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Introduction to Machine Learning

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What you will learn

- ML vs. traditional programming
- Building blocks
- Types of ML
- When to use it ?

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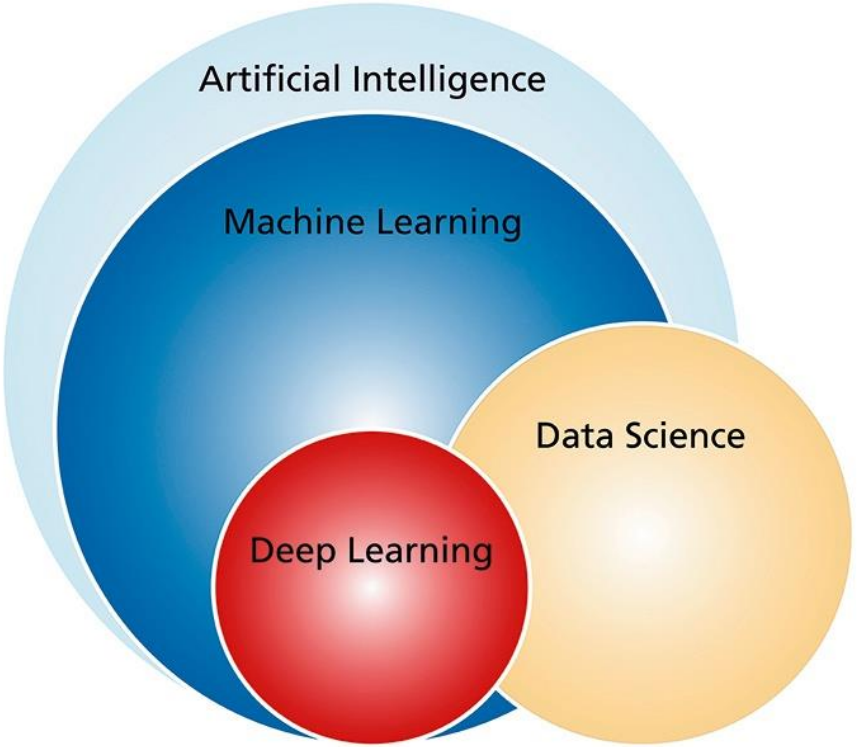

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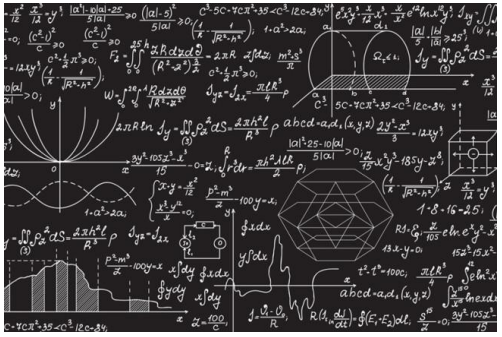
Traditional programming

Data of interest →

Program →

Computer → Output



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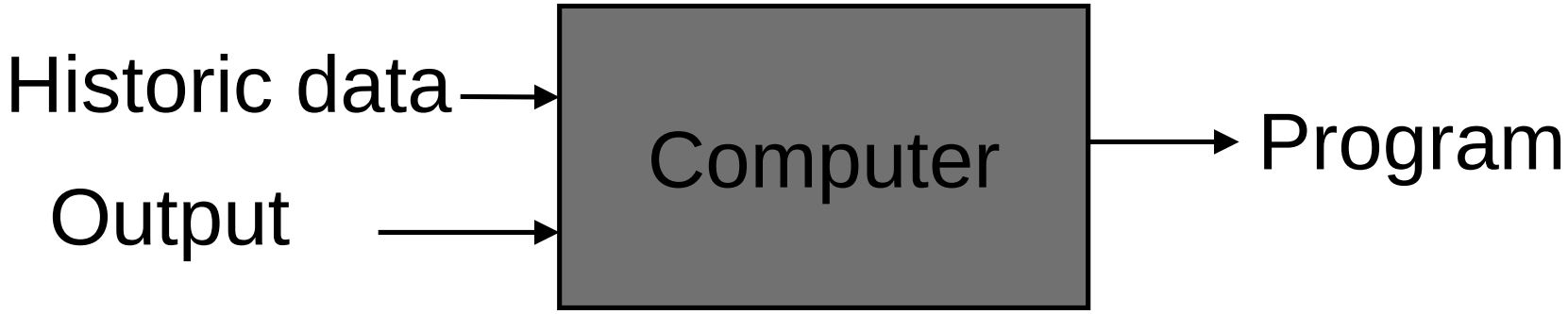
Machine learning



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Example on Blackboard

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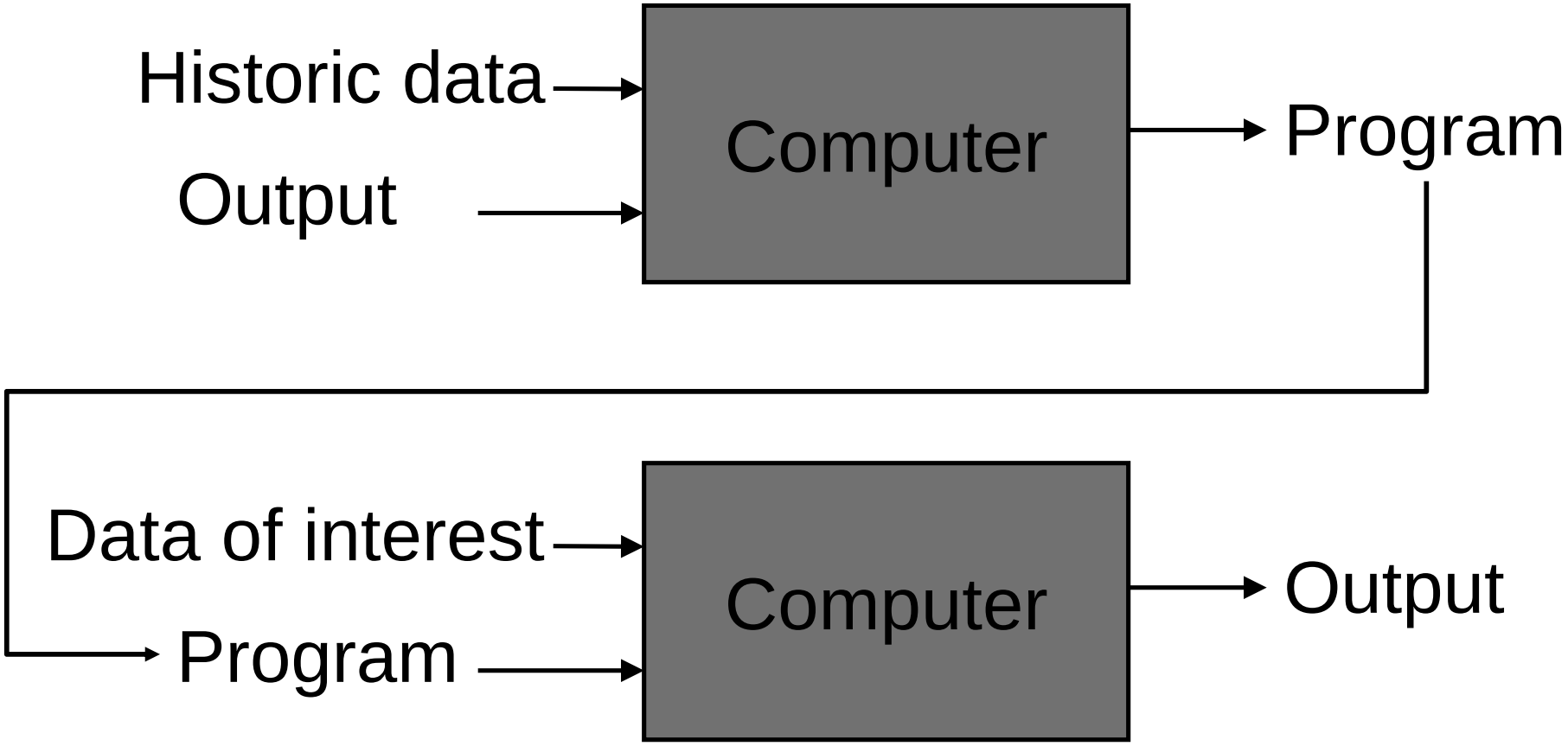
Machine learning



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Historic data →

SALES		
purchase_number	date_of_purchase	customer_id
1	03/09/2016	1
2	02/12/2016	2
3	15/04/2017	3
4	24/05/2017	1
5	25/05/2017	4
6	06/06/2017	2
7	10/06/2017	4
8	13/06/2017	3
9	20/07/2017	1
10	11/08/2017	2

item_code
A_1
C_1
D_1
B_2
B_2
B_1
A_2
C_1
A_1
B_1

“CAT”

Output →

Computer

→ Program

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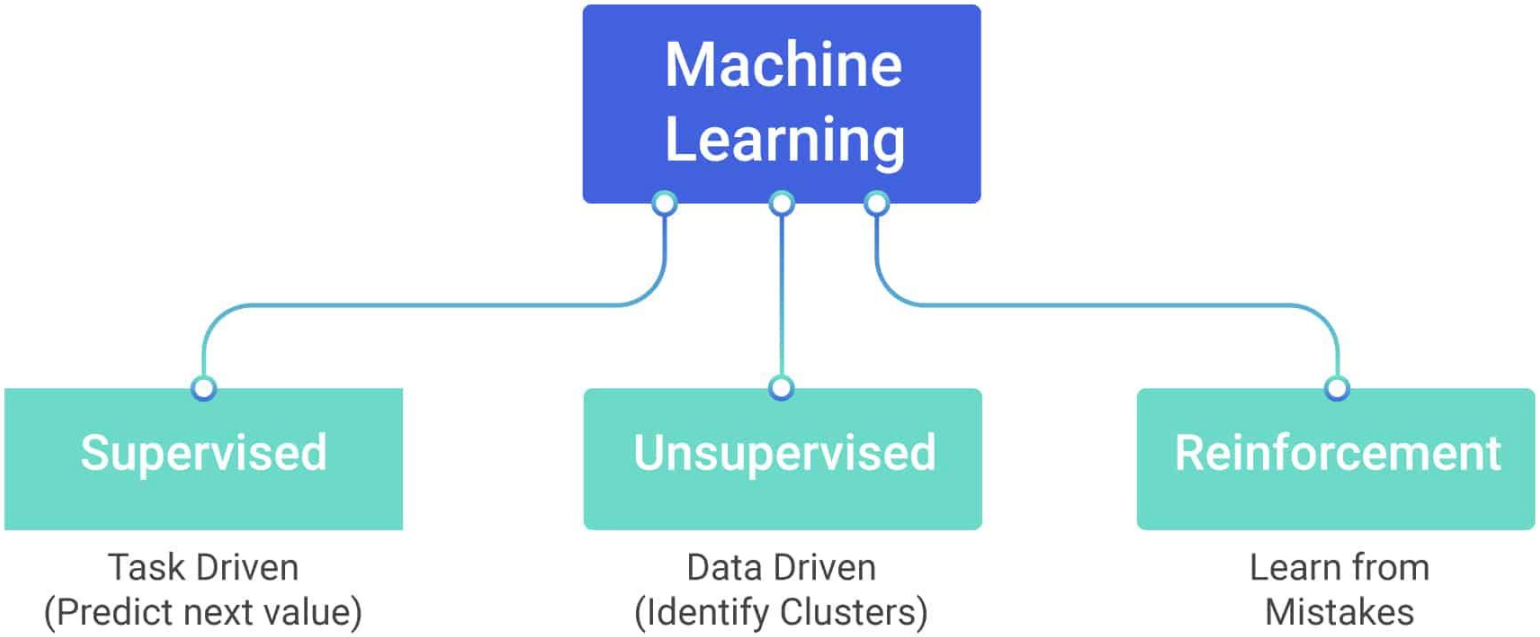

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Training

Training samples: X

ID	Feature 1 (height)	Feature 2 (weight)
User 1	Xx	Xx
User 2	Xxx	Xxx
User 3	Xxx	Xxx
…	…	…

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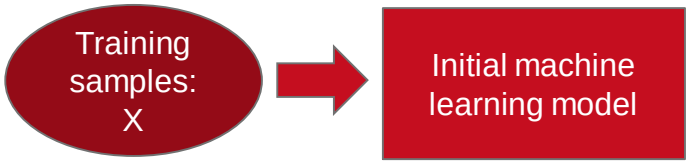
Training



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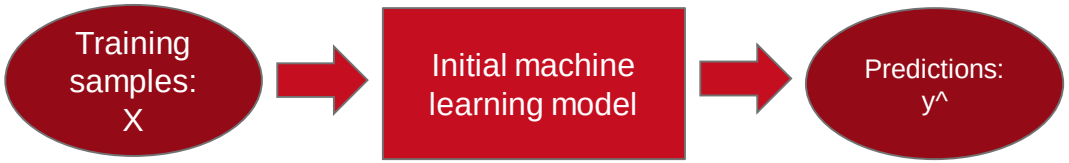
Training



Predicted label: Gender
Male
Female
Female
…

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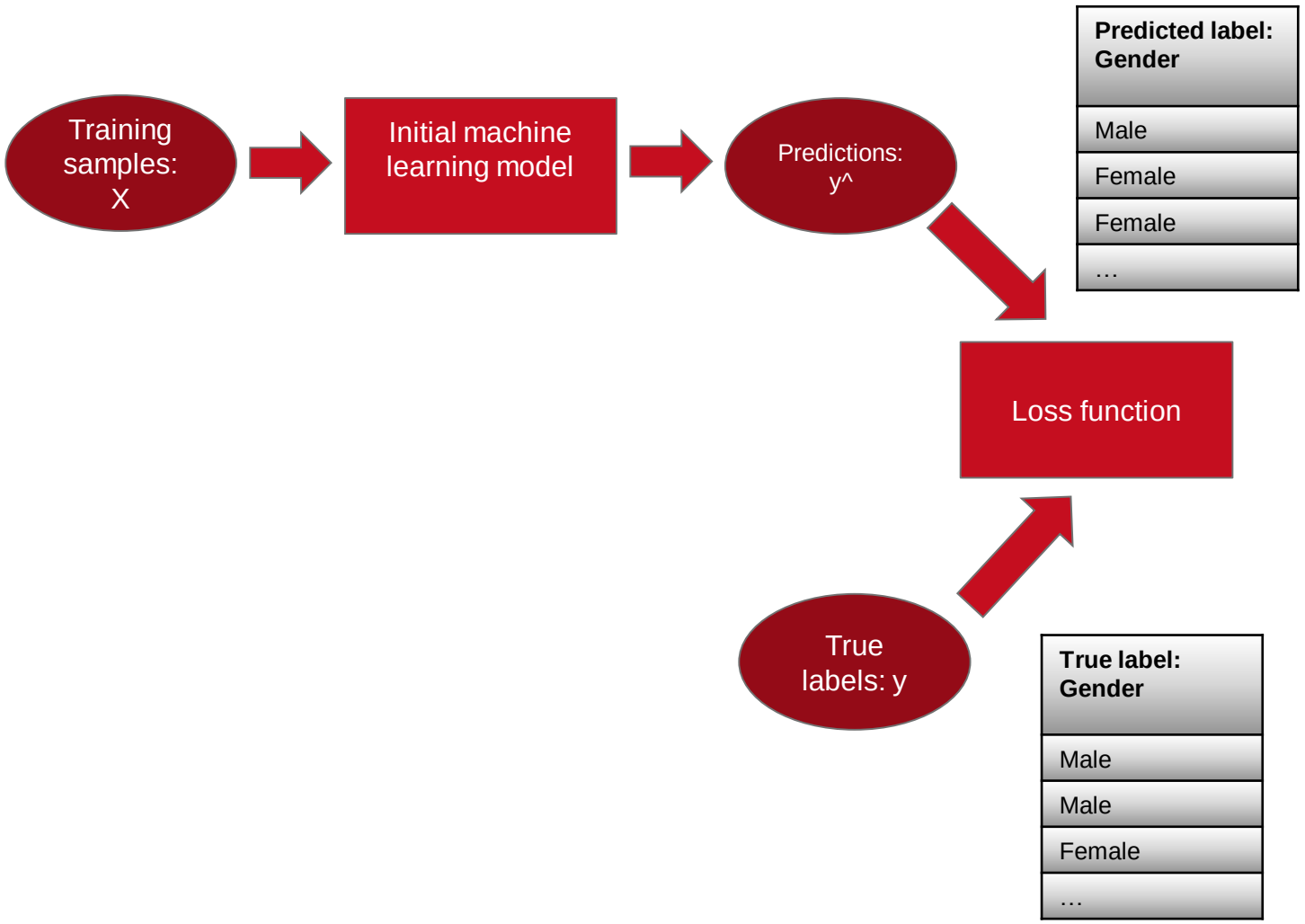
Training



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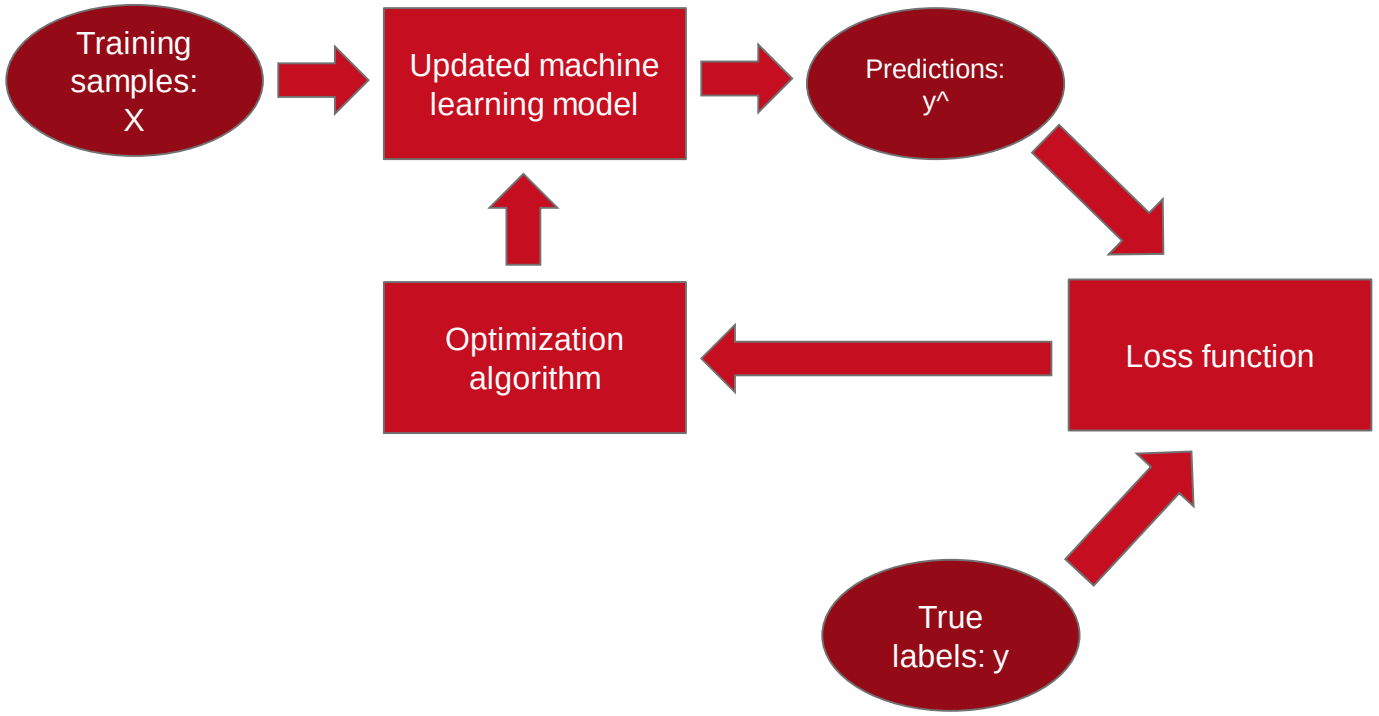
Training



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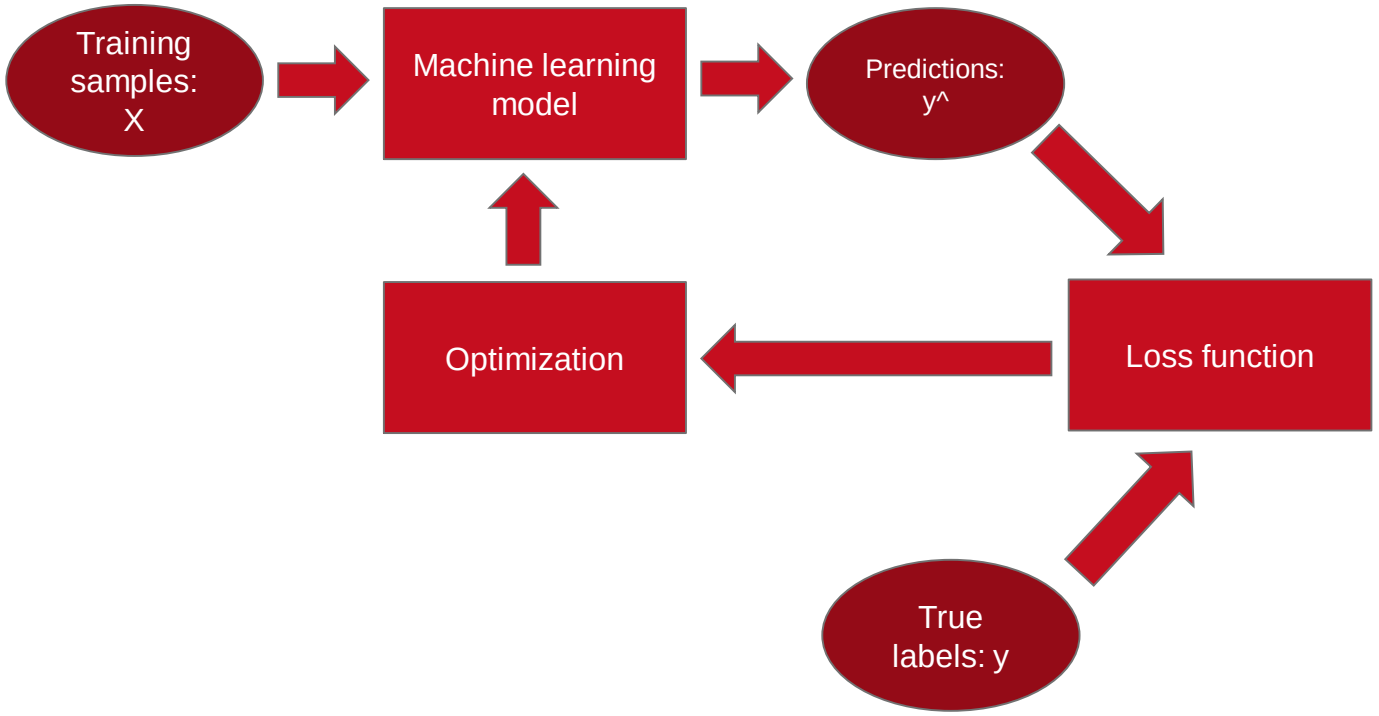
Training loop



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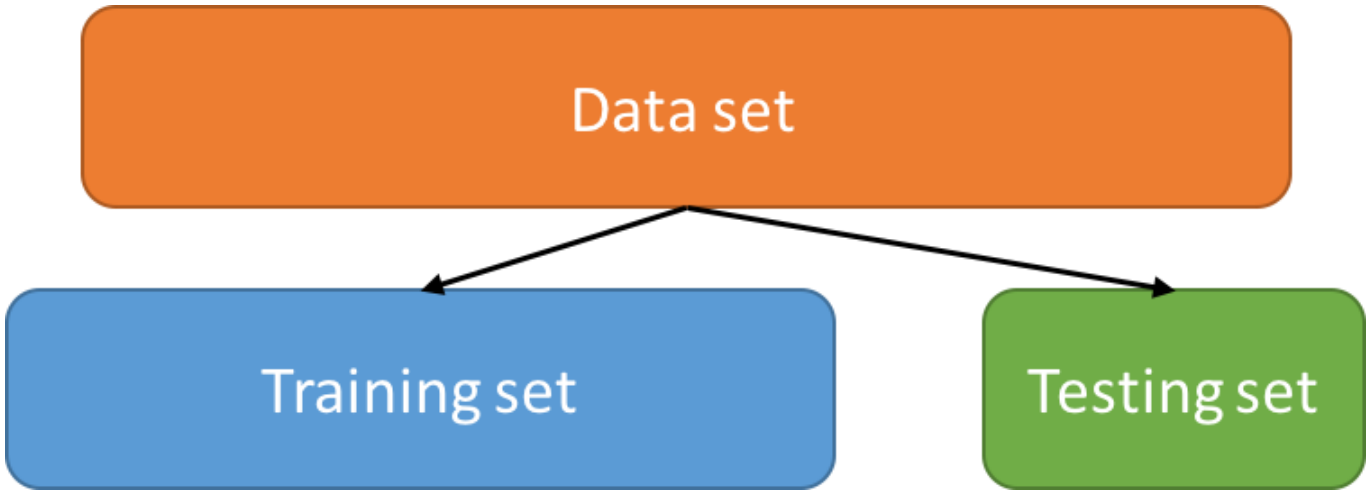
How to evaluate our model ?



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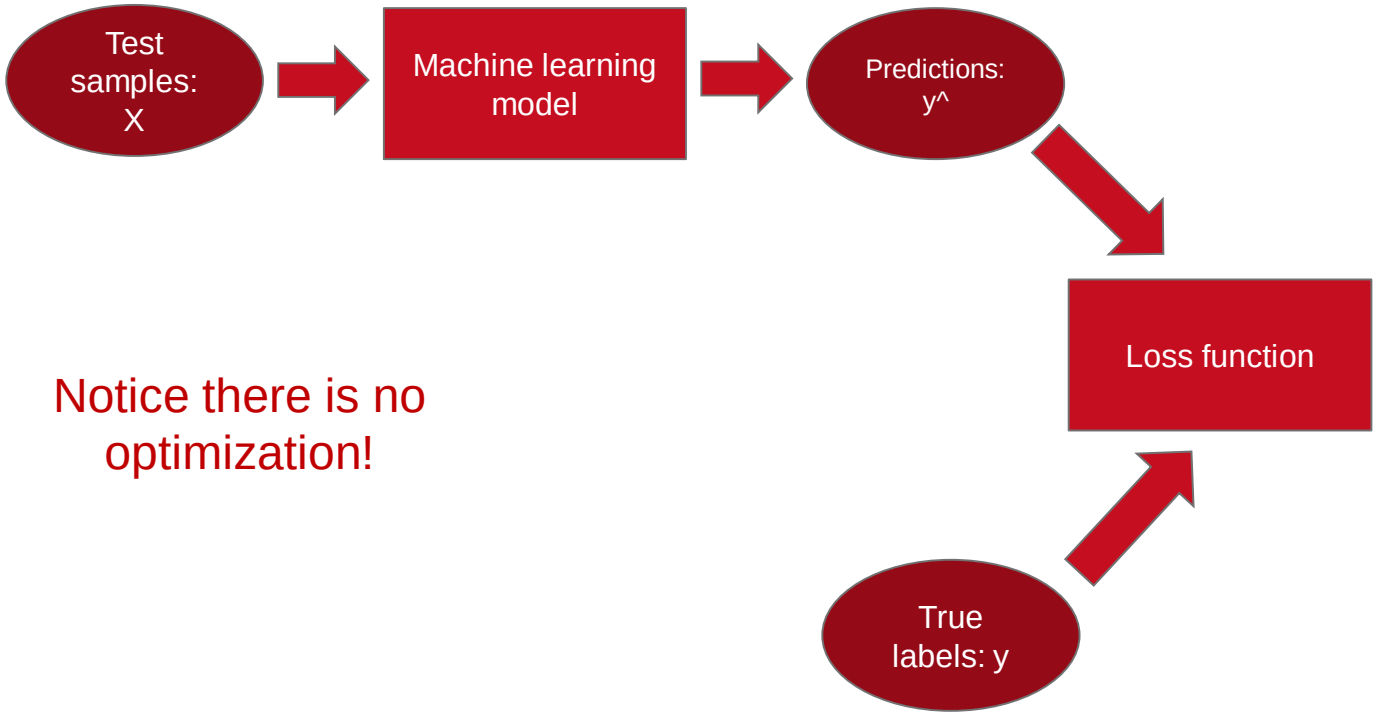
Evaluation



Notice there is no optimization!

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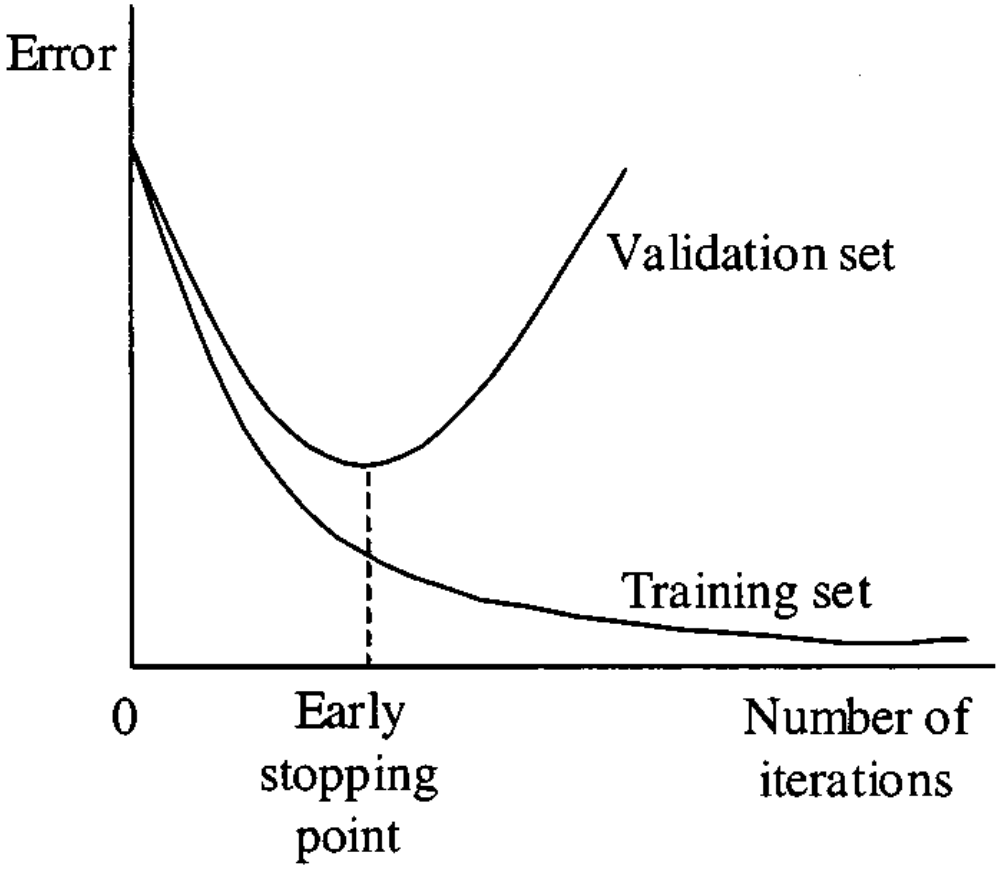
The overfitting problem:



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About models, loss functions and optimization algorithms

- There exists a variety of models, loss functions and optimization algorithms
- Some model choices conclude the choice of the optimization algorithm and loss functions, others don‘t
- We are going to use the most general ones

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Lets learn the first ML model:

Linear Regression