**Logistic Regression**

**(Introduction)** Logistic Regression is a method of binary classification (2 classes). It is mostly used in statistics and made its way to machine learning. The method called so after the logistic function (sigmoid function) which maps any real value in value between 0 and 1. (<https://machinelearningmastery.com/logistic-regression-for-machine-learning/>)

**(Methodology)**(At first, data was read. Then label–columns were dropped from the data-table, so just all 112 Signal values represented the input. Input was assigned to X and label-column to y. Which labels were used depended upon in which classes the classification were to conduct. So for example, for the OK/NOK classification the NOK column was assigned to y.

Afterwards train/test split was conducted. The typical 70/30 % split ratio was used. Random state wasn’t engaged. The logistic regression model was created with pythons library “sklearn” and its class “Pipeline”. *max\_iter* = 1e5 parameter was given.

Results:

The model performed best on the RAW data input. Signal 1 performed the same as the signal 1\_dn. The results are shown in the table xxx. The accuracies were obtained with Signal 1\_dn as input.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | y | | | |
| X | NOK | WD40 | Gleitmo | WD 40 or Gleitmo |
| RAW | 0.910 | 0.668 | 0.696 | 0.670 |
| mean | 0.812 | No vlaues since RAW data performed best | | |
| std | 0.785 |
| rms | 0.822 |
| std + mean | 0.831 |

Y = Classification

X = Input