# Electric motors data analysis

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# 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

# Data Example

| 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?

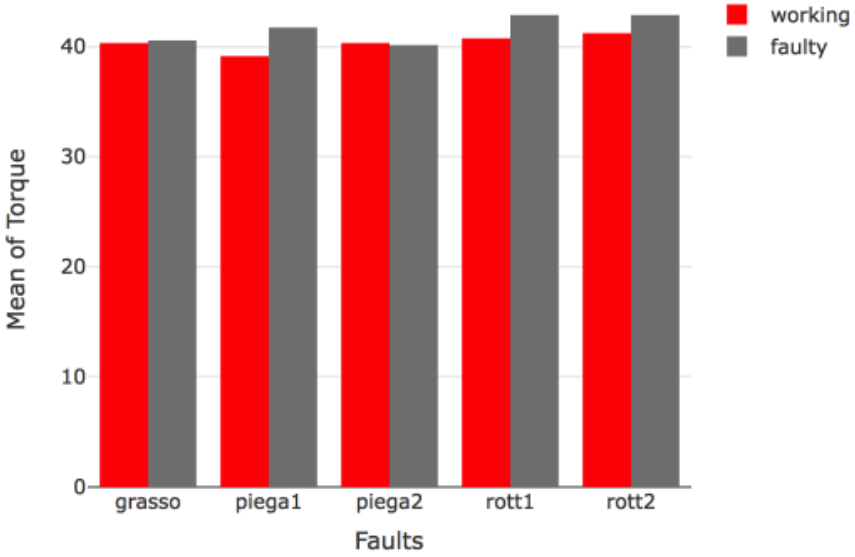
# First Steps

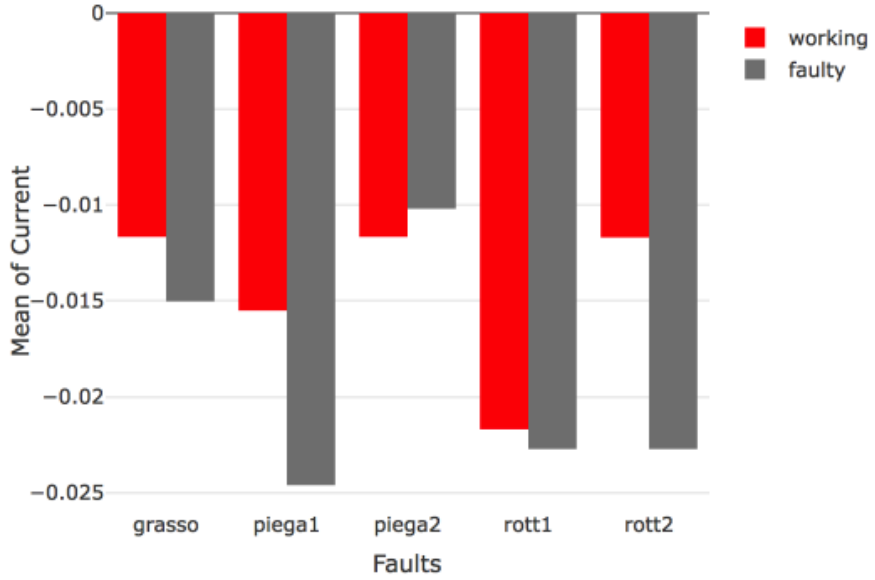
- Loading data
  - *Problem* — data samples have different length
  - *Solution* — cut all samples to the length of minimal one
- Before PCA
  - *Problem* — underdetermined data — ≈1k statistical units with ≈100k variables
  - *Solution* — downsample data, take every 100th measurement
- PCA
- Data exploration
  - For example, do faulty and working operations have the same or different mean, distribution etc

# PCA

PCA results go here

# Data Properties



# Conclusions

What we got so far

Questions?