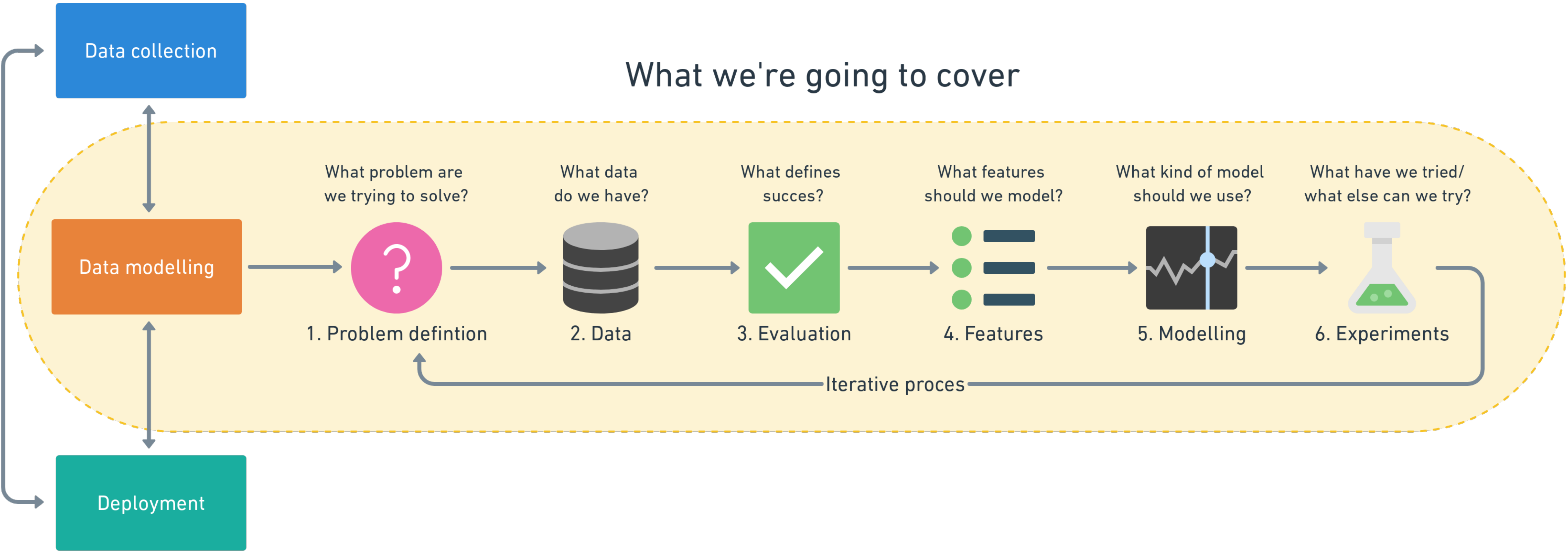
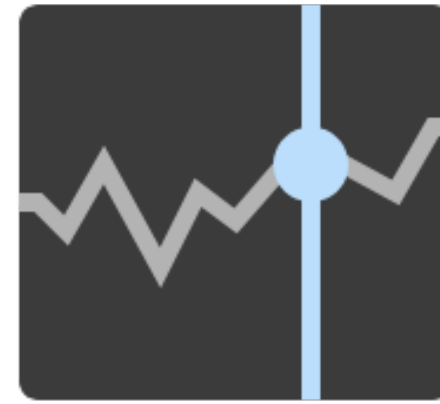


Steps in a full machine learning project





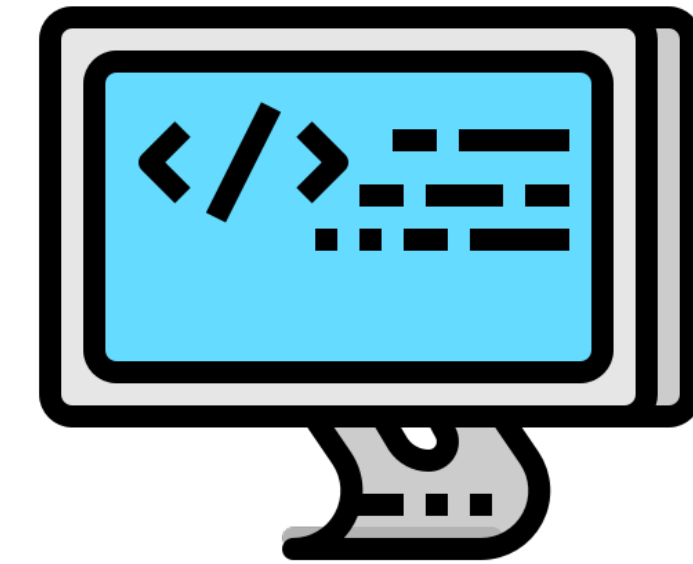
# 5. Modelling Part 4 — Comparison

**“How will our model perform in the real world?”**

# 3 parts to modelling

## 1. Choosing and training a model

Training Data

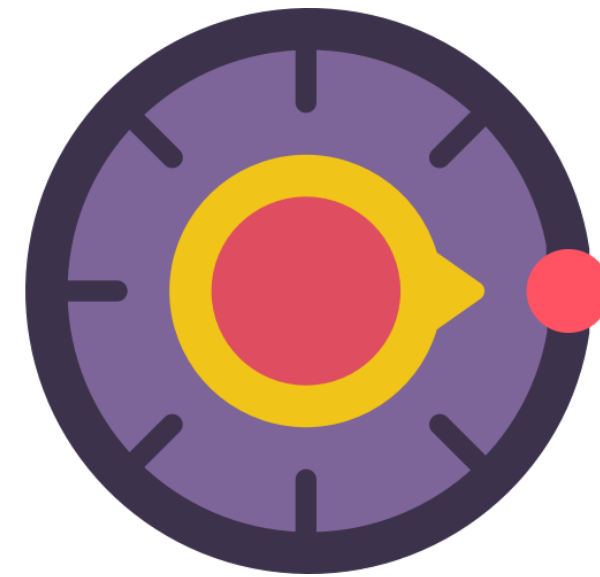


or



## 2. Tuning a model

Validation Data

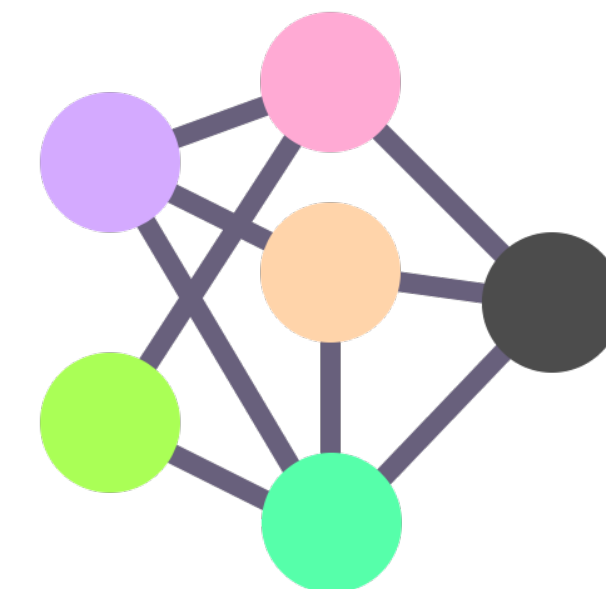


## 3. Model comparison

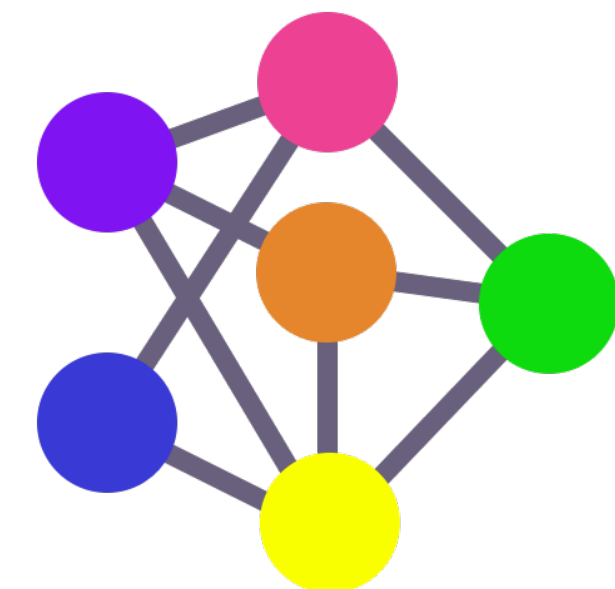
Test Data



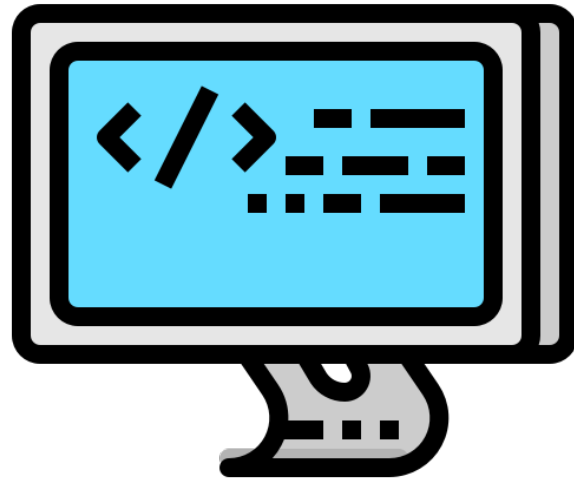
vs.



vs.



# Testing a model



**Data Set**

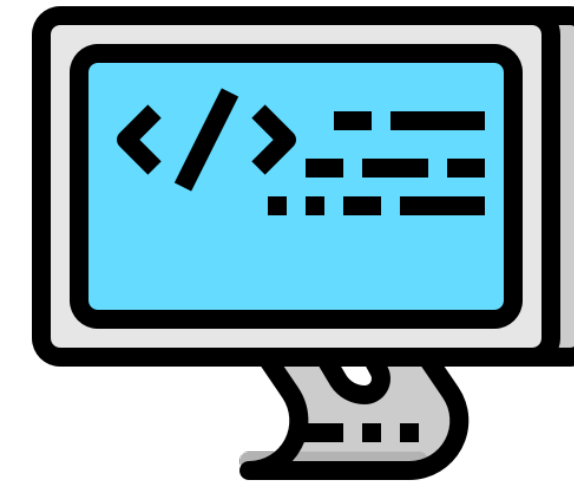
**Performance**

Training

98%

Test

96%



Underfitting  
(potential)

**Data Set**

**Performance**

Training

64%

Test

47%

Overfitting  
(potential)

**Data Set**

**Performance**

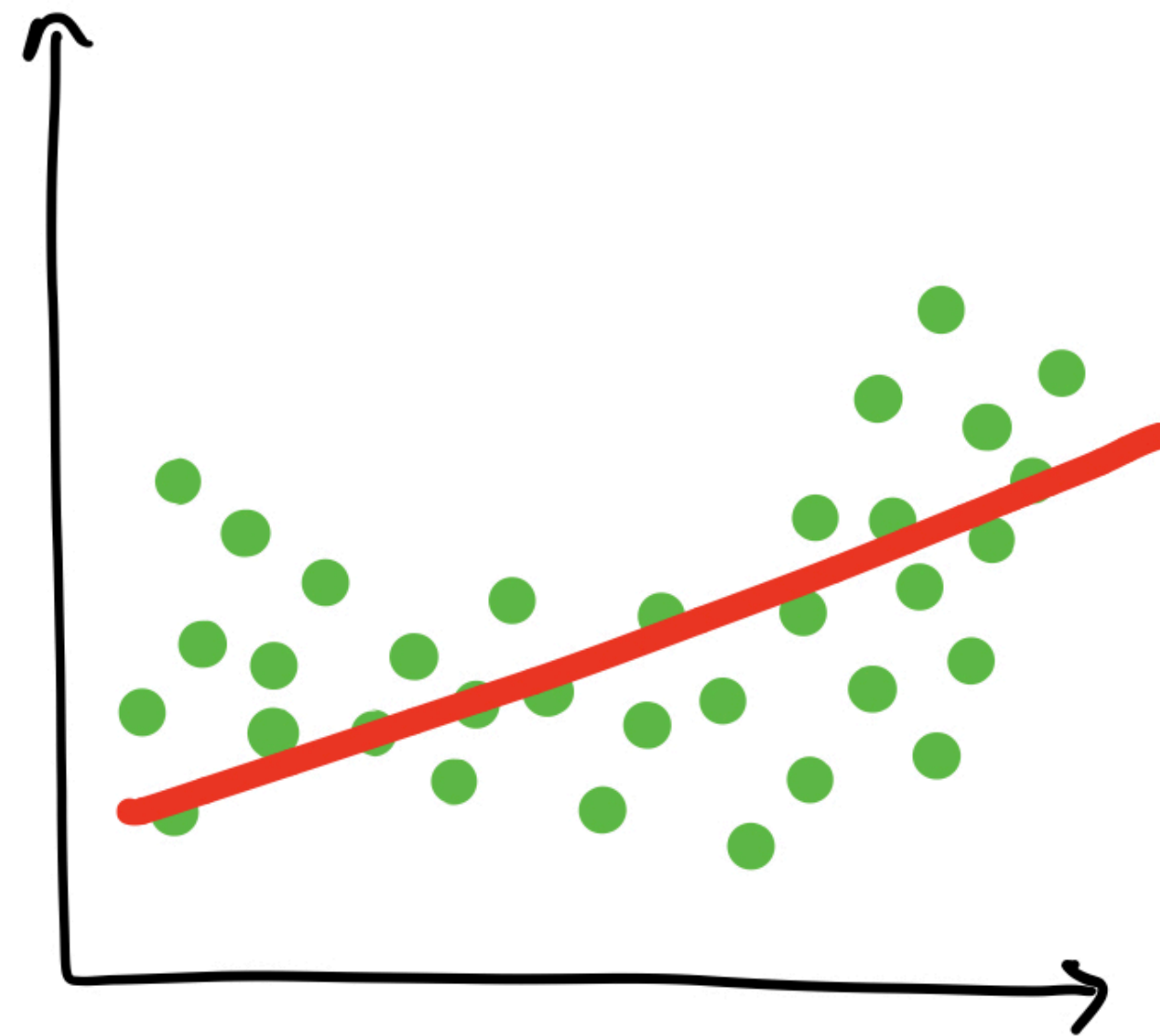
Training

93%

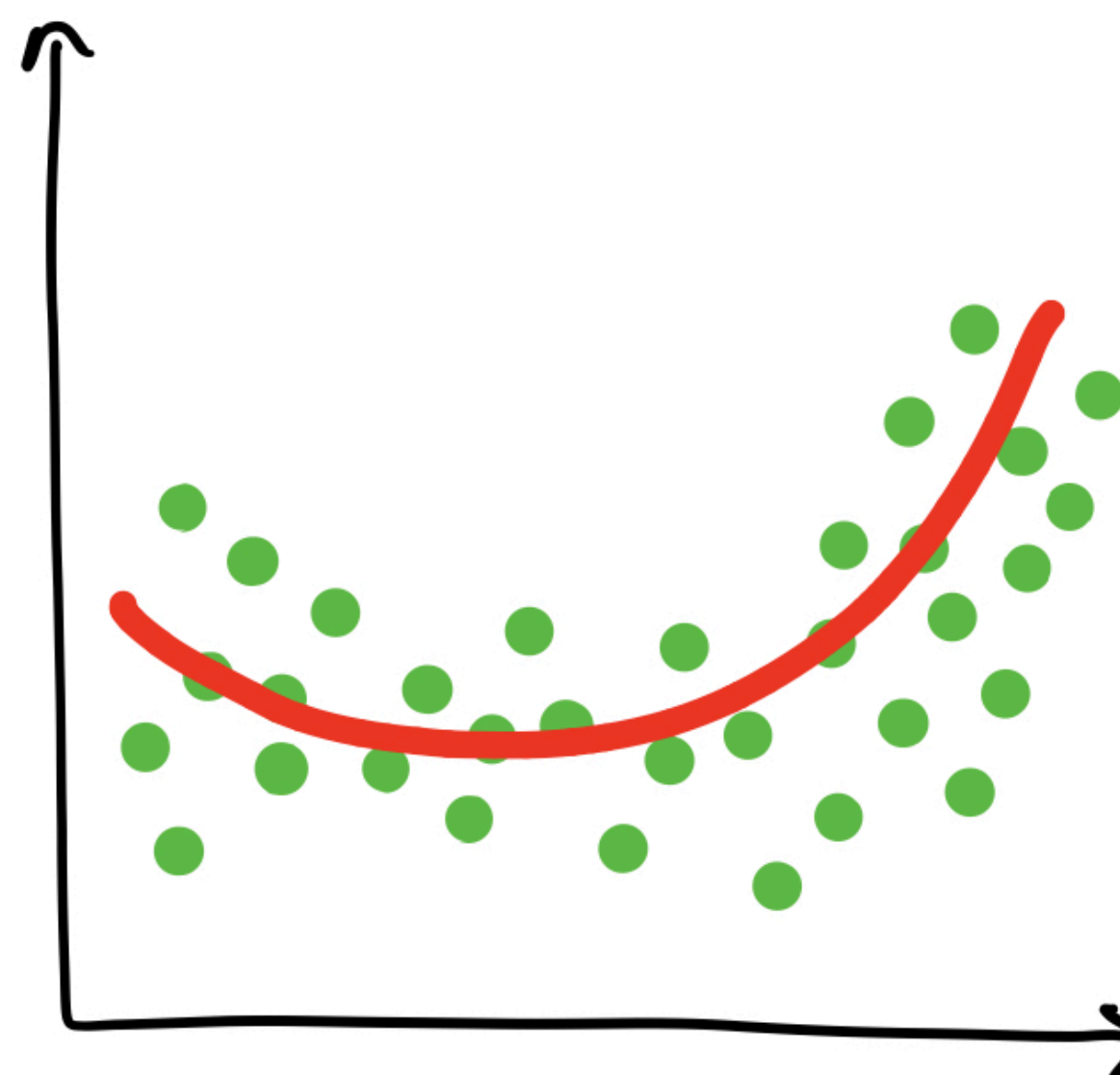
Test

99%

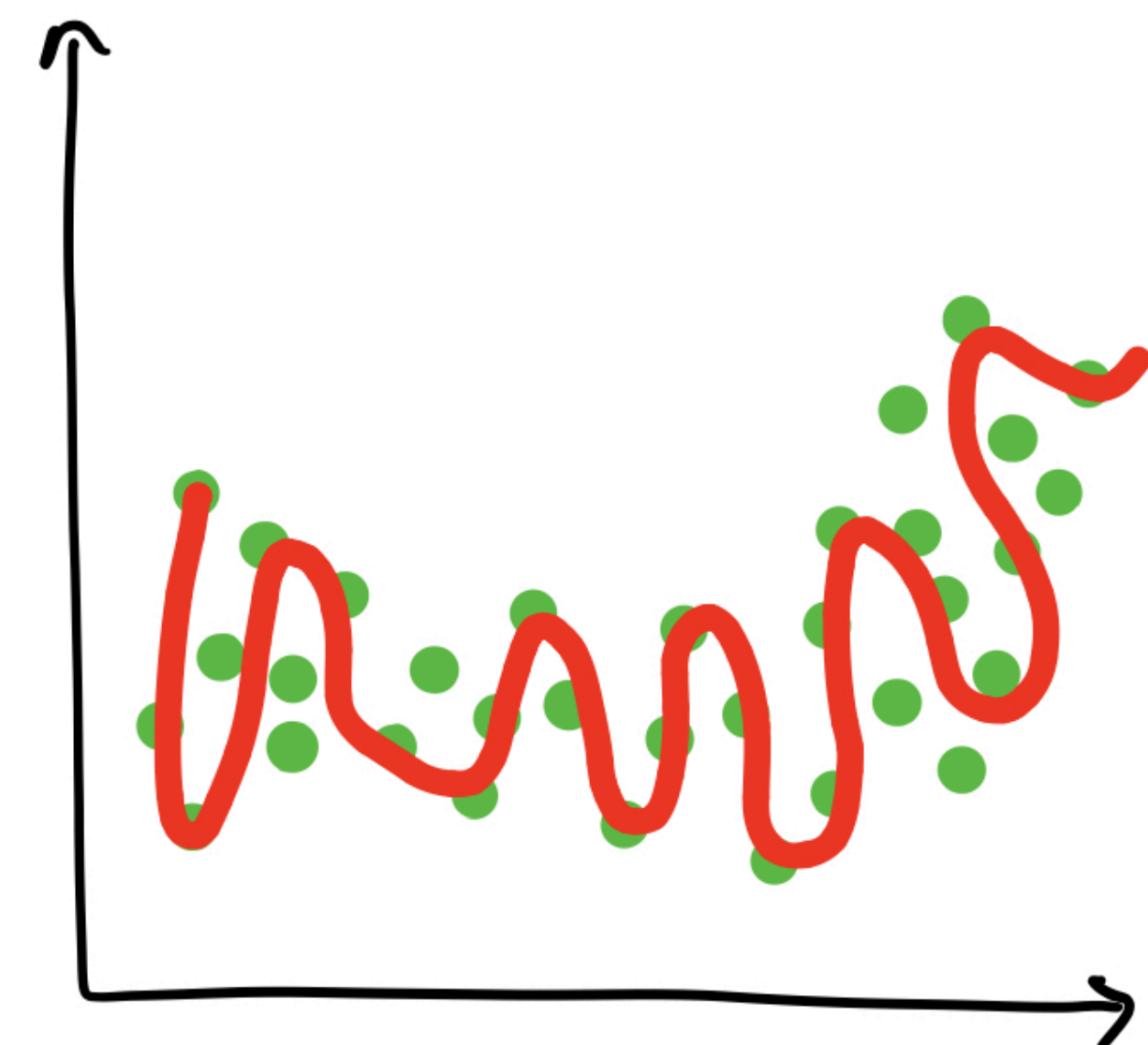
# Overfitting and underfitting



**Underfitting**

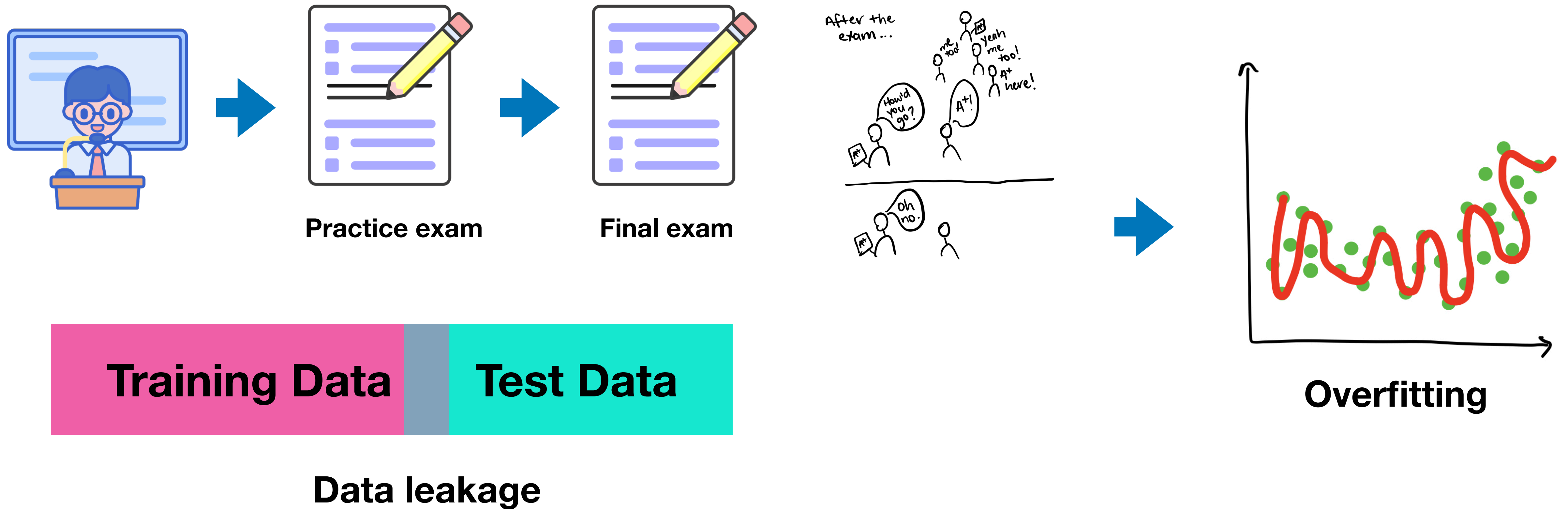


**Balanced**  
(Goldilocks zone)

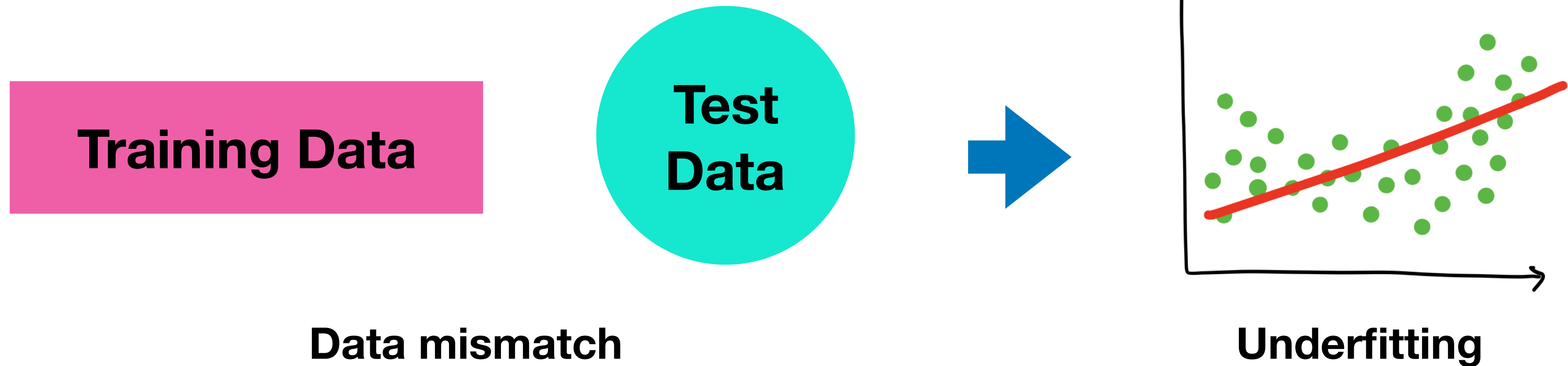


**Overfitting**

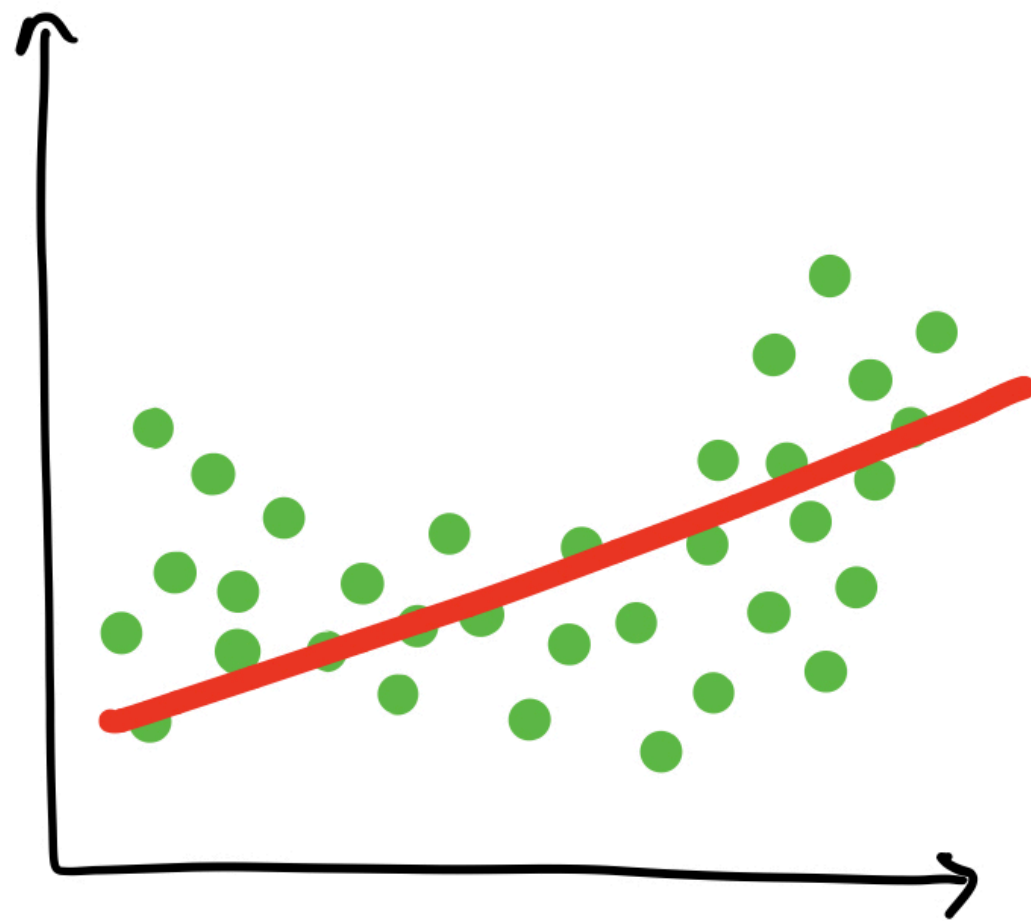
# Overfitting and underfitting



# Overfitting and underfitting

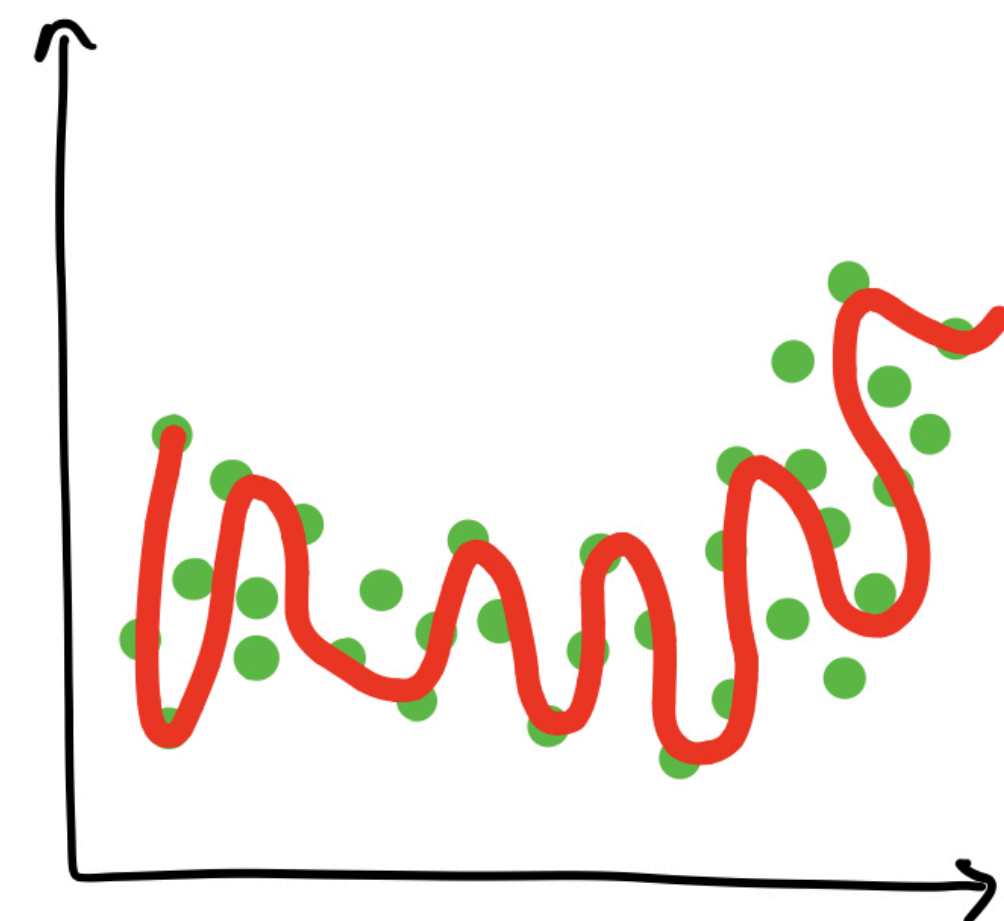


# Fixes for overfitting and underfitting



Underfitting

- Try a more advanced model
- Increase model hyperparameters
- Reduce amount of features
- Train longer




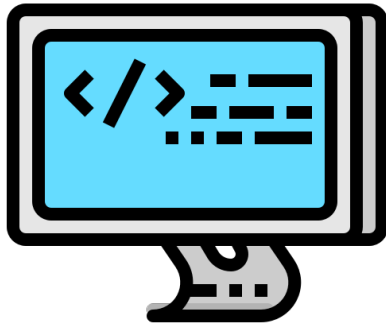
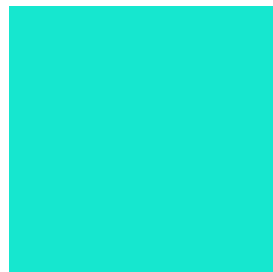

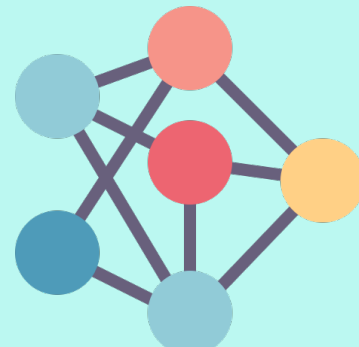
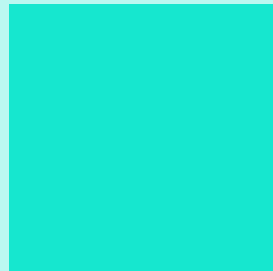

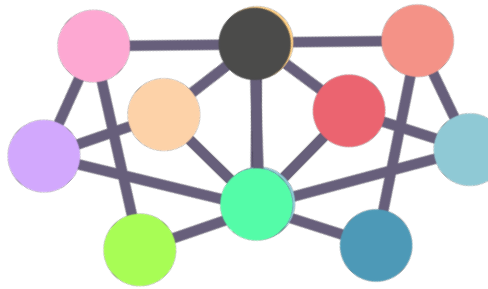

Overfitting

- Collect more data
- Try a less advanced model



# Comparing models

## Experiment

				Accuracy	Training time	Prediction time
1		→ 	→ 	→ <b>87.5%</b>	<b>3 min</b>	<b>0.5 sec</b>
	Inputs	Model 1	Outputs			
2		→ 	→ 	→ <b>91.3%</b>	<b>92 min</b>	<b>1 sec</b>
	Inputs	Model 2	Outputs			
3		→ 	→ 	→ <b>94.7%</b>	<b>176 min</b>	<b>4 sec</b>
	Inputs	Model 3	Outputs			

# Things to remember

- **Want to avoid overfitting and underfitting (head towards generality)**
- **Keep the test set separate at all costs**
- **Compare apples to apples**
- **One best performance metric does not equal best model**

# Up next

## 6. Experimentation



**“How could we improve/what can we try next?”**