

EMBEDDED VISION DESIGN 3

REGRESSION

HANDS-ON

JEROEN VEEN

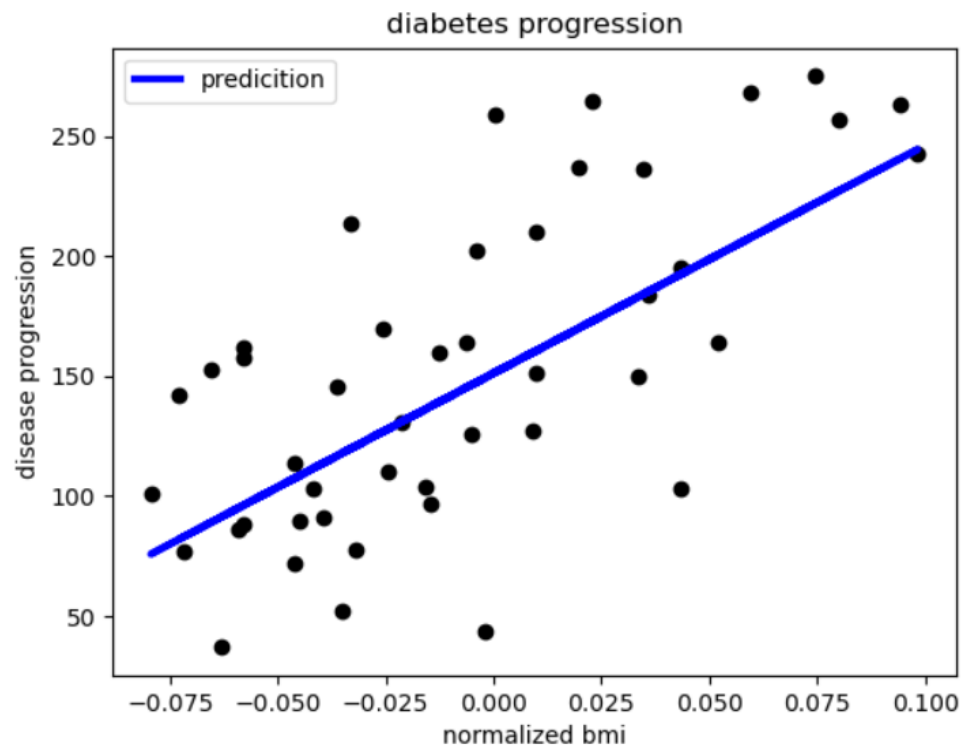


HAN_UNIVERSITY
OF APPLIED SCIENCES

CONTENTS

- Linear regression exercise
- Polynomial regression exercise
- Learning curve exercise

LINEAR REGRESSION EXAMPLE



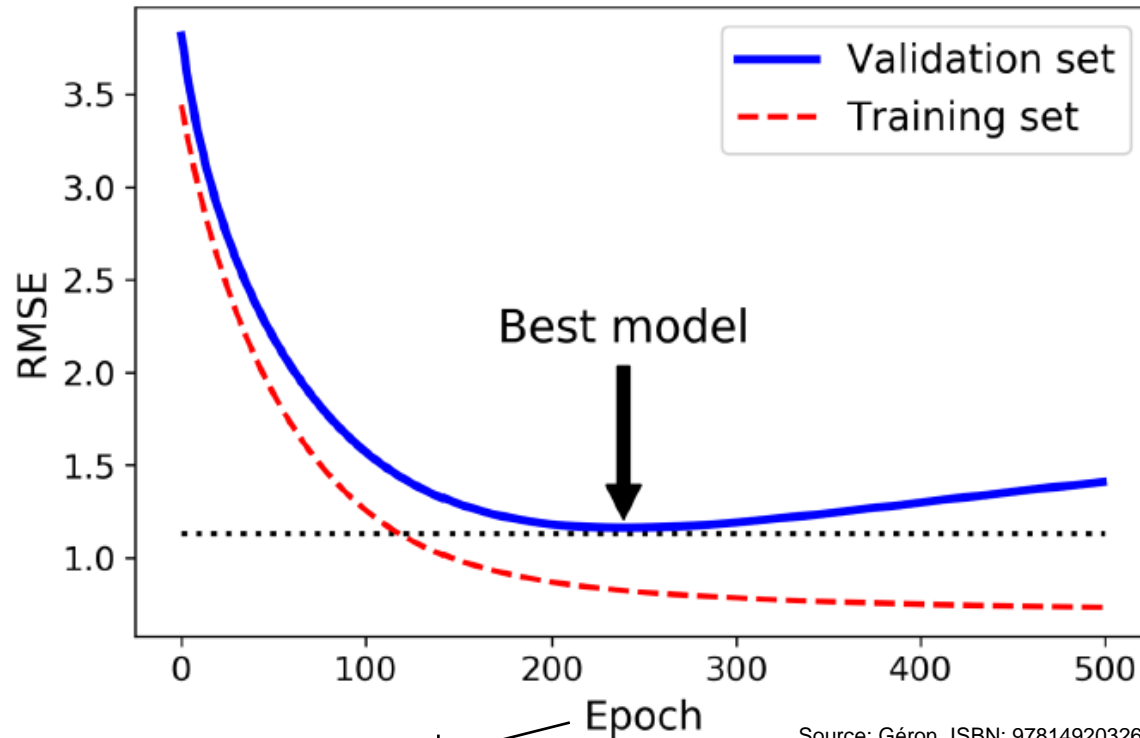
See Regression_01.py

POLYNOMIAL REGRESSION

- Exercise 1: Can you improve the model by polynomial regression?
- Try out generating your own regression example:
https://scikit-learn.org/stable/modules/generated/sklearn.datasets.make_regression.html
- Build on Regression_01.py
and see Géron, page 129 (114 in new ed.)

EARLY STOPPING

- Interpretation of learning curves



epoch means that each sample in the training dataset has been used to update the internal model parameters

Epoch

Source: Géron, ISBN: 9781492032632

LEARNING CURVES

- Exercise 02: Plot the learning curves for polynomial regression and experiment with various degrees
- Can you interpret the curves?
- Build on Regression_01.py
and see Géron, page 130-134

LOGISTIC REGRESSION

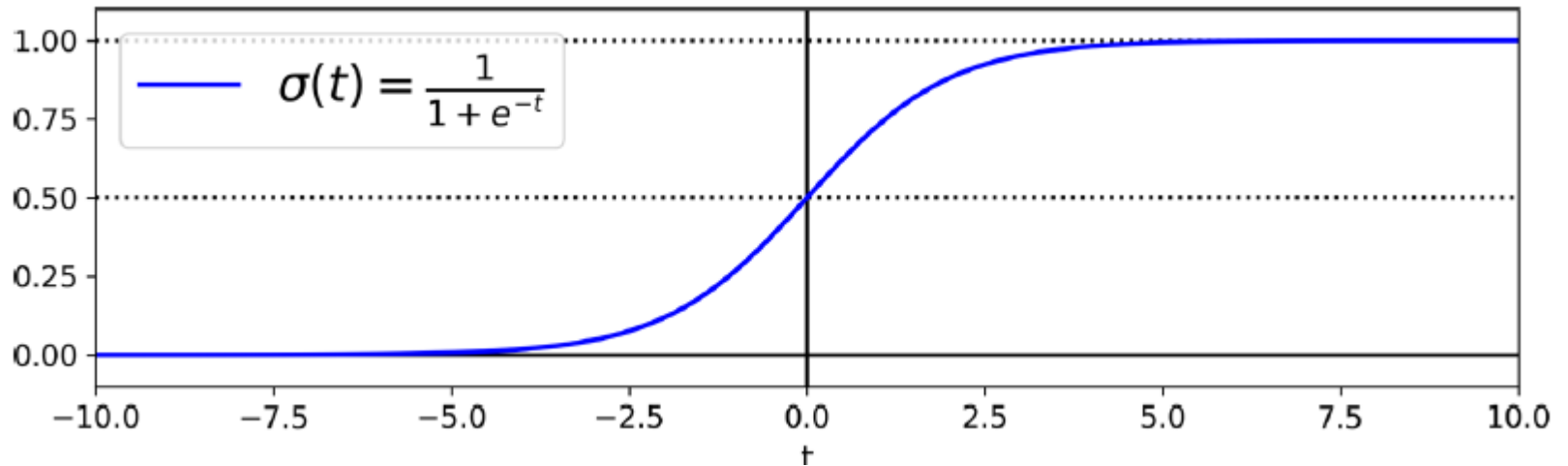
- Estimate the probability that an instance belongs to a particular class
- Binary classifier
- Baseline for evaluating more complex classification methods



Source: Mathworks, Applying Supervised Learning

ESTIMATING PROBABILITY

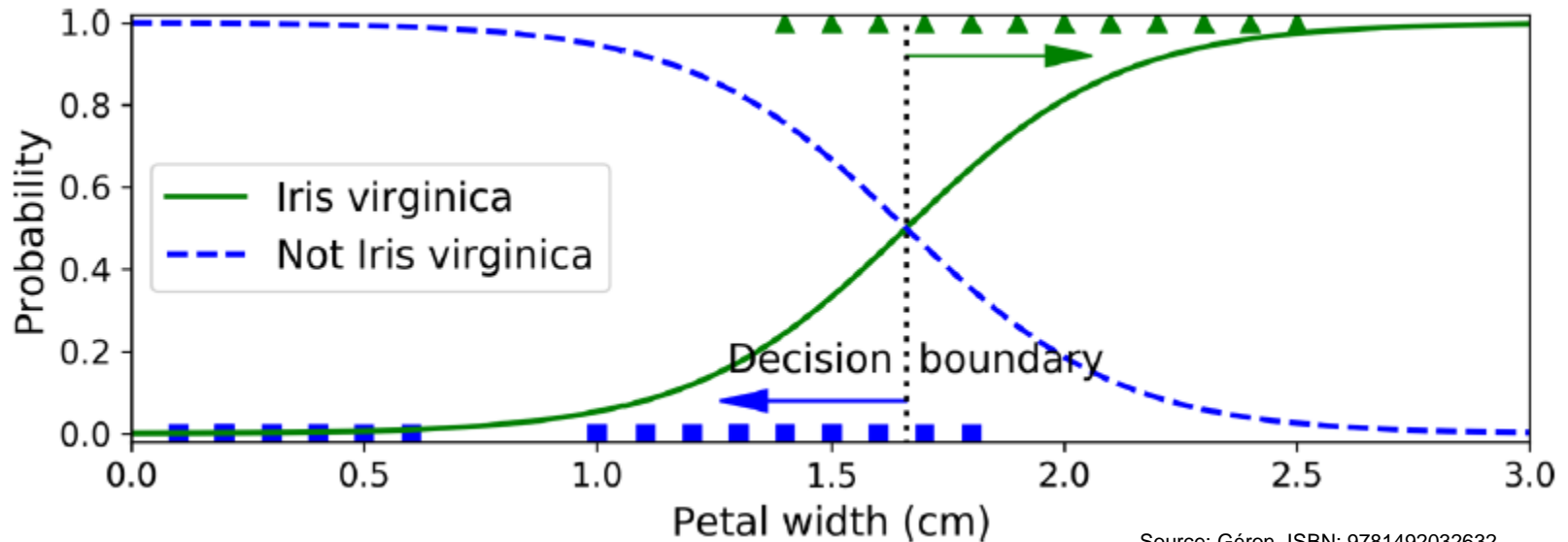
- Logistic functions maps prediction result to probability
- Sigmoid function



<https://developers.google.com/machine-learning/crash-course/logistic-regression/calculating-a-probability>

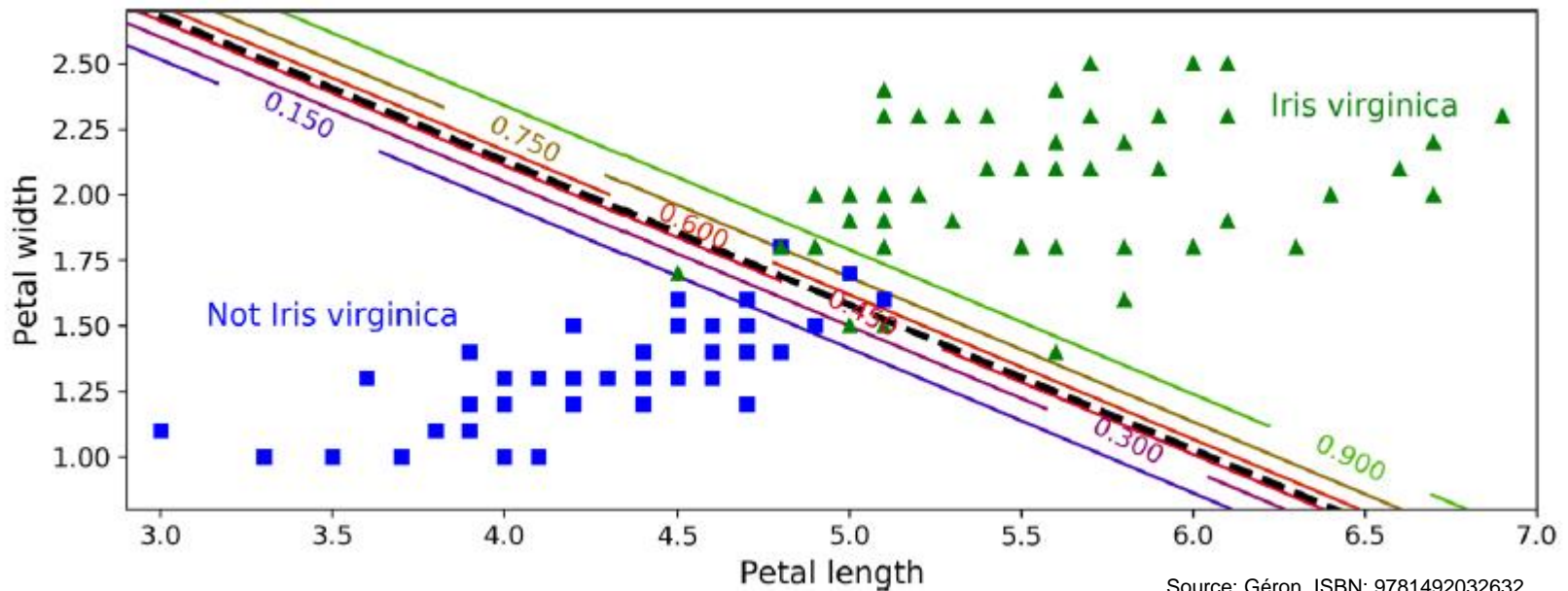
DECISION BOUNDARY

- Aka classification threshold
- Both probabilities are equal to 50% ?



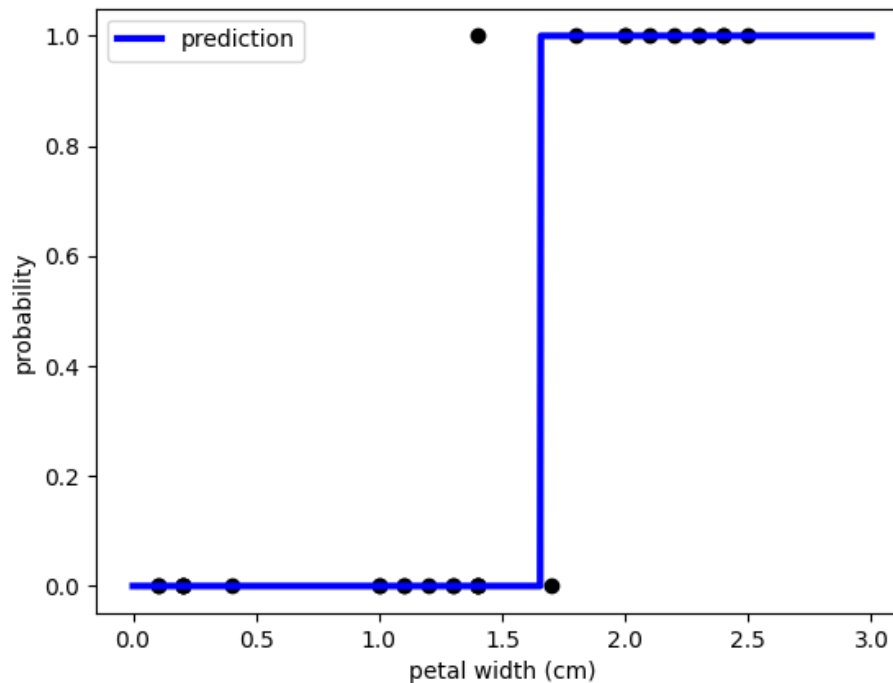
Source: Géron, ISBN: 9781492032632

LINEAR DECISION BOUNDARY



- Logistic Regression models can be regularized

LOGISTIC REGRESSION EXAMPLE



See Regression_02.py