# Electric motors data analysis

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ABB

# Dataset

- Measurements of torque and current from electric motors
- Time-series data with frequency 20KHz
- Data taken from 5 distinct motors in AC and DC modes
- Each data sample is one recorded operation
- Operations are recorded while motor is working properly, then a fault is induced and the same operations are recorded again
- In total 1066 AC samples, 924 DC samples

| Torque | Current |
|--------|---------|
| 16.693 | 0.023 |
| 16.739 | 0.019 |
| 16.823 | 0.010 |
| 16.810 | 0.007 |
| 16.823 | -0.002 |
| 16.849 | -0.010 |
| 16.992 | -0.018 |
| 17.108 | -0.033 |
| 17.290 | -0.035 |
| 17.297 | -0.052 |

# Main Goals

3 main goals:

- ▶ Motor Classification
  Can we identify a motor by a recorded operation?
- ▶ Fault Classification
  Can we group faults?
- ▶ Fault Prediction
  Can we predict the state of motor by a recorded operation?

# First Steps

**First problem** — data is very high-dimensional ($p \approx 10^5$)
**Solution** — do PCA first to select the most important moments

**Then** — data exploration
For example, do faulty and working operations have the same or different
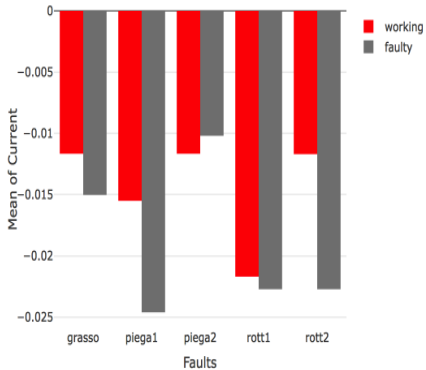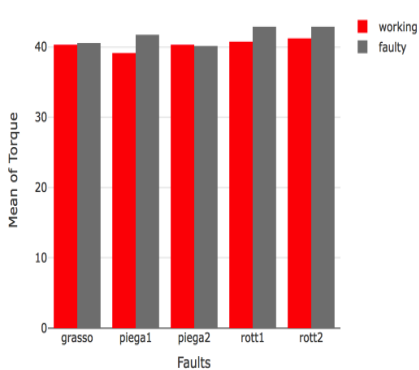mean, distribution etc

# Before PCA

**Loading data into frame**
**Problem** — different lengths of data samples
**Solution** — cut all samples to minimal length value

# PCA

PCA results go here

# Data Properties

What we got so far

Questions?