Simon Klüttermann

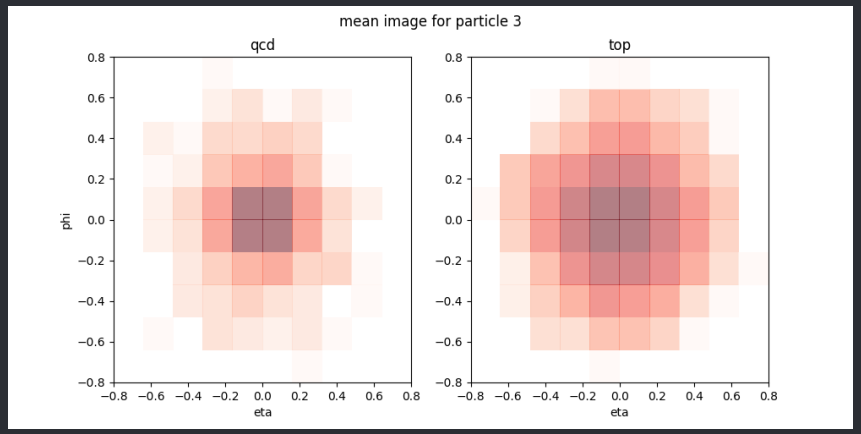
Presentation for the Numerics PHD Programm

About me

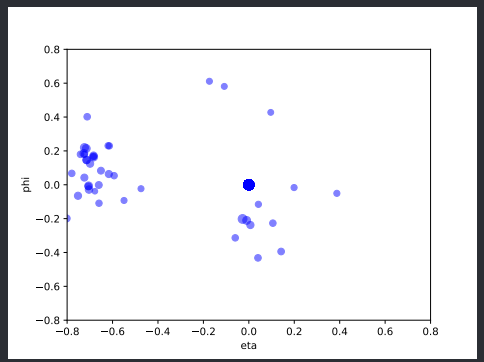
- Simon Klüttermann
- 23-year old german
- Master of Particle Physics from RWTH Aachen University
- Programmer for a decade
- Currently: Startup CTO

- Machine learning expert
- 2 Theses about ML in physics
- Strong interest in
  - Unsupervised Learning
  - Trustable ML
  - Small datasets
- Strong interest in scientific work

About my masters thesis



- Use Machine Learning to filter for anomalous jets to find signs of non-qcd physics
- Apply Graph Ml
- Highly complicated data, Lots of symmetries and arbitrary anomalies

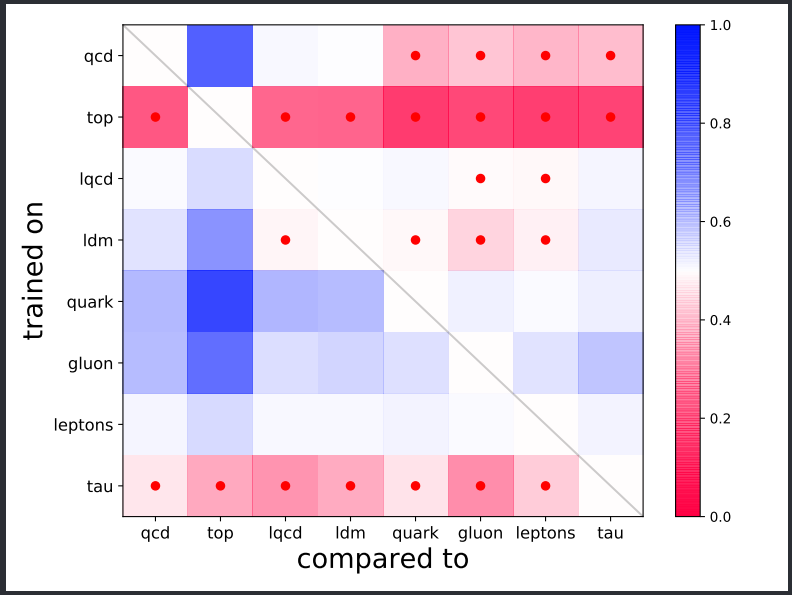


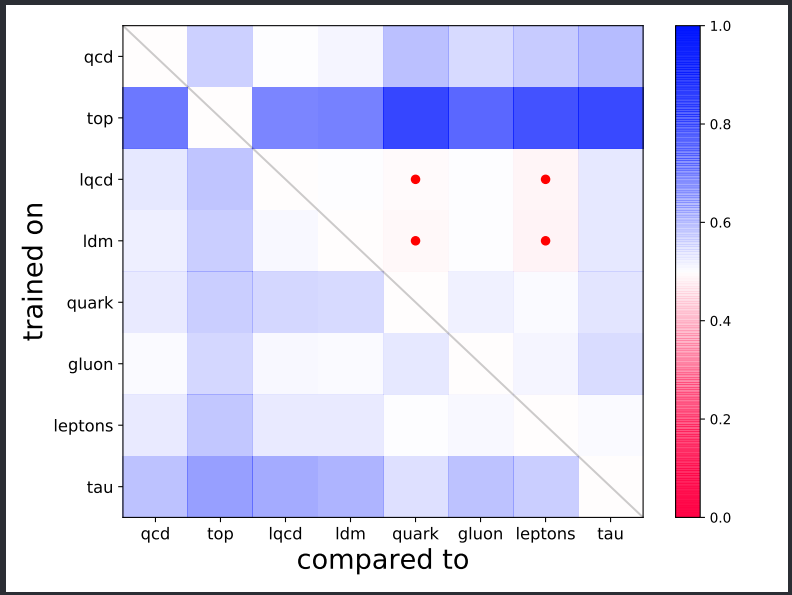
- Wrote my own graph layer
- Noticed that existing methods don't really work
- Invented my own anomaly detection algorithm
- Drastically improved generality of this method

grapatf 0.6

```
pip install grapatf
```

About my masters thesis





About the Project

FCC-hh

- Proposed Replacement for LHC (7x Energy)
- Hopefully able to answer questions like DM, Gravity, Matter asymmetry

Machine Learning

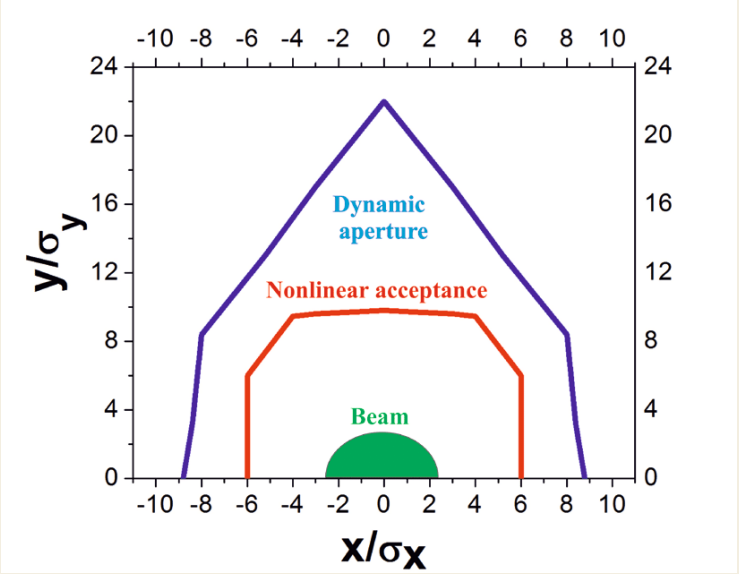
- Automatic intellectual work
- Drastically improved other regions of physics

About the Project

Task 1 Dynamic Aperture Simulations

Accelerate Tracking Simulations

Calculate DA using recurrent ML



Task 2 Correction Schemes

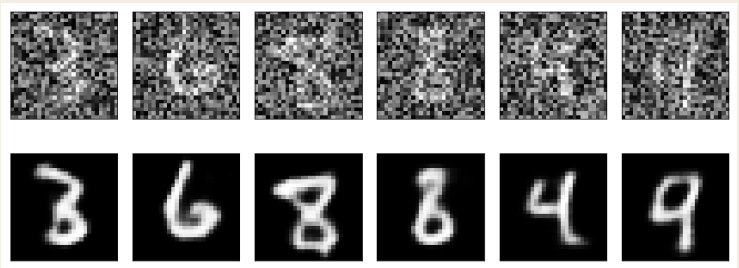
Implement LHC correction schemes

Try to improve them using ML

Task 3 Denoise Beam Measurements

Use Autoencoder to remove Noise from Beam Measurables

Correct higher order resonances



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Thank You!