# Krótkie wprowadzenie do uczenia maszynowego

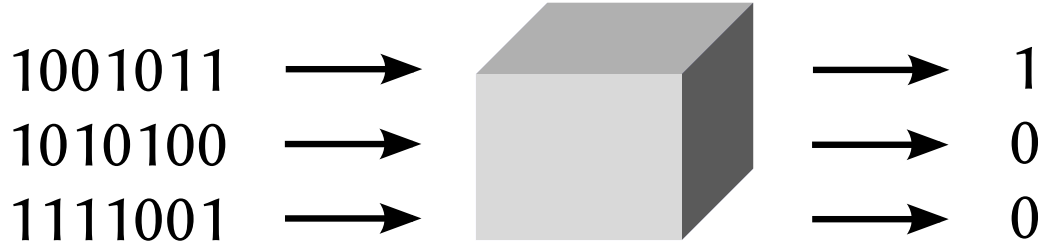
Robert Różański

tradycyjne programowanie:

tworzymy instrukcje mówiące komputerowy co robić, krok po kroku

uczenie maszynowe:

trenujemy program, żeby mógł wykonywać określone zadanie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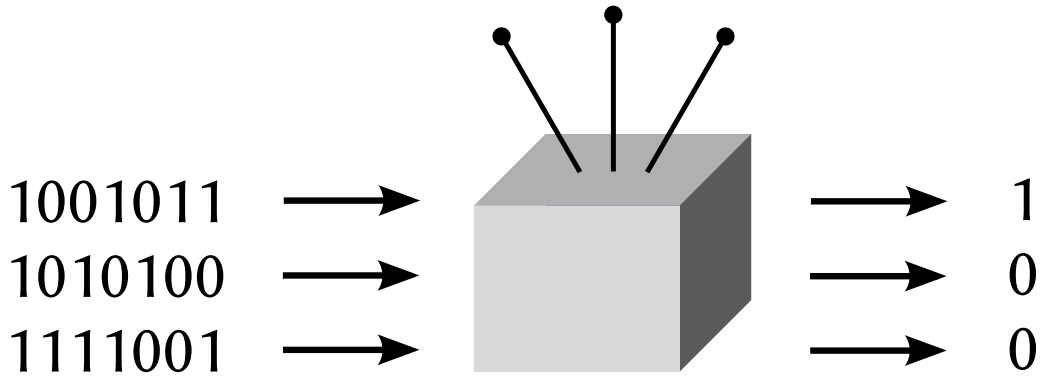
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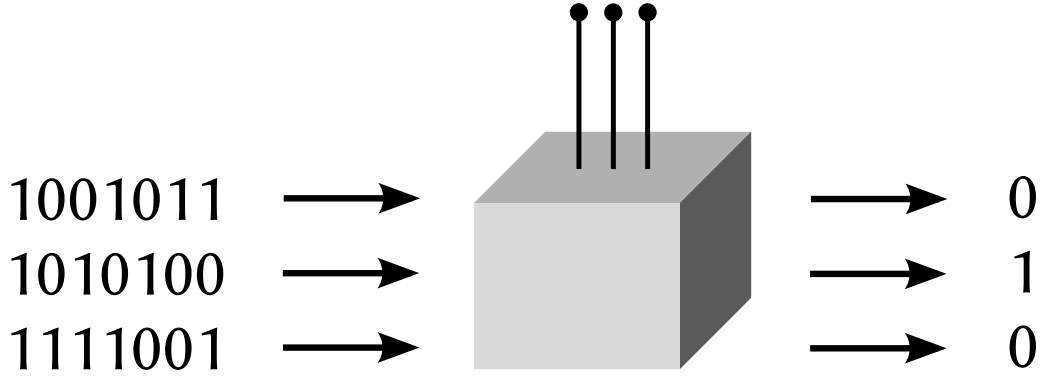
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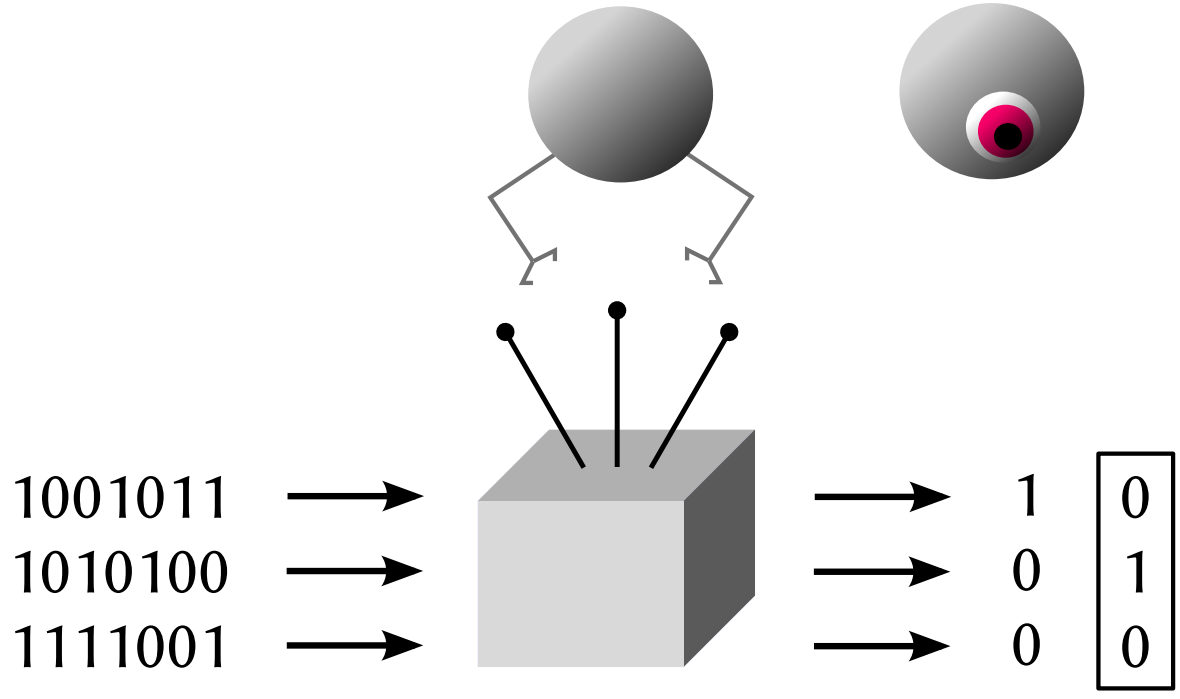
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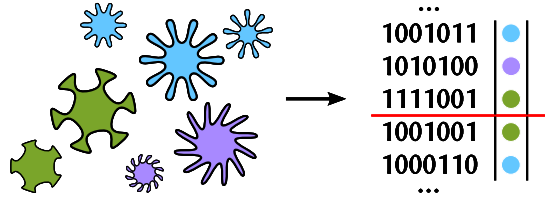
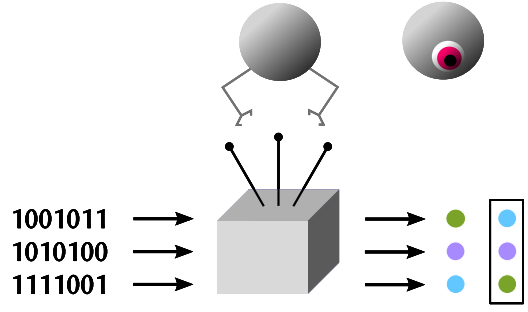
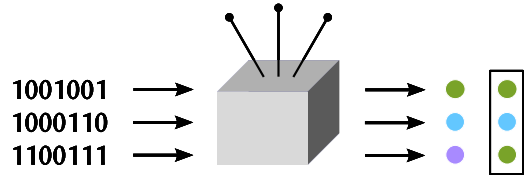
1. Przygotowanie danych



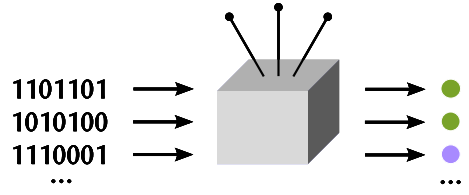

2. Uczenie

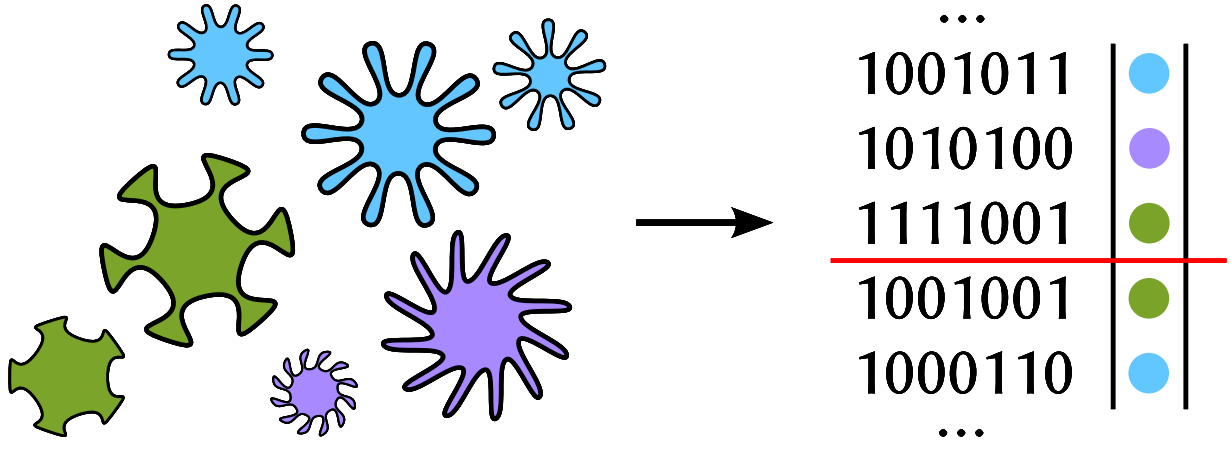



3. Ewaluacja




4. Użycie

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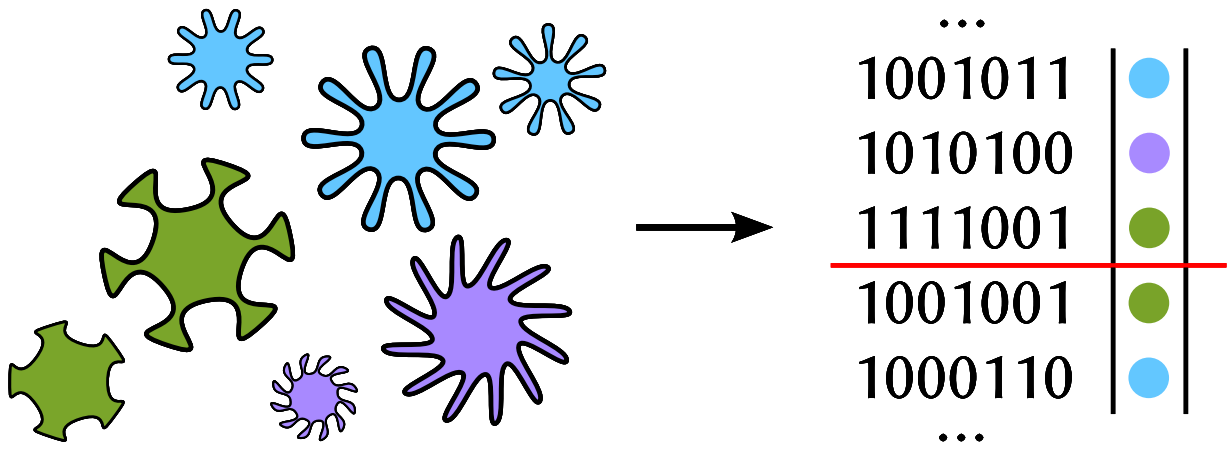
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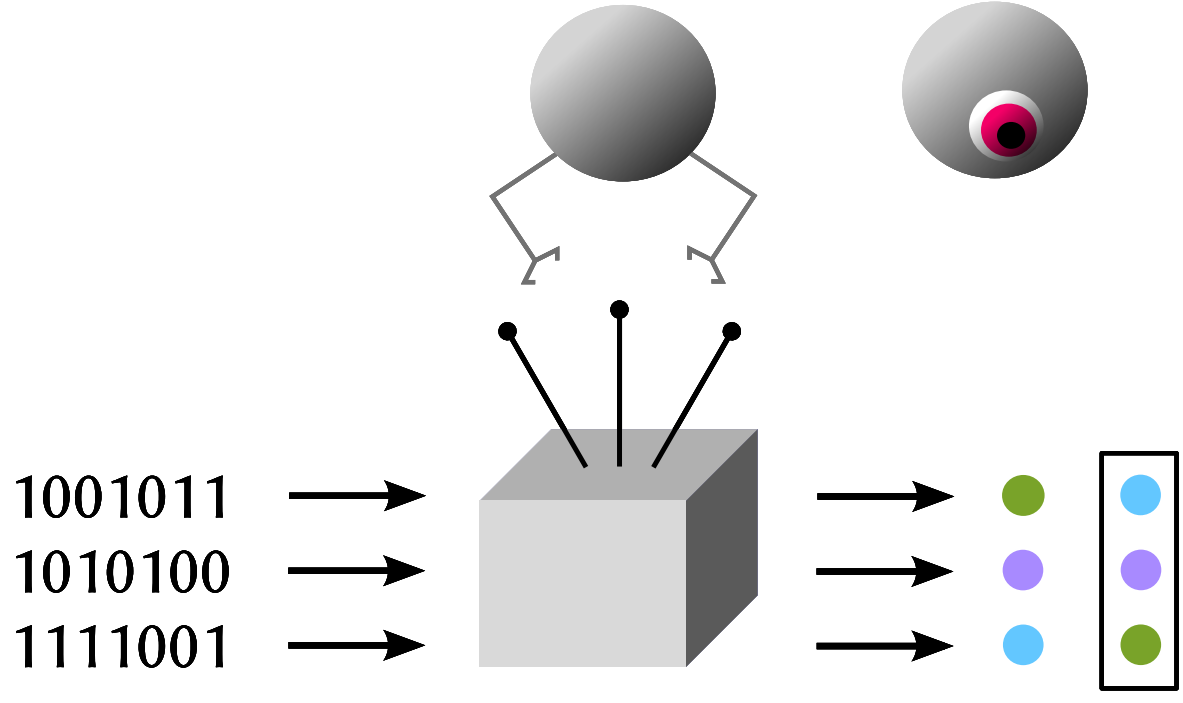
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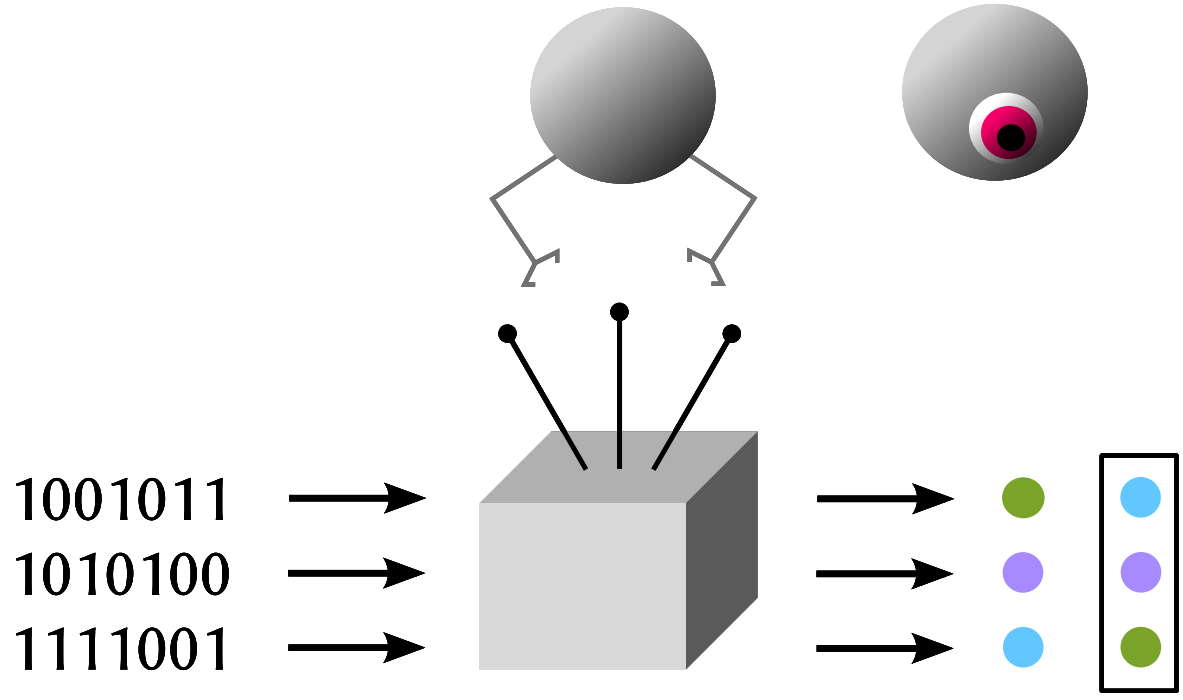
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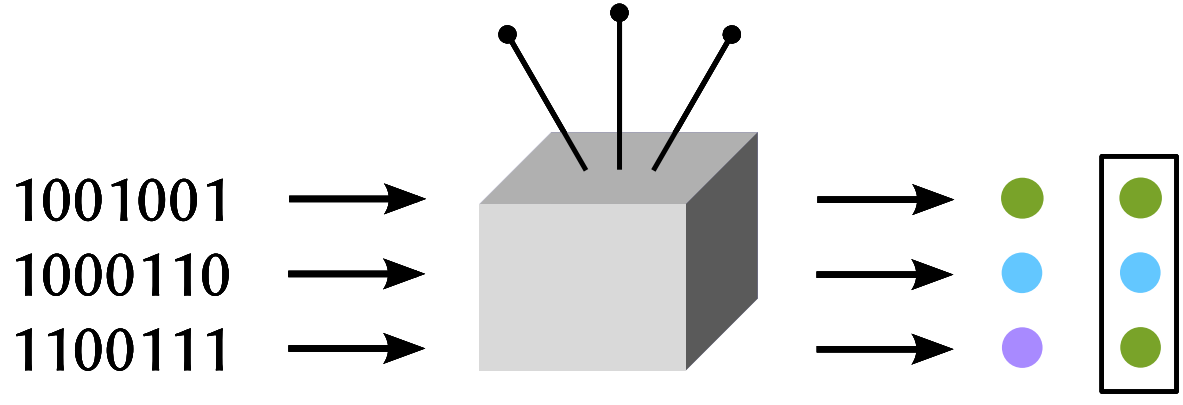
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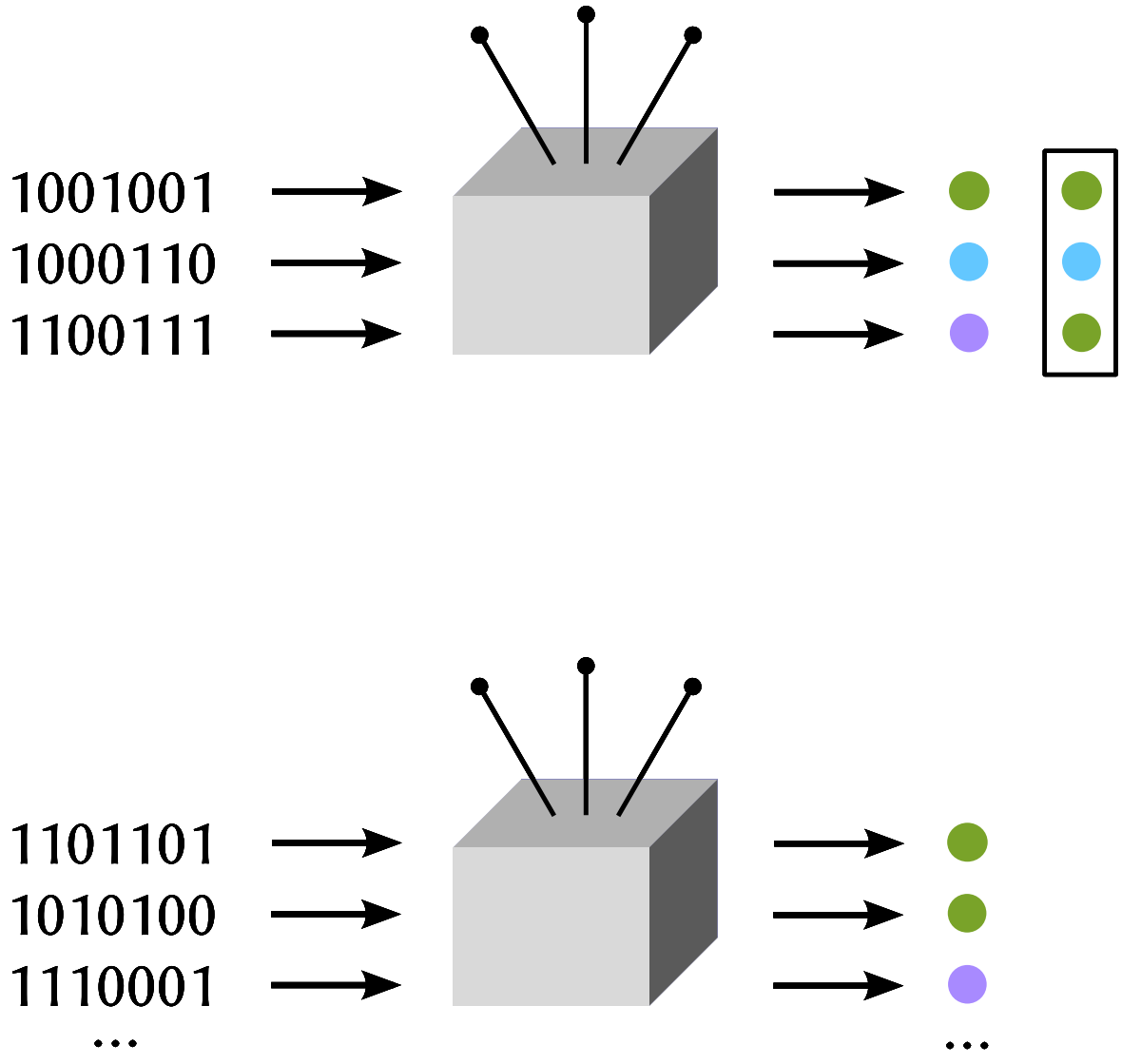
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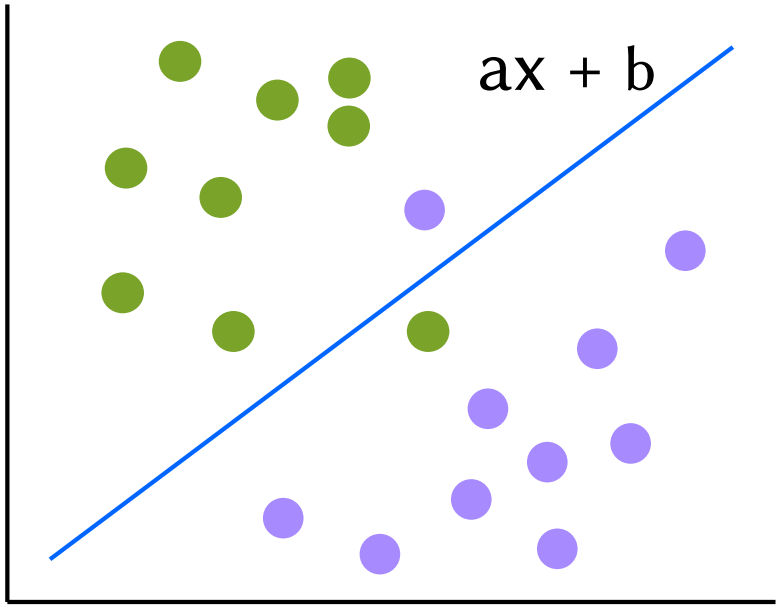
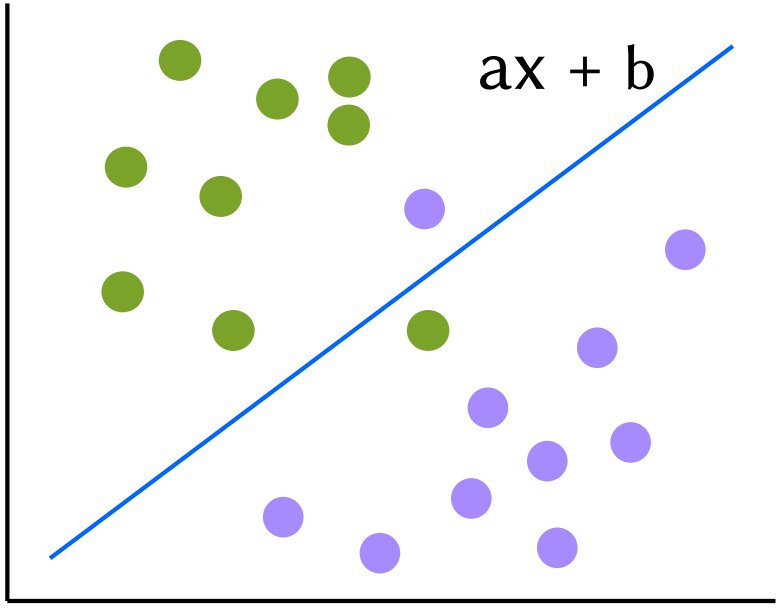

ax + b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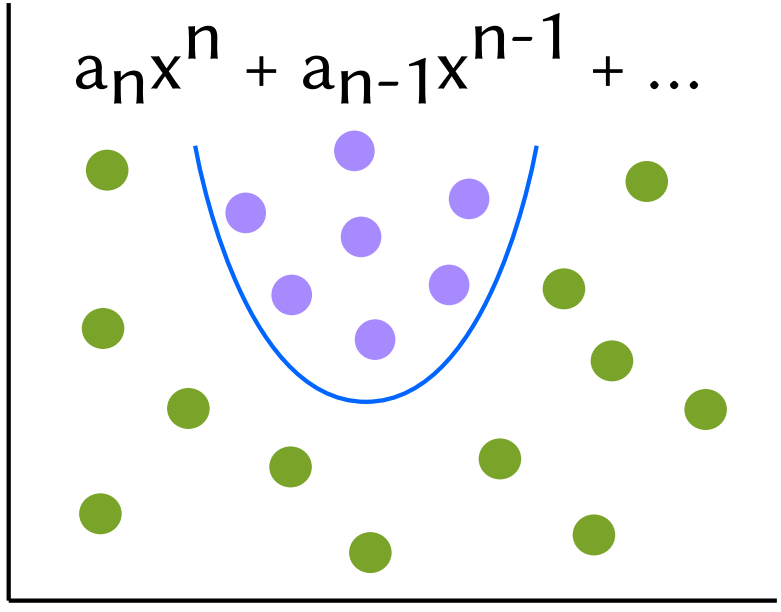
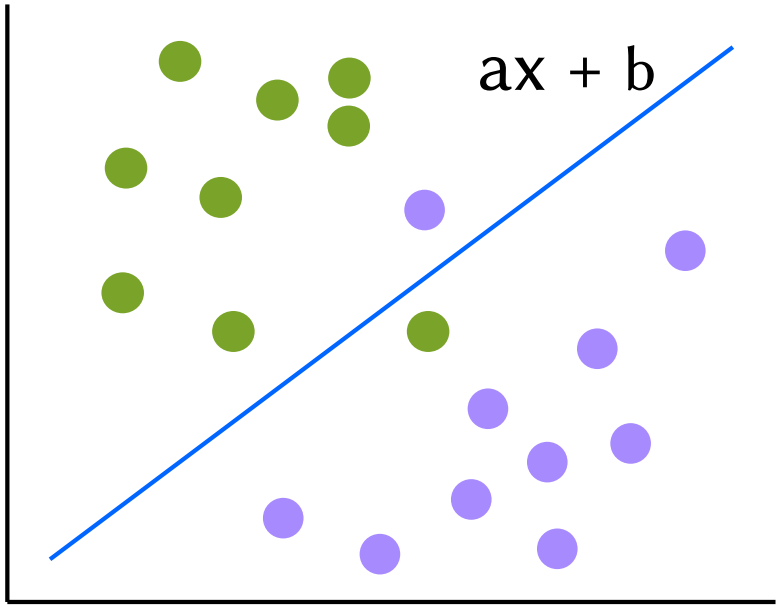

$a_n x^n + a_{n-1} x^{n-1} + \ldots$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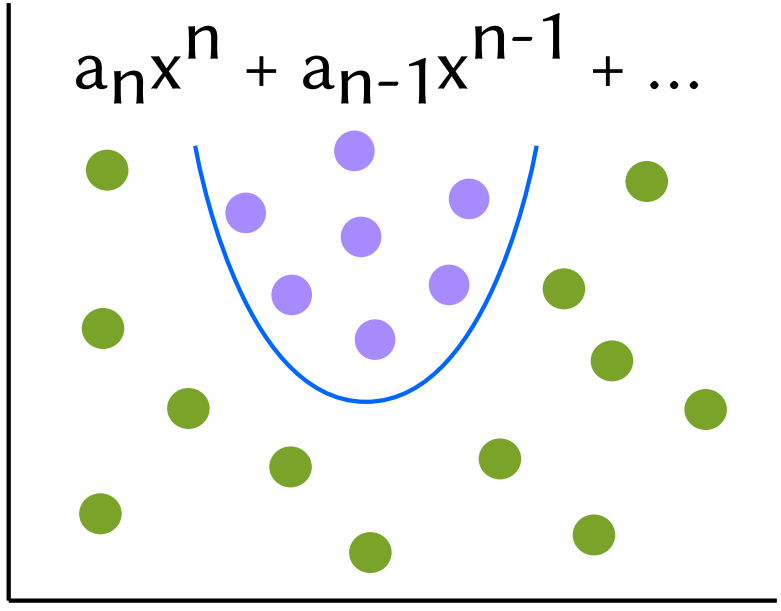
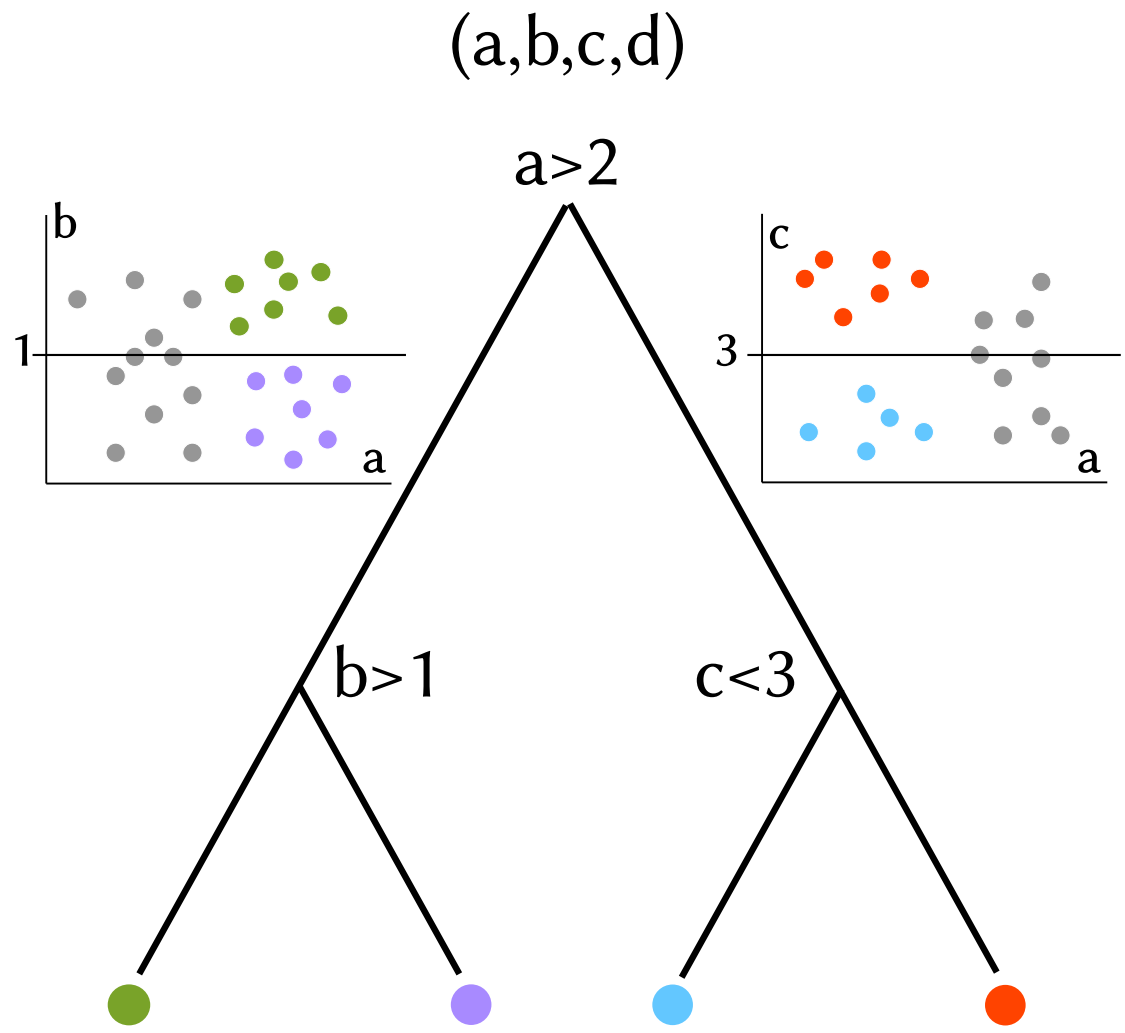
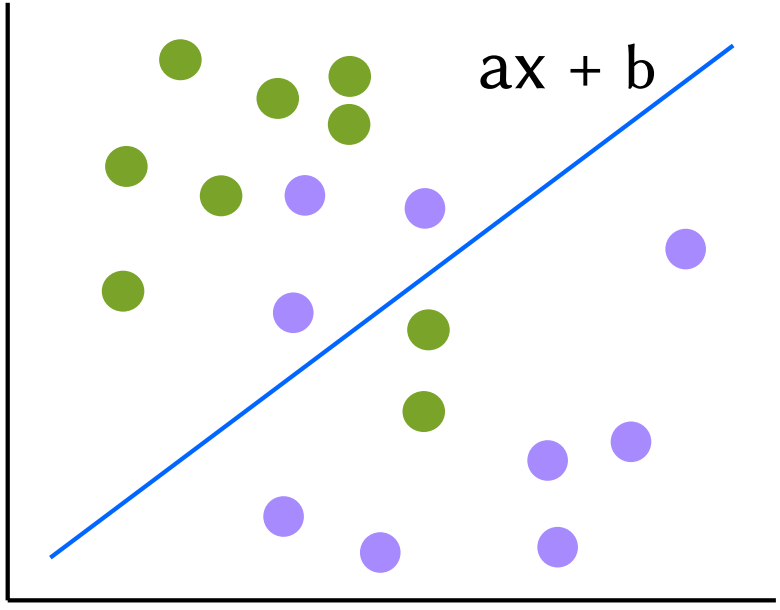

$a_n x^n + a_{n-1} x^{n-1} + \ldots$


(a,b,c,d)
a>2
b
1
a
b>1
c
3
a
c<3



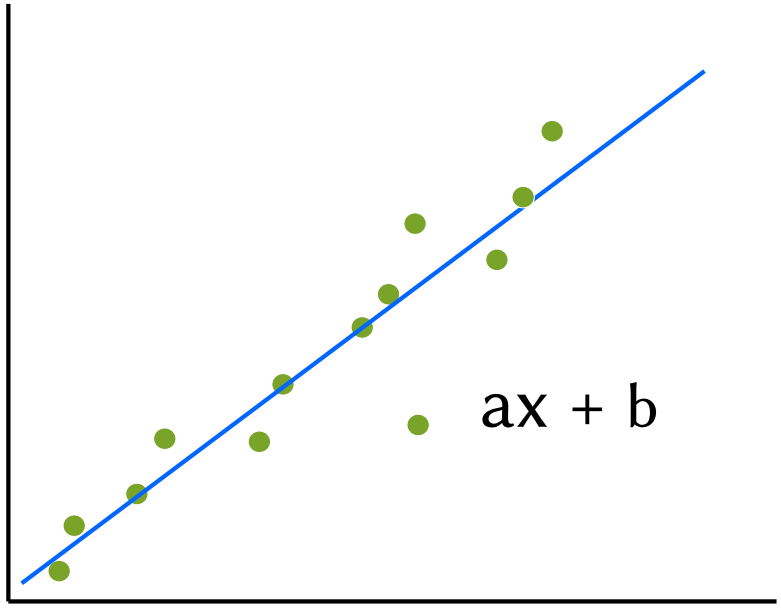

true positive rate
(recall, sensitivity)

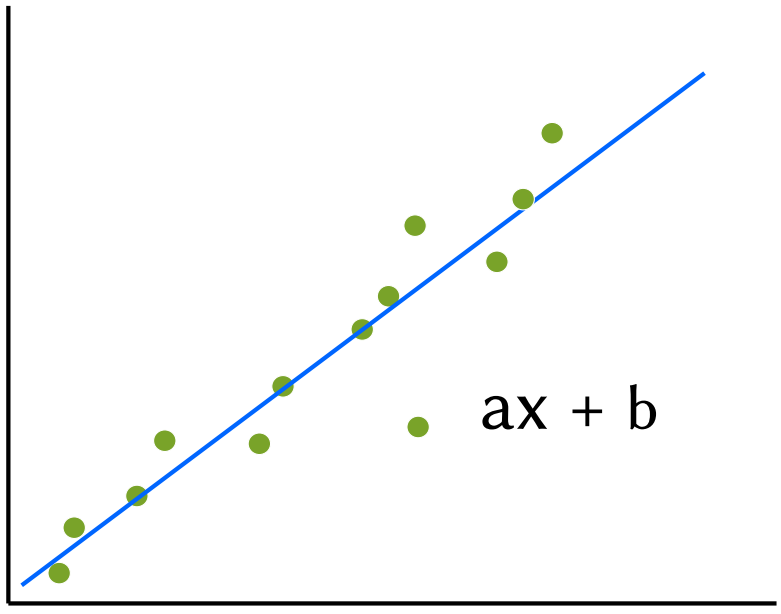
TP / (TP + FN)

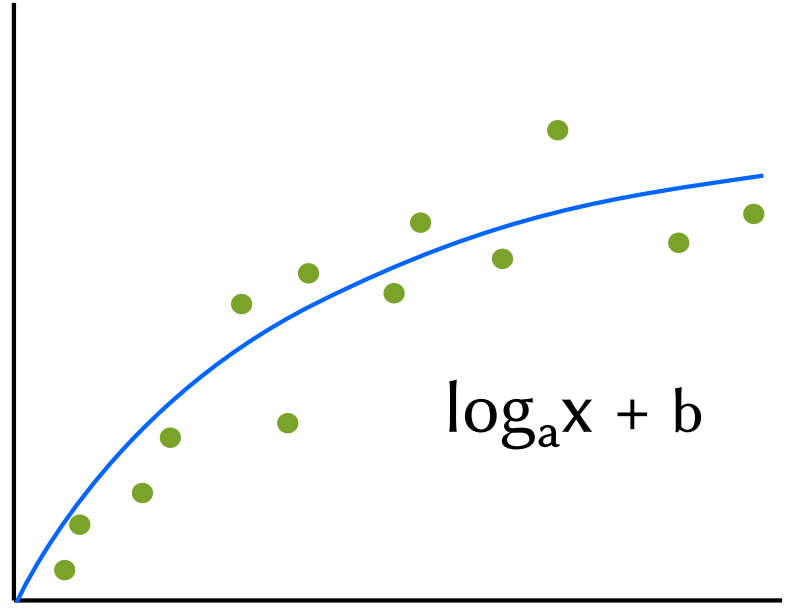
| | predicted | |
|---|---|---|
| actual | | |
| | TP (7) | FN (3) |
| | FP (3) | TN (6) |

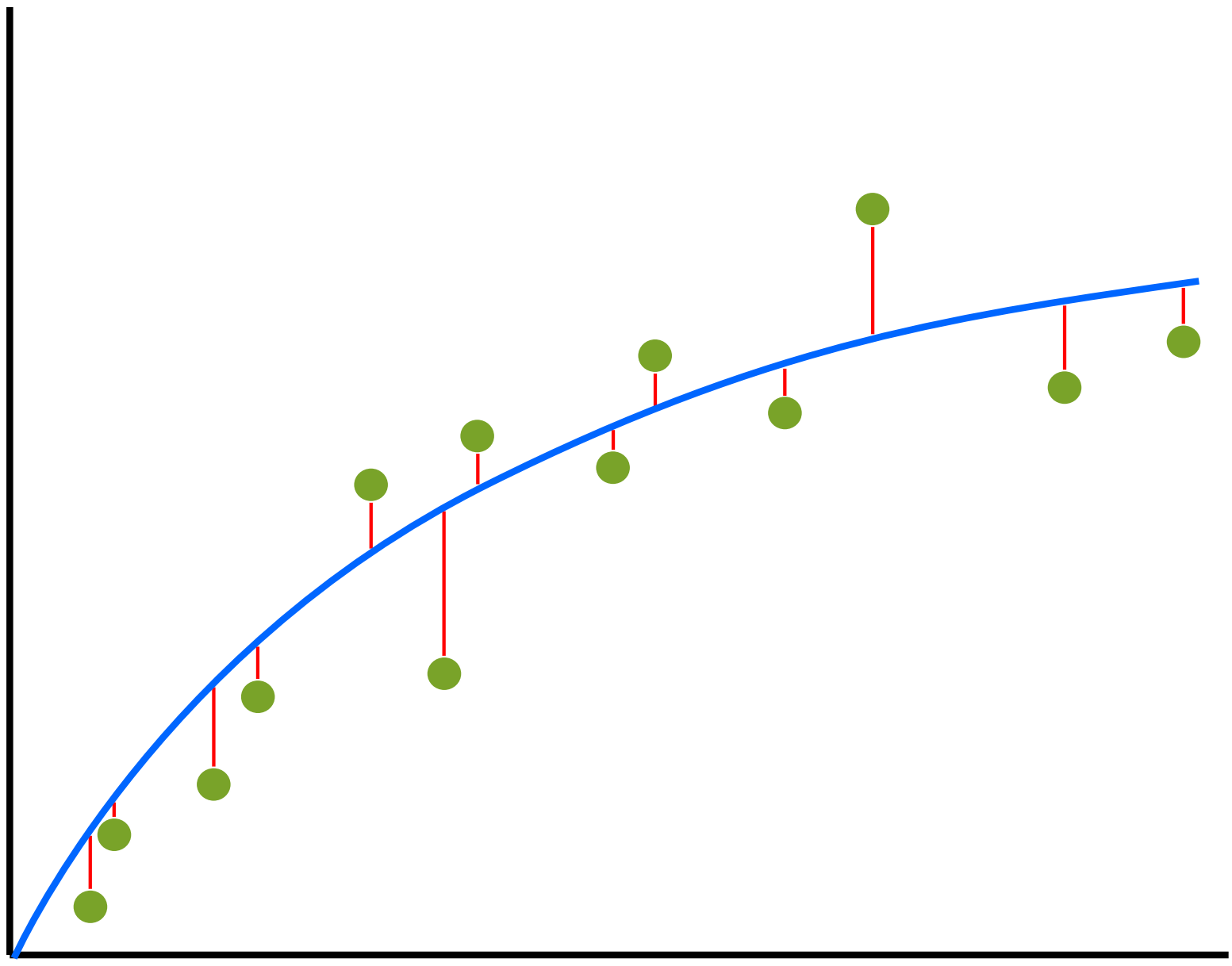
true negative rate
(specificity)

TN / (TN + FP)

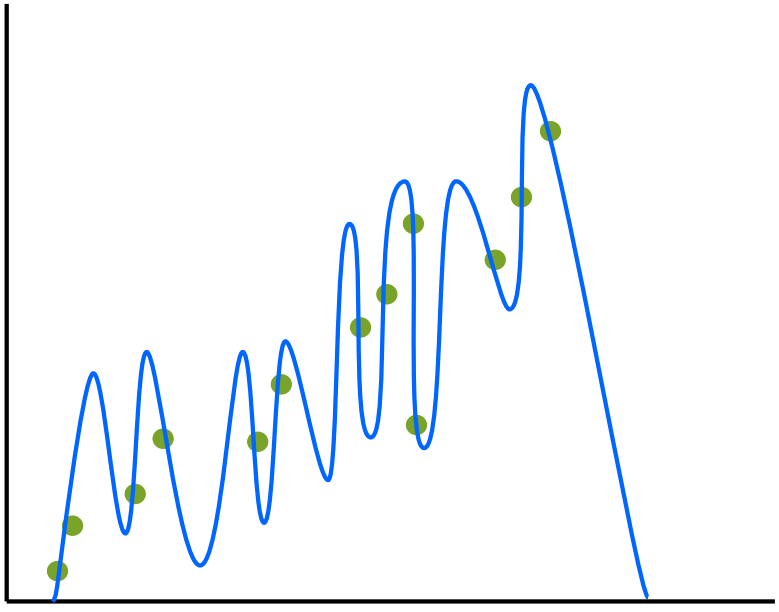

ax + b

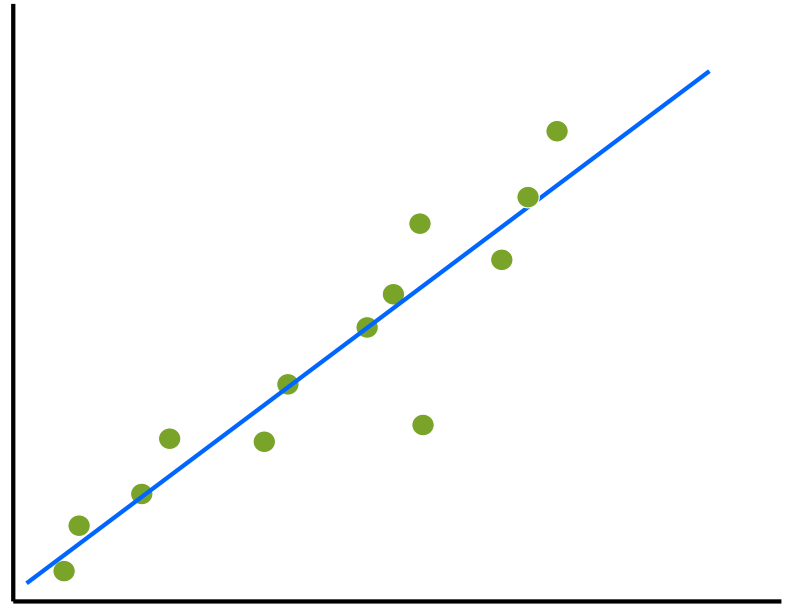

ax + b

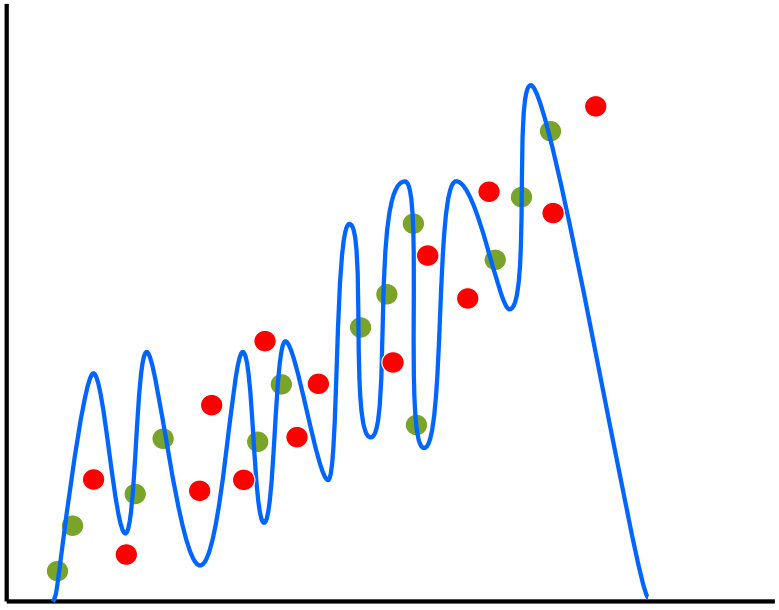

$\log_a x + b$

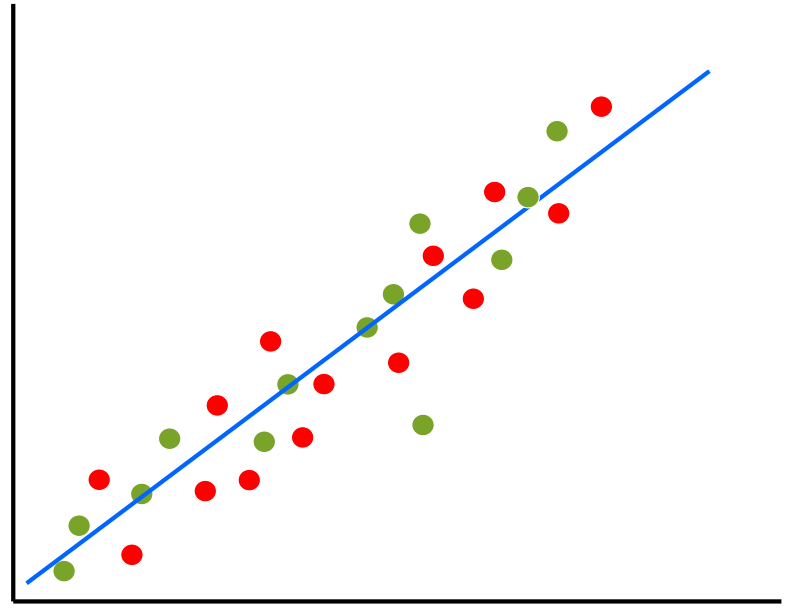



error
parameter value









# Główne lekcje:

złożone modele pozwalają na uchwycenie złożonych zależności, ale wymagają więcej danych treningowych i sprawiają większe problemy z uogólnianiem

bardziej ogólne metody łatwiej zastosować do nowych problemów, ale bardziej wyspecjalizowane działają lepiej

podchodząc do nowego problemu warto użyć kilku prostych metod i zobaczyć czy/jak działają

# Co pominąłem:

skupiłem się tylko na "supervised learning"

istnieją problemy inne niż regresja i klasyfikacja

preprocessing danych

algorytmy uczące