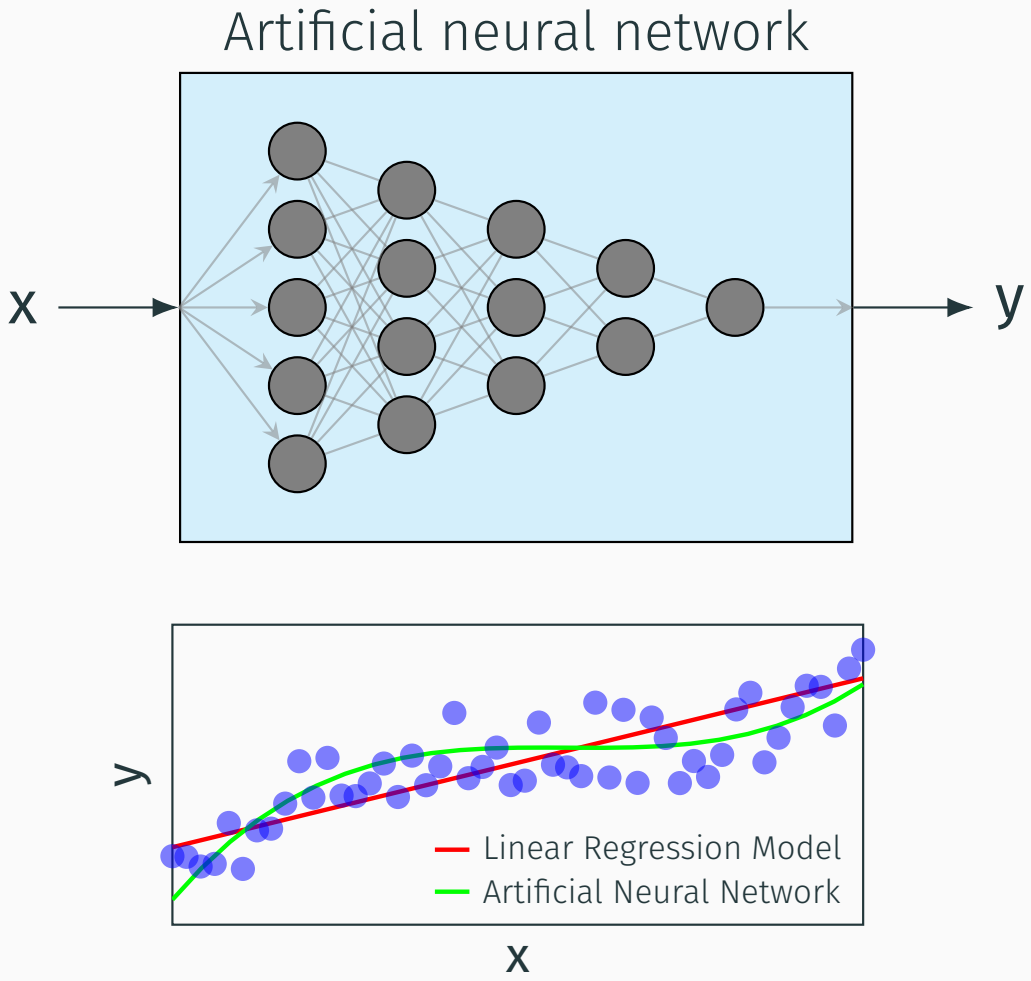

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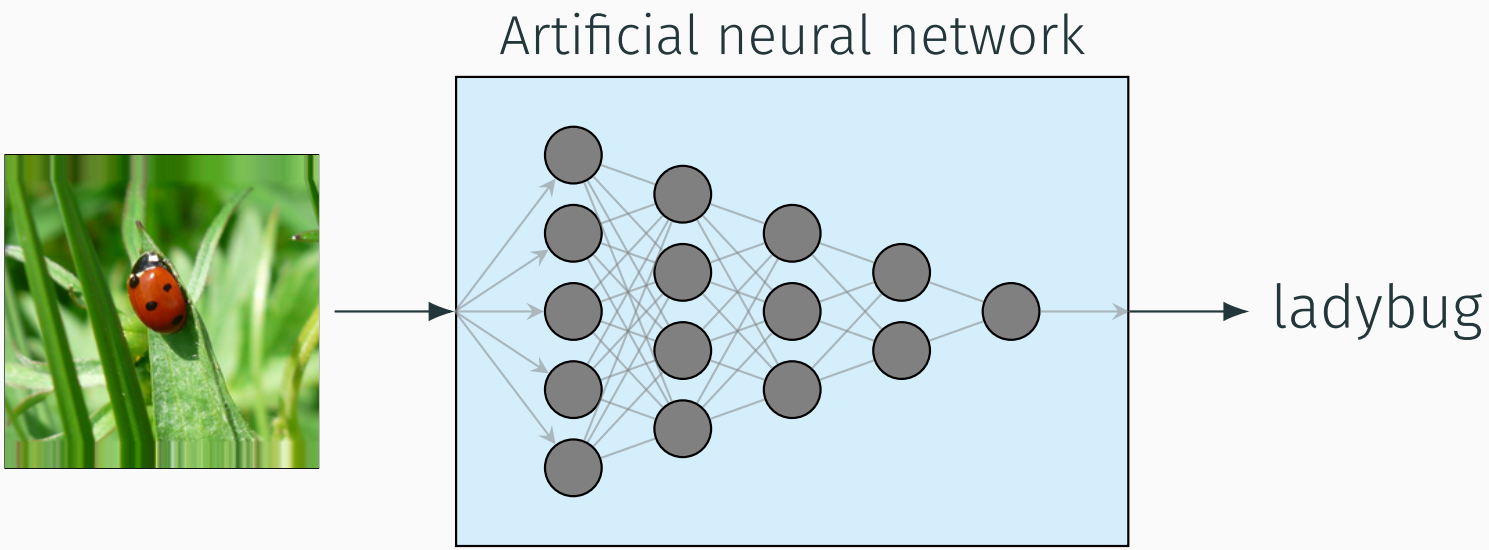
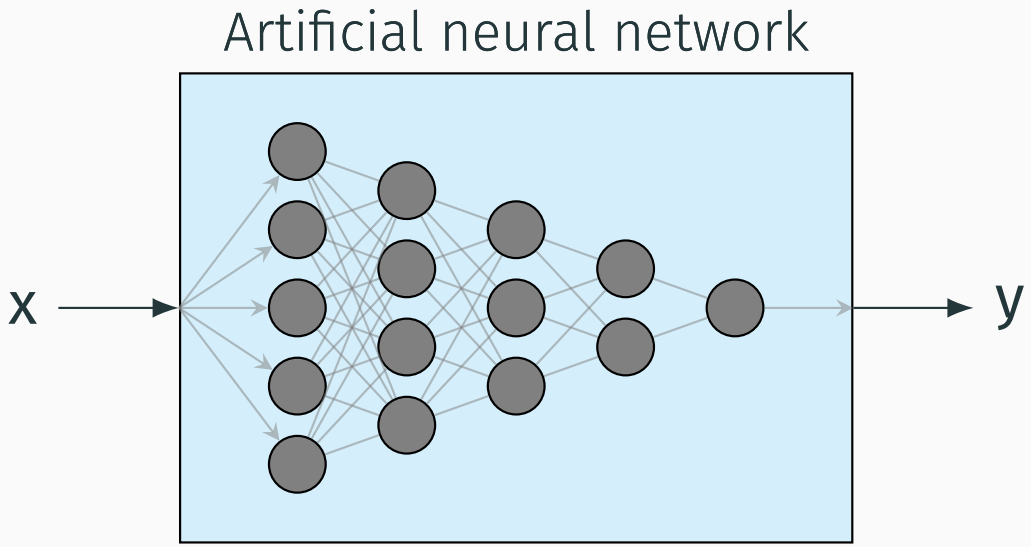


Artificial neural networks: Interpretability



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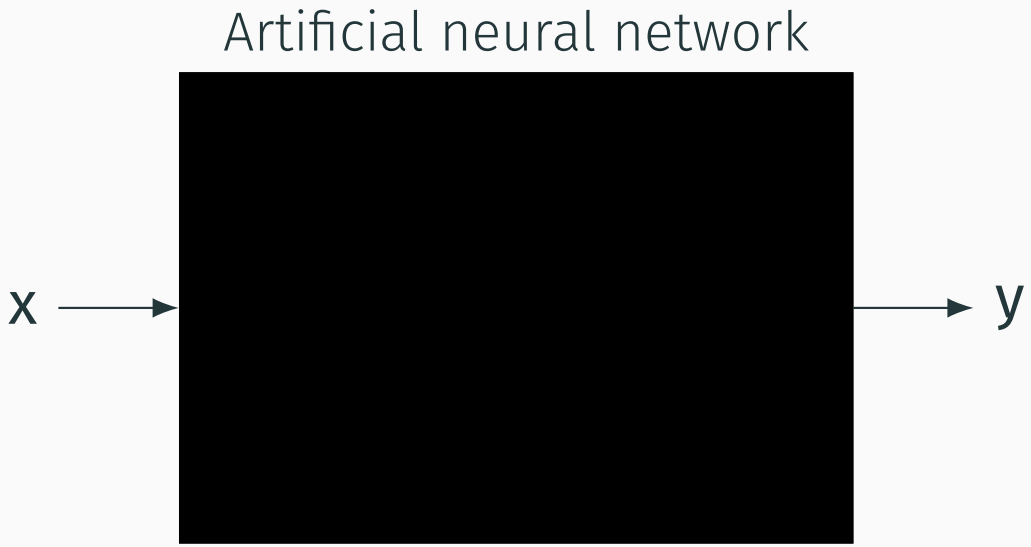

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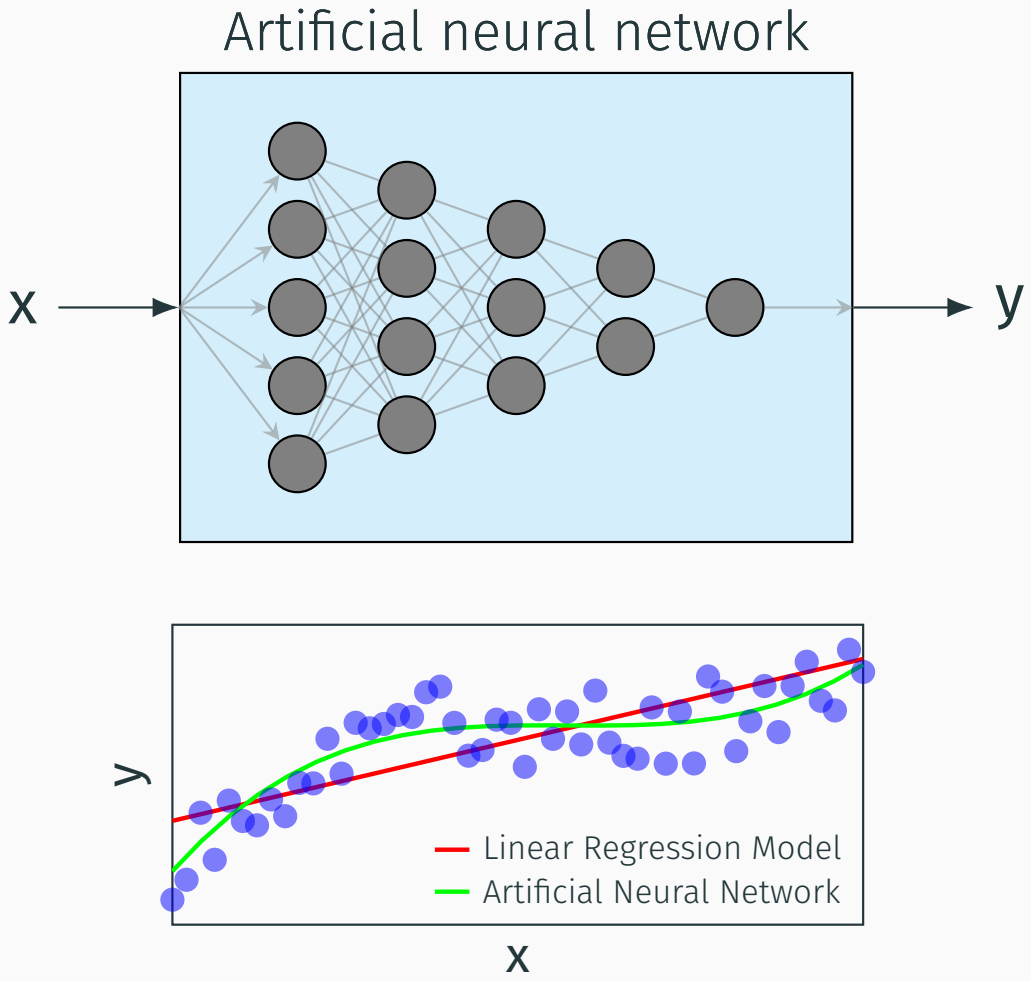

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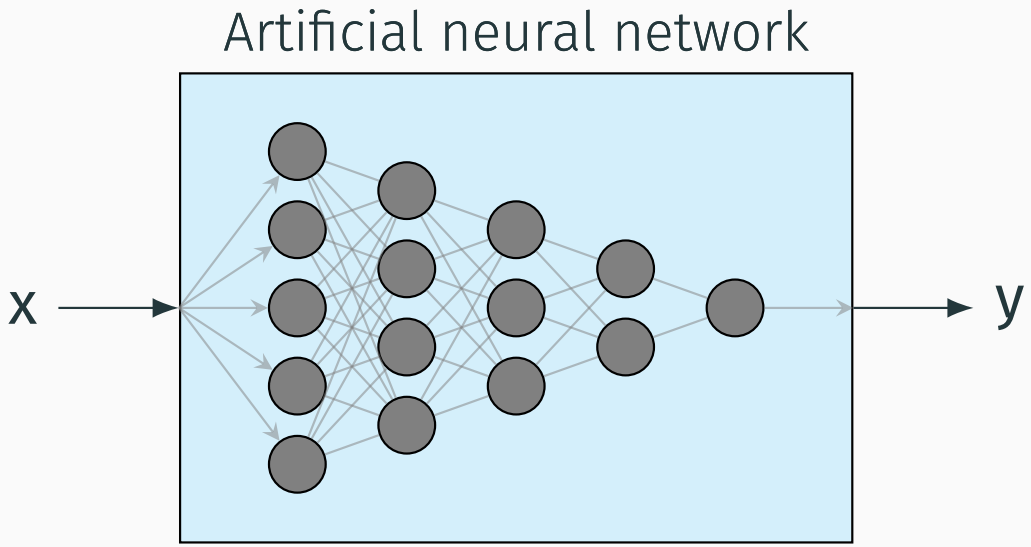

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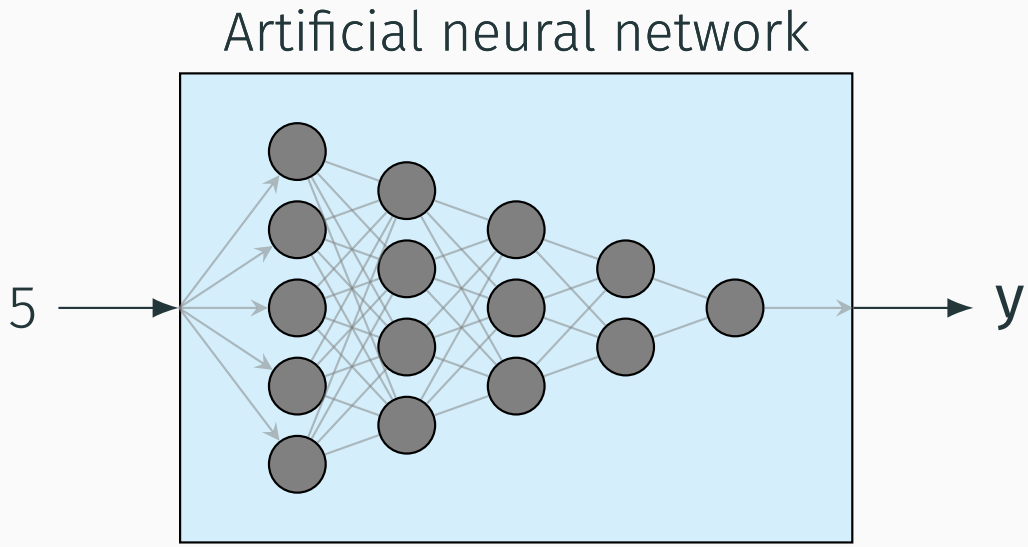

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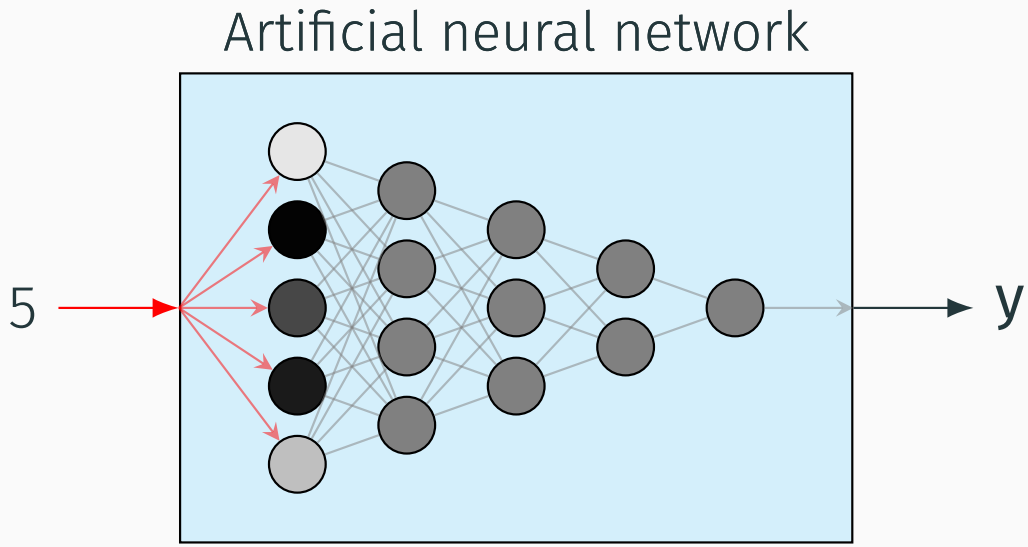

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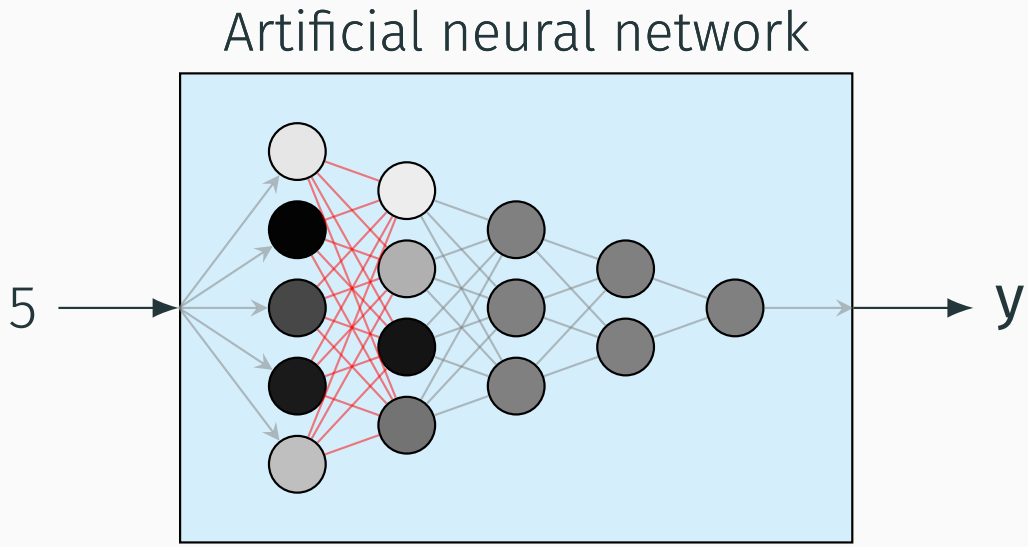

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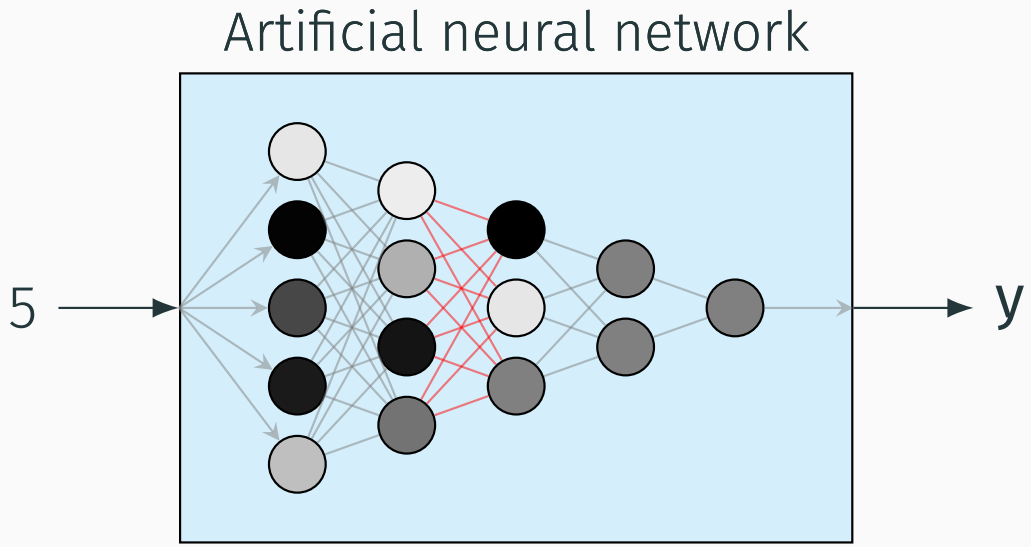

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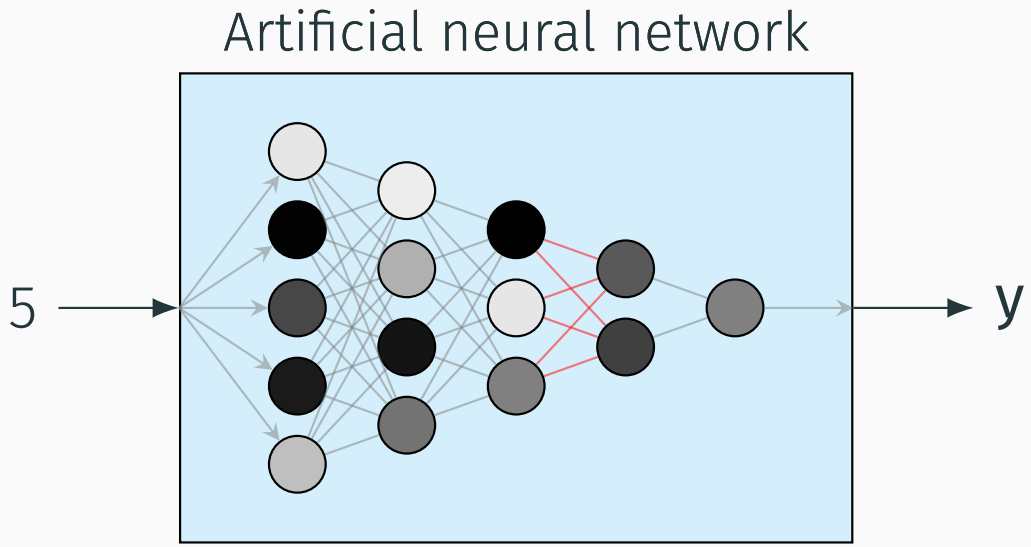

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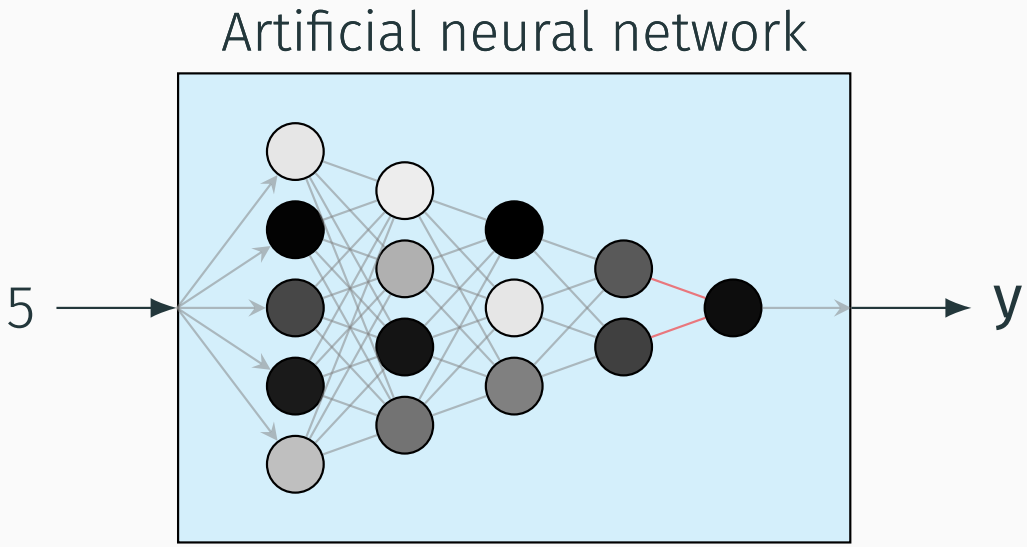

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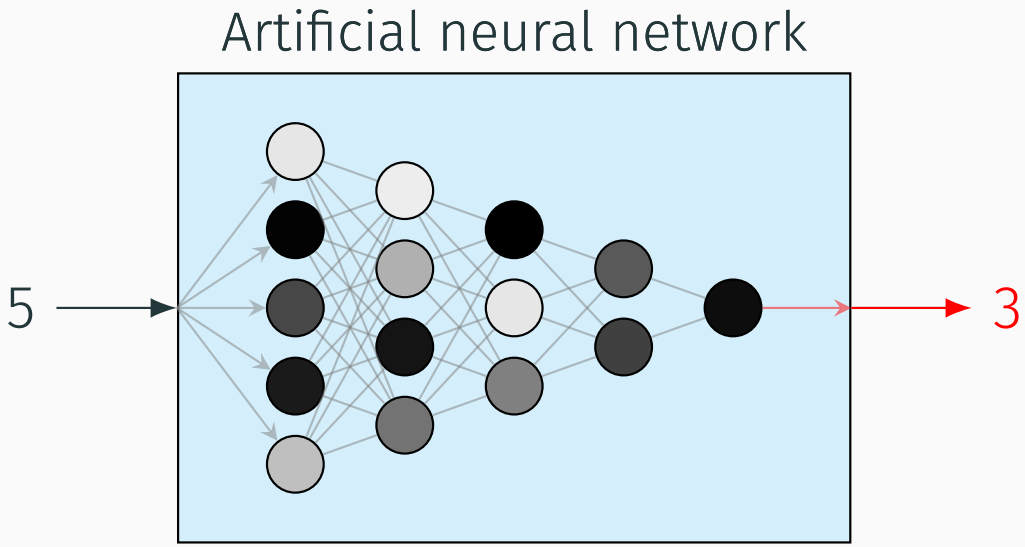

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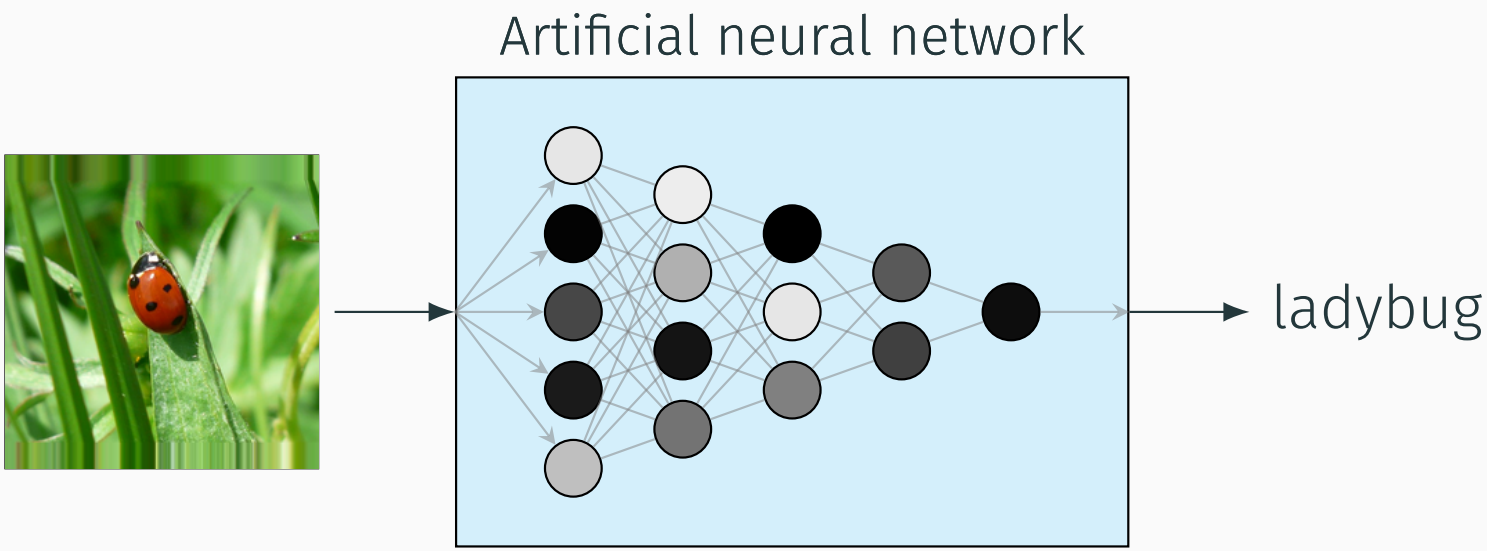

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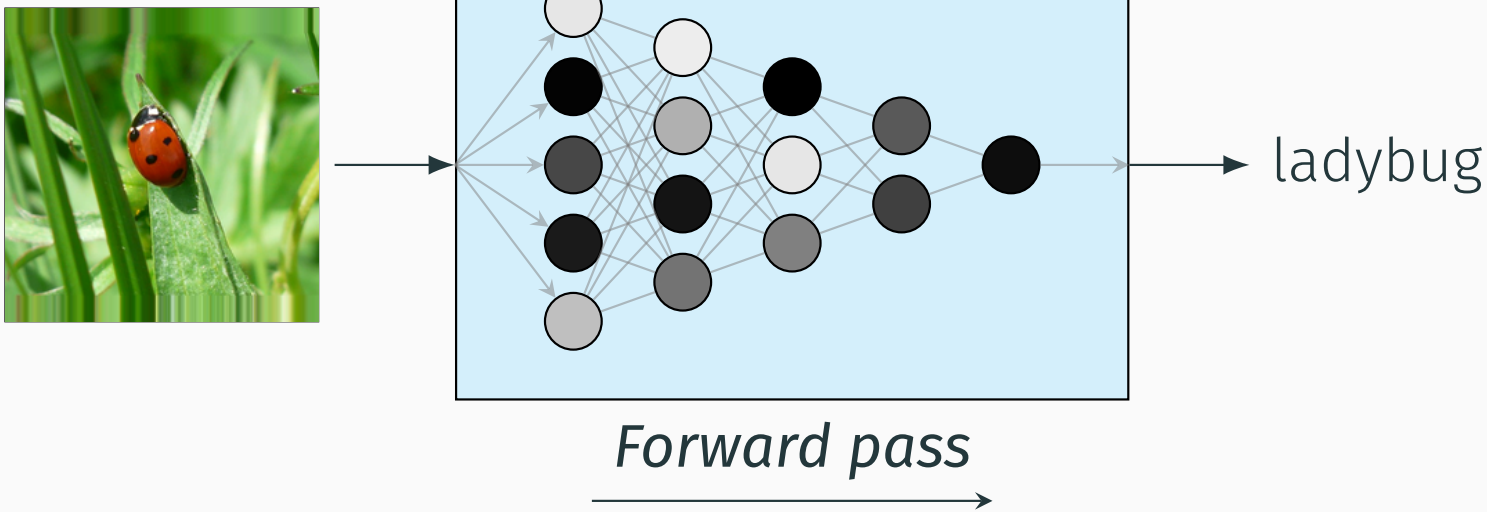
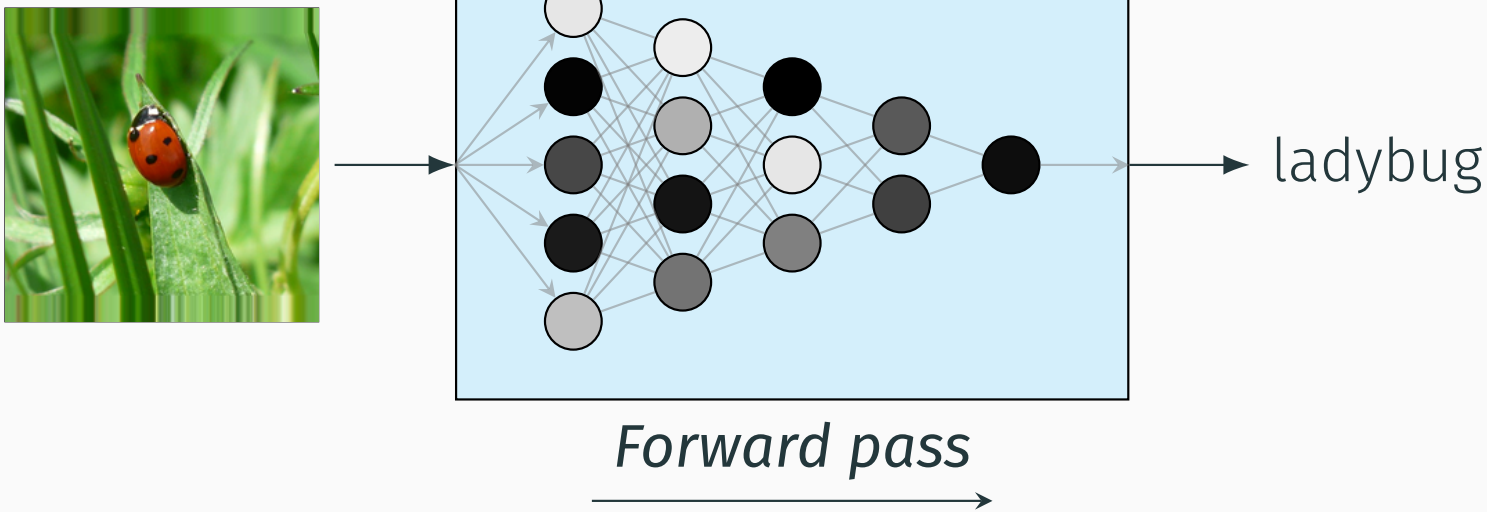


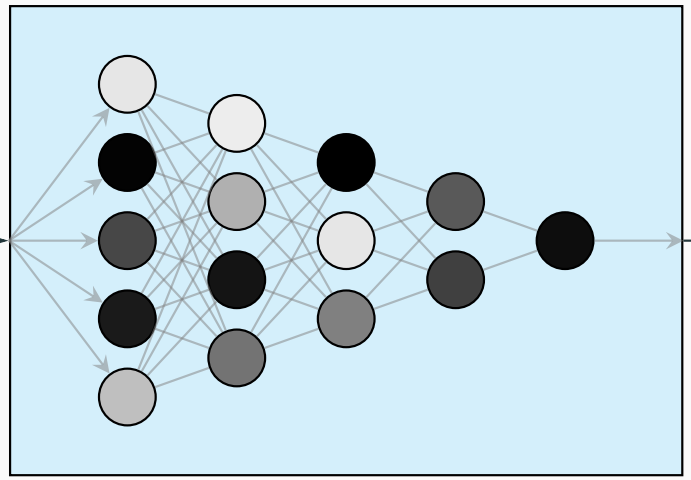
$$n_j^i = f\left(\sum_{k=0}^{n} w_{jk}^i n_k^{i-1}\right)$$

Artificial neural networks: Explainability



$$n_j^i = f(\sum_k w_{jk}^i n_k^{(i-1)})$$

Artificial neural networks: Explainability



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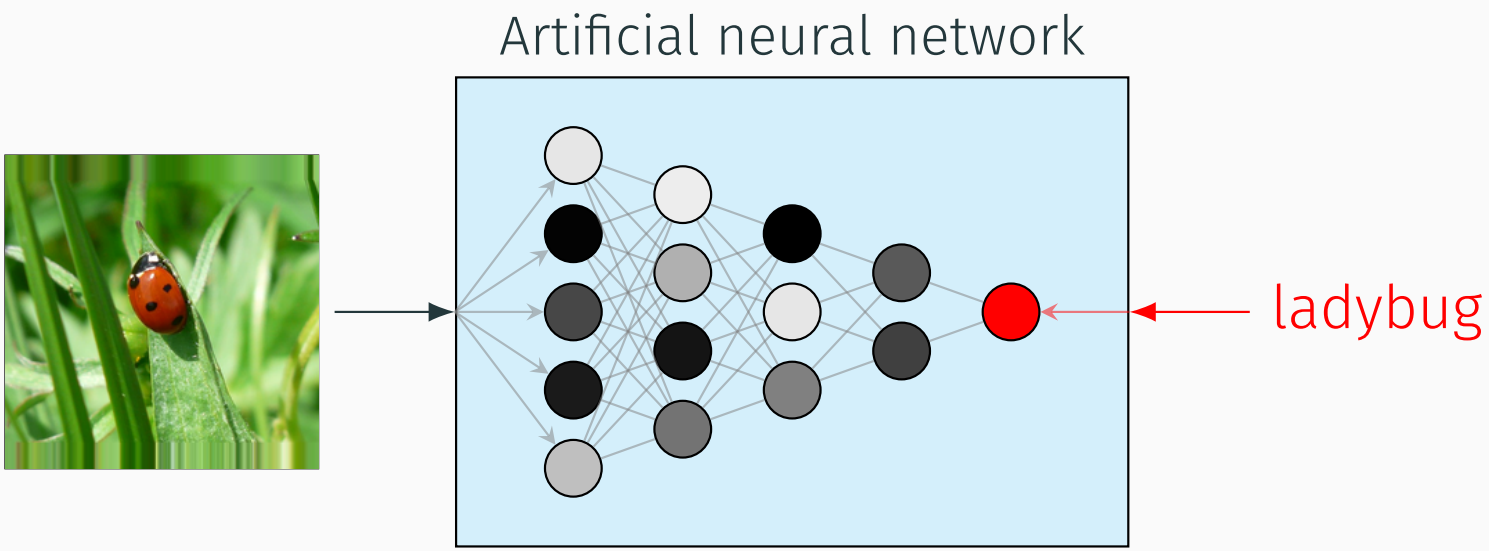
Backward pass

$$R_j^{i-1} = \sum_k \frac{n_j^{(i-1)} w_{jk}^{(i-1)}}{\sum_l n_l^{(i-1)} w_{lk}^{(i-1)}} R_k^i$$

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