Machine Learning

11.12.19 / Us (for the last time)

Today’s Focus

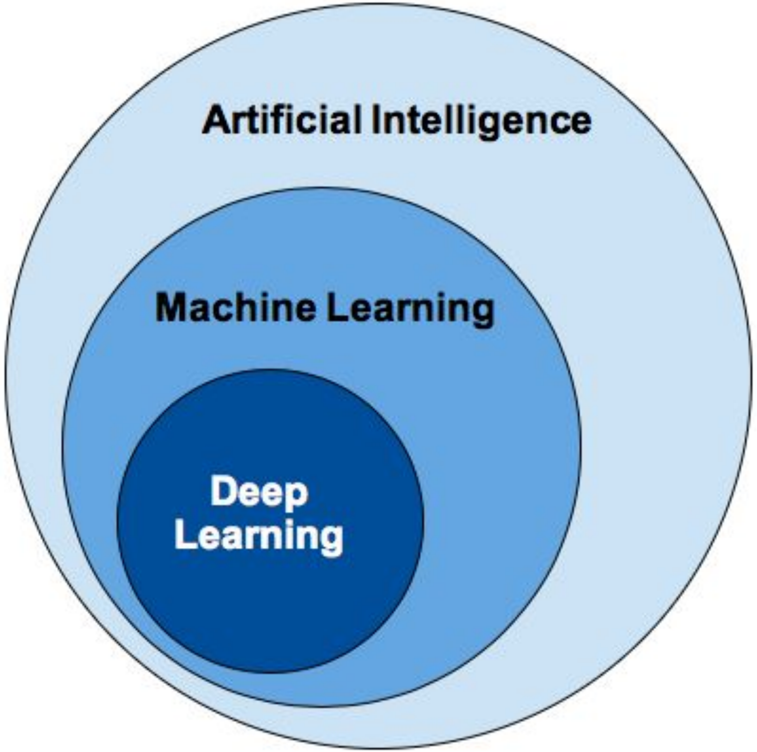
ML Theory

Scikit-Learn

Challenges

What is Machine Learning?

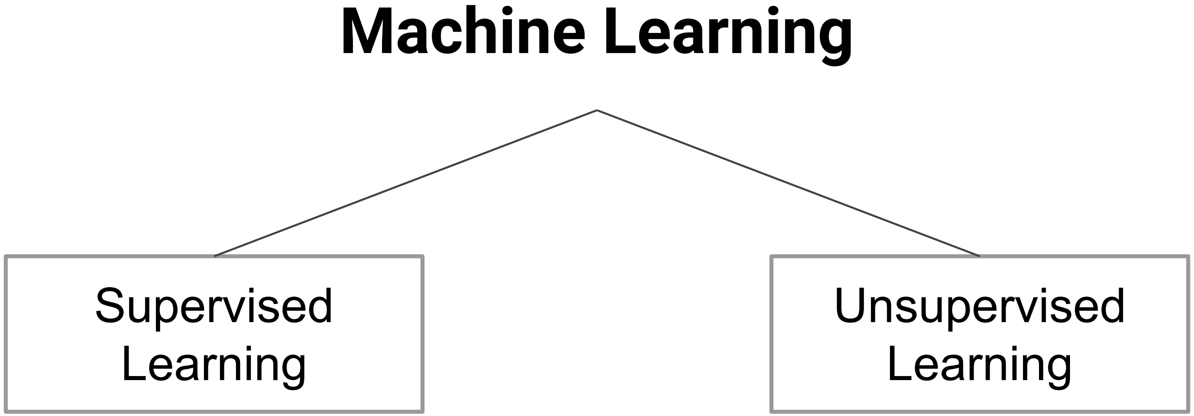
Difference between AI / Machine Learning / Deep Learning



What is Machine Learning?

- In short, algorithms that can be trained with labelled data. Always with the aim that the algorithms are able to **generalize** in a later stage
  - Make accurate predictions for new objects that were not seen during training
- Machine Learning covers fields of statistics, computer science, psychology and more

Supervised vs. Unsupervised Learning



Machine Learning

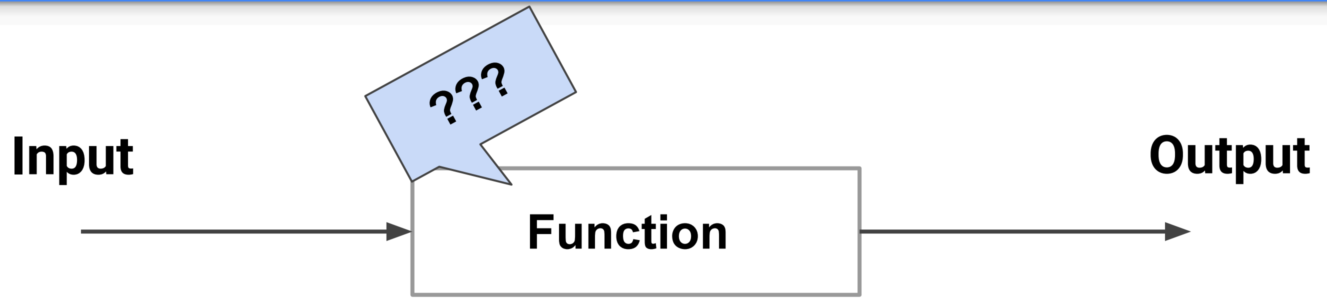
Supervised Learning

Unsupervised Learning

Data is labeled: Classification, Regression, etc.

Data is unlabeled: Clustering, dimensionality reduction, etc.

Supervised Machine Learning I



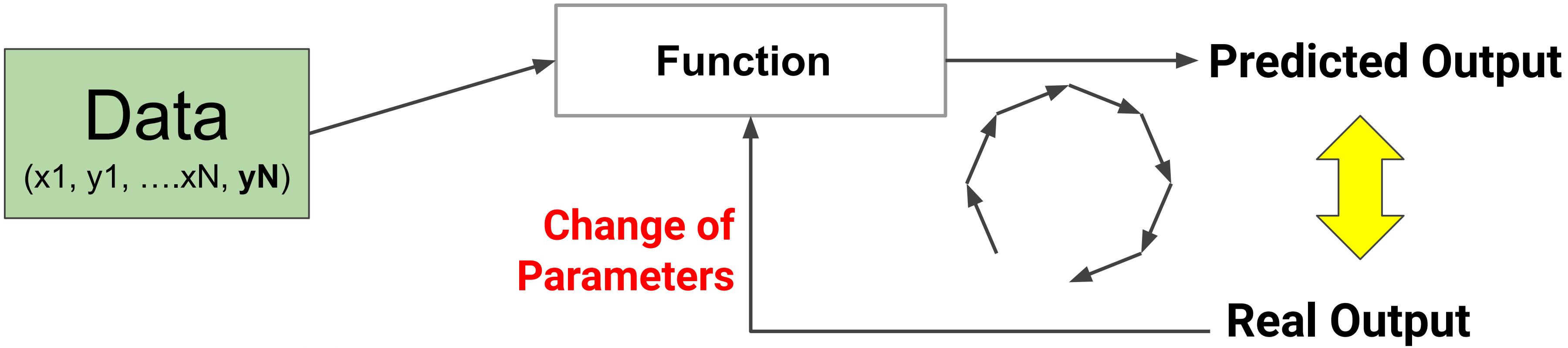
???

Input

Function

Output

→ WE DO NOT KNOW HOW OUR FUNCTION LOOKS LIKE...



Data

(x1, y1, ….xN, **yN**)

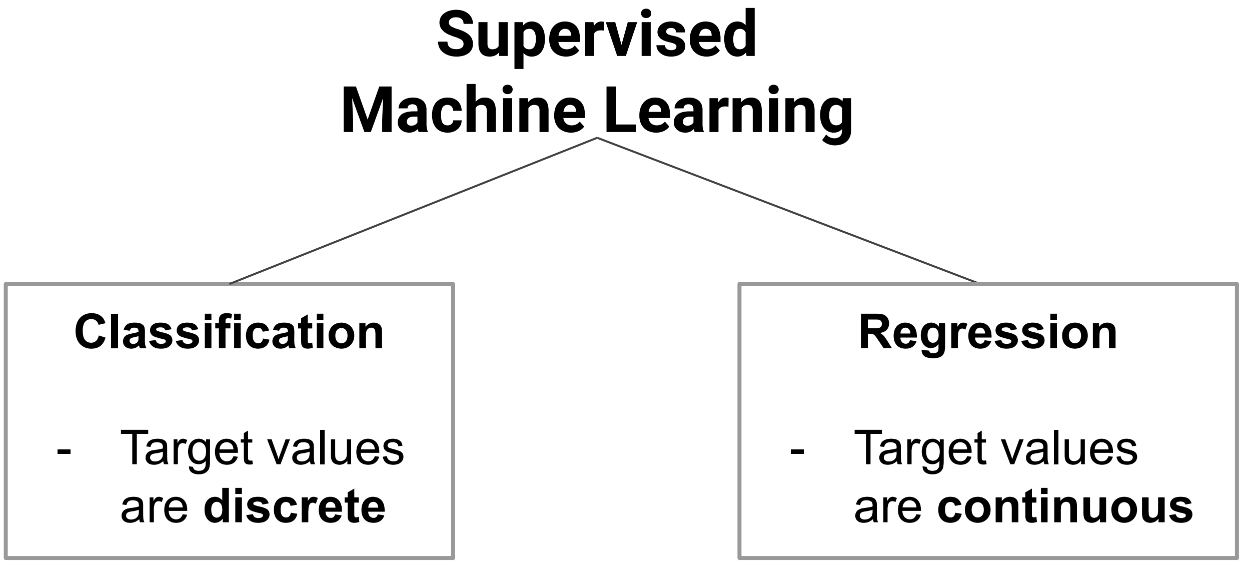
Function

Predicted Output

Change of Parameters

Real Output

Supervised Machine Learning II



Supervised Machine Learning

Classification

- Target values are **discrete**

Regression

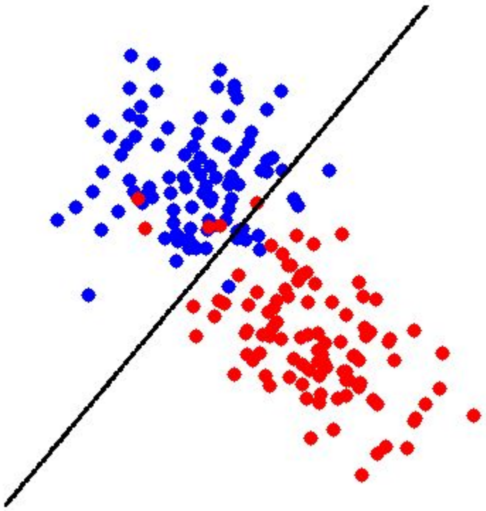
- Target values are **continuous**

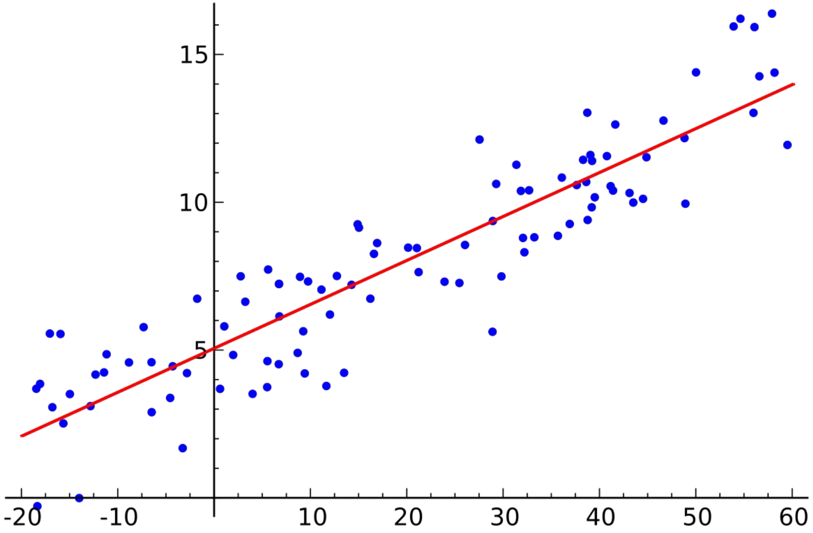
Supervised Machine Learning III

Classification

Supervised Machine Learning

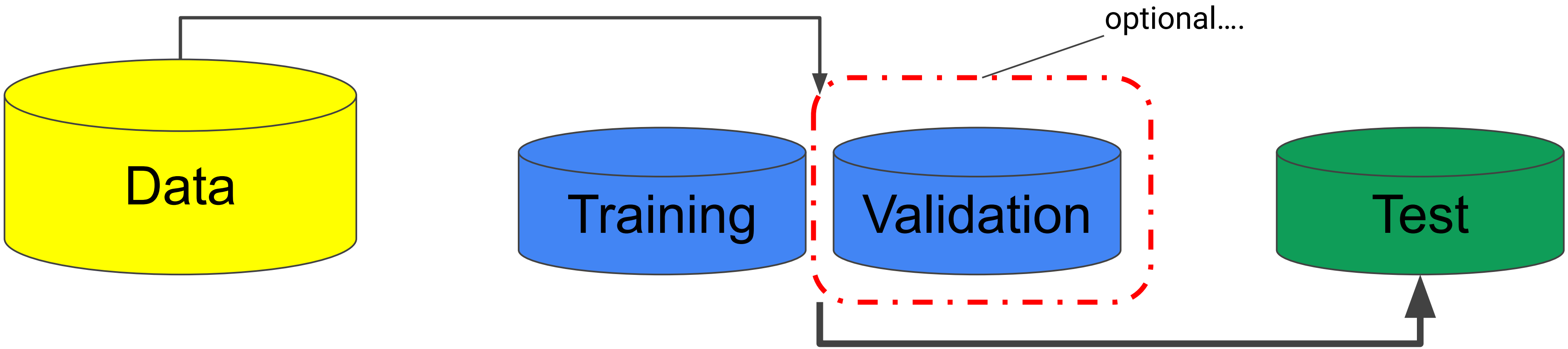
Regression





Training vs. Testing

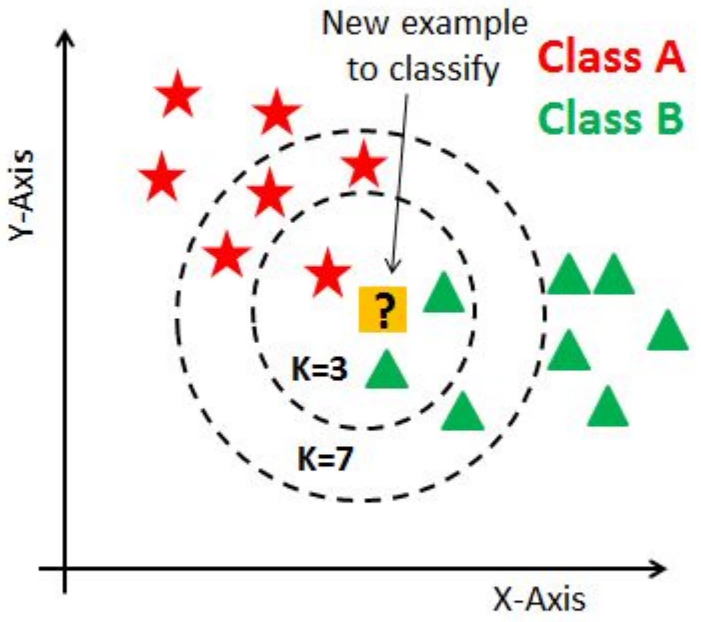
GOAL: Our ML is able to **generalize** on completely new data points!



Our first ML model...

K-Nearest Neighbour I

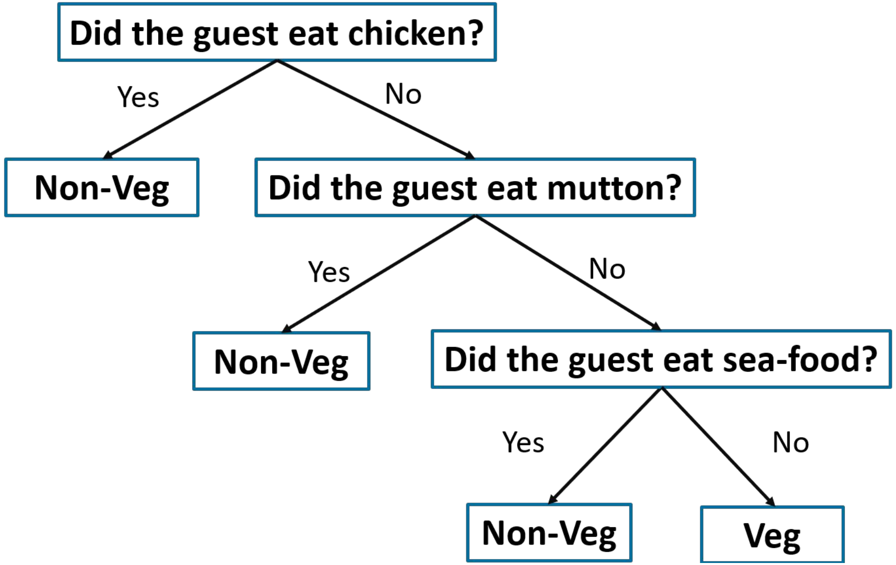
- KNN can be used for classification, but also for regression
- K: number of the nearest neighbours the classifier will take into account in order to make its prediction (hyper-parameter)
- Clear distance metric: *Euclidean norm*



Our second ML model!

Decision Tree I

- DT can be used for classification, but also for regression
- The aim of DT is to find a sequence of questions in order to have the best accuracy of classifying the data with fewest steps
- **Easy to interpret!**



Did the guest eat chicken?

Yes

No

Non-Veg

Did the guest eat mutton?

Yes

No

Non-Veg

Did the guest eat sea-food?

Yes

No

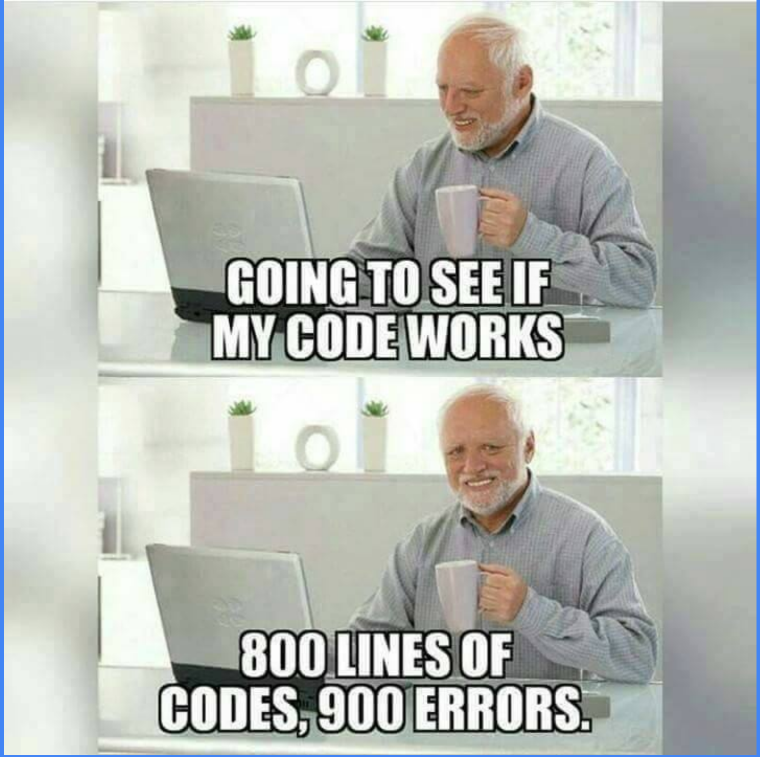
Non-Veg

Veg

Ok, enough theory! 💩

→ Time for …

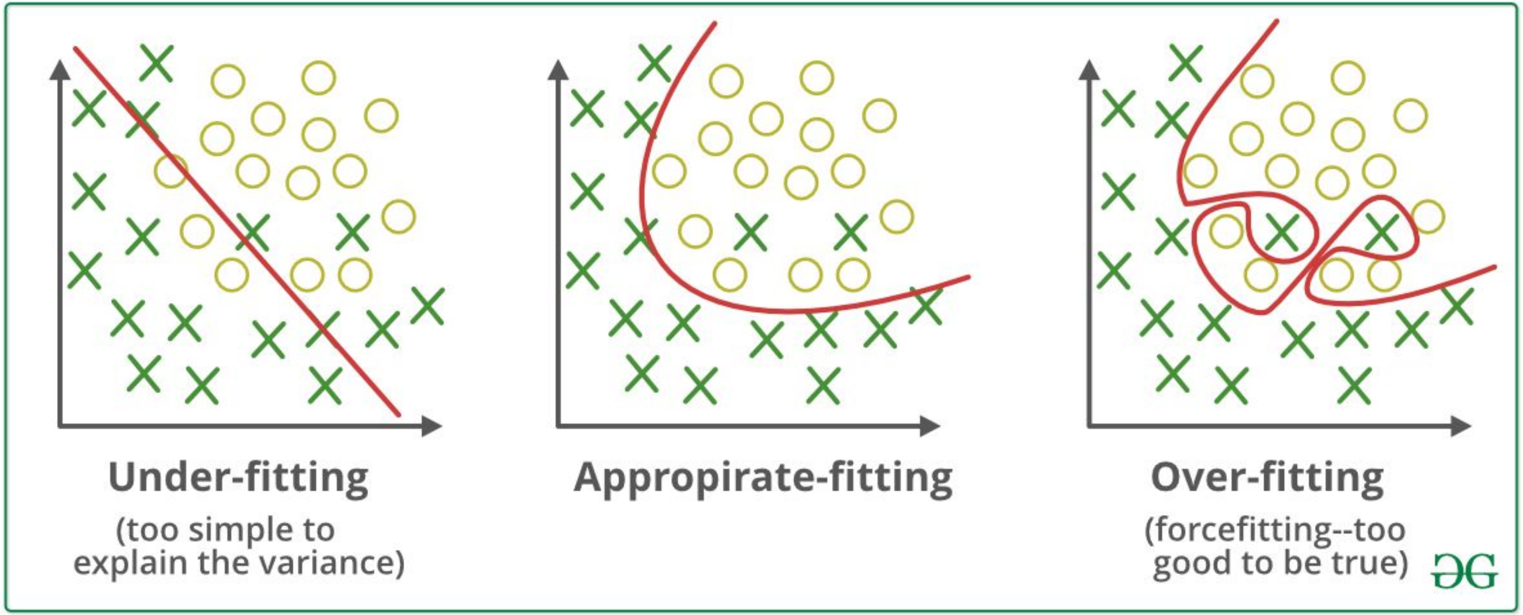
CODING!


GOING TO SEE IF MY CODE WORKS
800 LINES OF CODES, 900 ERRORS.

… one last thing ~~☝️~~

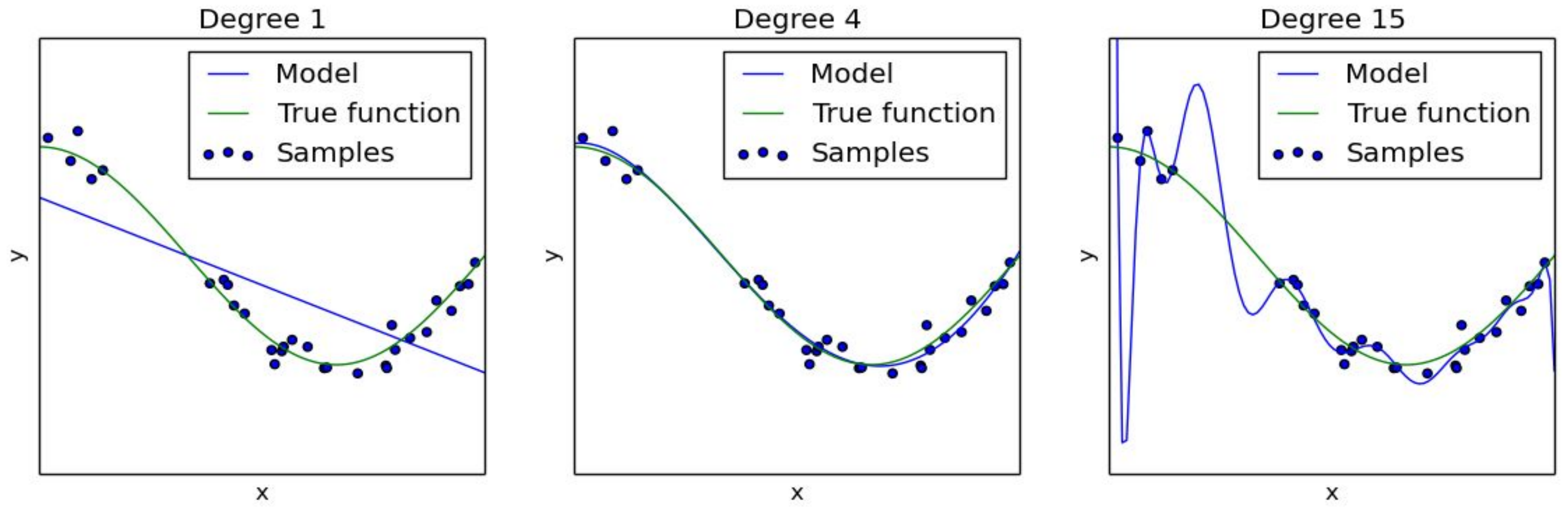
Overfitting vs. Underfitting I

Classification



Overfitting vs. Underfitting II

Regression



Great job!

You did it!💕👏

Thanks!

Python team

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