Bringing features on the same scale

Question: Can you make an example where it is important to bring features to the same scale and outline the different techniques?

Feature scaling is an a very important factor when it comes to data that has very different weights. A good example would be using on the height of a football player. This is because the largest value range will dominate.

Lets see this in an example:

distance derivates

$$(18-30)^2 + (1,6-1,8)^2 + (204-980)^2 = 2,1 \cdot 10^{11}$$

This could be achieved by the min max algorithm which scales data into a range of [0-1]

Lets look at the student_id database and apply min-max

min	125	0
	178	0,96
max	120	1
	167	0,76
	170	0,81
	173	0,87
	135	0,15
	125	0
	145	0,34
	125	0

formula $x_{(norm)} = \frac{x^i - x_{min}}{x_{max} - x_{min}} =$

Additional Standardization can be applied where needed

Here will centerize the feature column at mean 0 with standard deviation 1 so that the feature column take the form of a normal distribution.

↳ Ironically it removes outliers.