The VISPA Internet-Platform

Martin Urban, Martin Erdmann, Benjamin Fischer, Robert Fischer, Erik Geiser, Christian Glaser, Gero Müller, Thorben Quast, Marcel Rieger, Florian von Cube, Christoph Welling

III Physics Institute A, RWTH Aachen University

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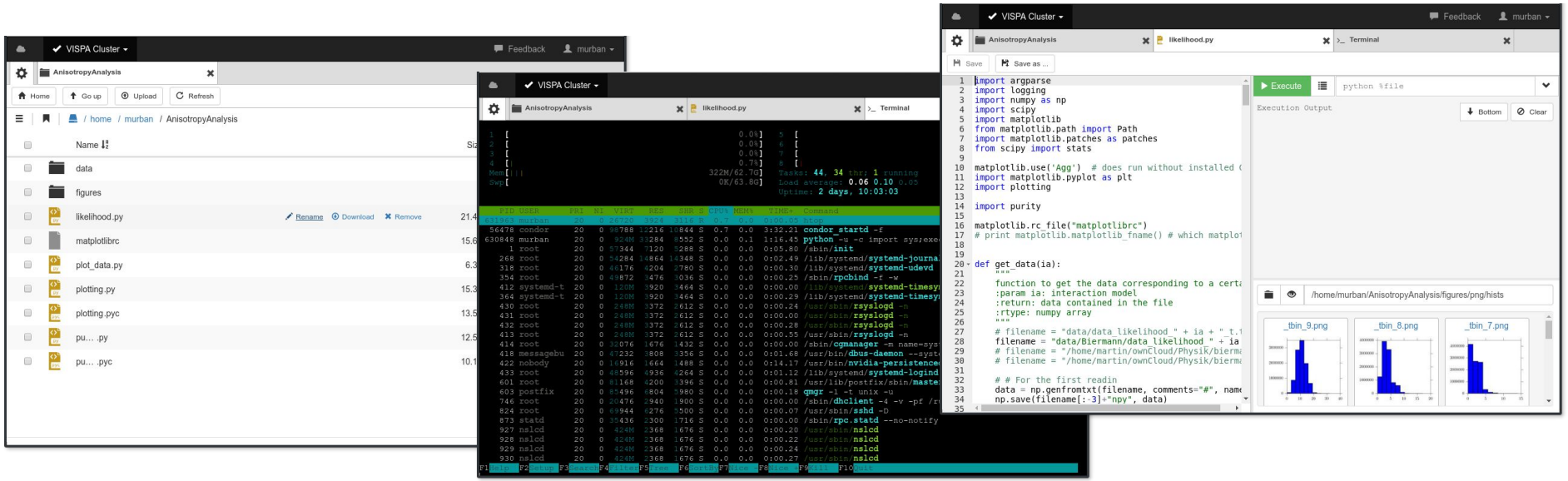
Environment inside Web Browser

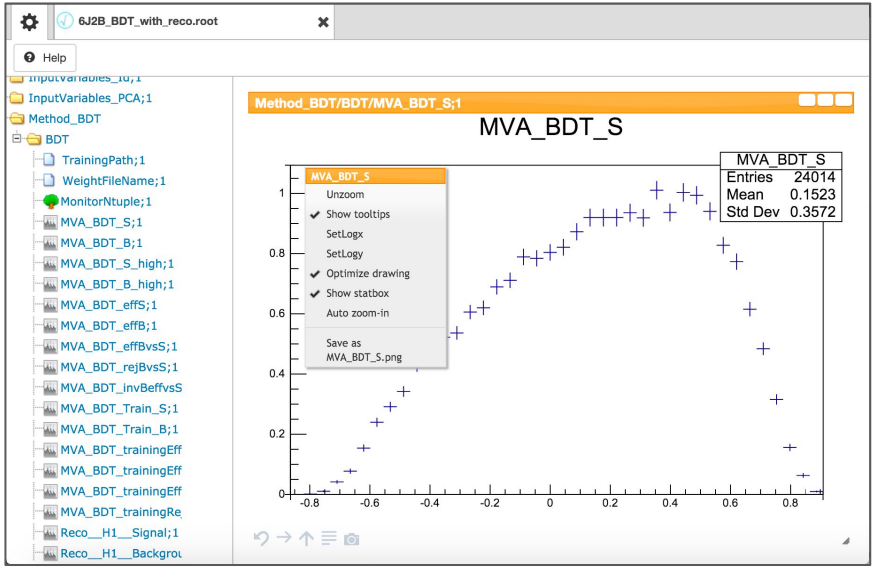


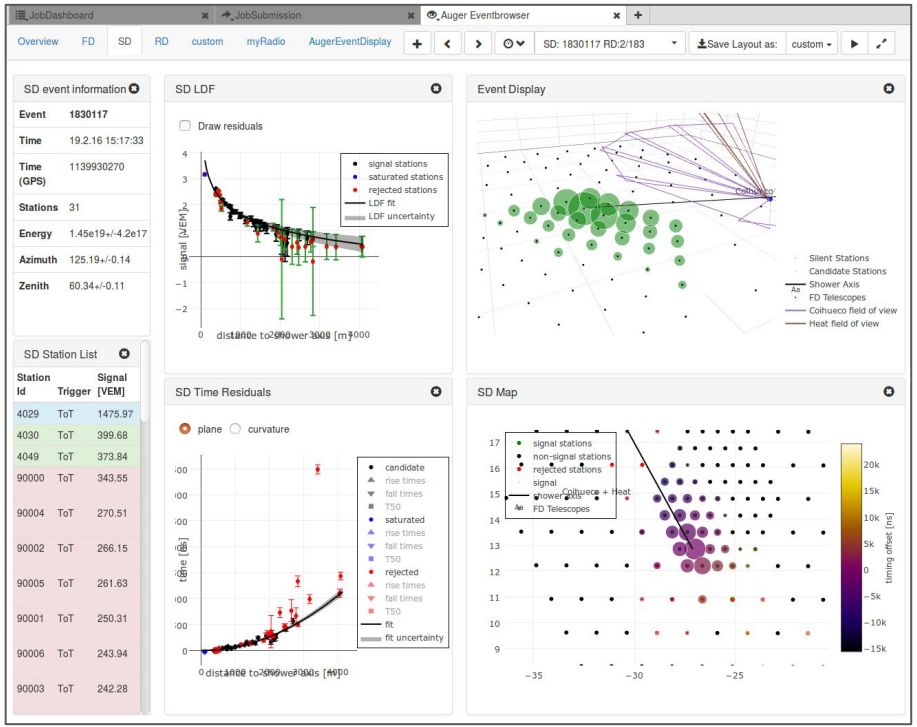
- Standard tools on top of remote resources
  - File browser with up/download
  - Code Editor with execution capabilities
  - Terminal with full key support
- Developed and used since 2010

Pioneering project for working with data through the web browser - from small to large resource requirements

Extensions

- Provide custom functionality
  - ROOT data browser
  - Browser for data of the Pierre Auger Observatory





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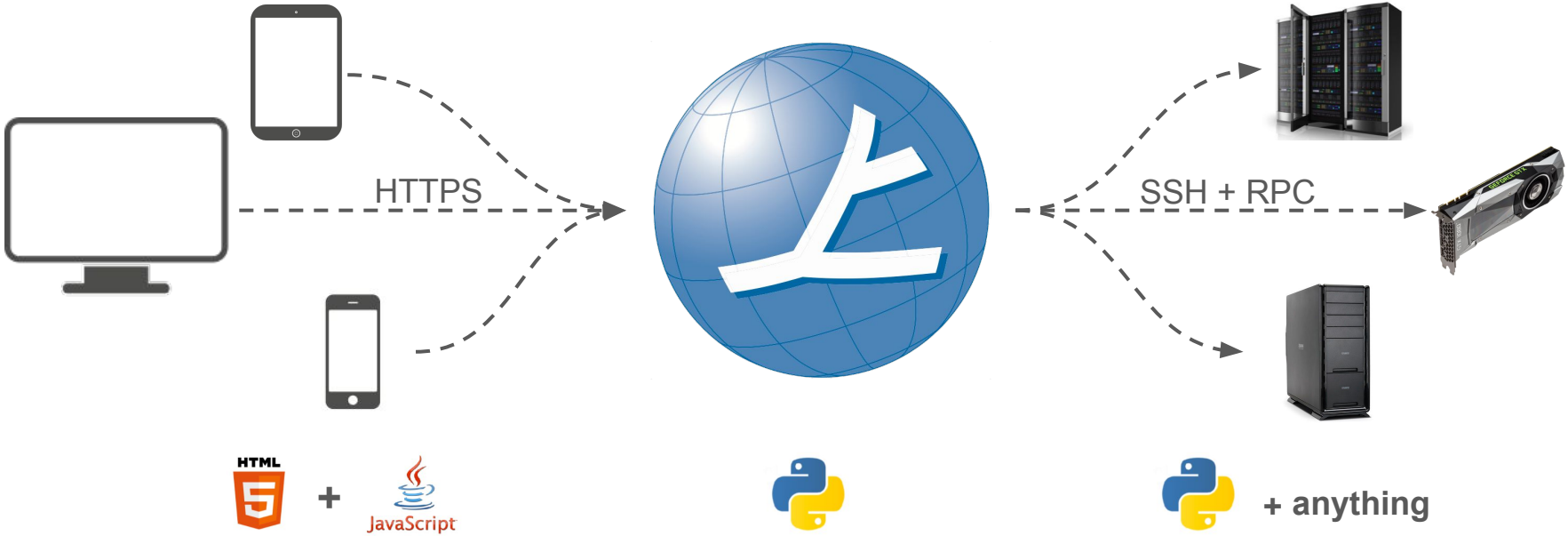
Concept

Clients: modern Web-Browser

Server: **VISPA**

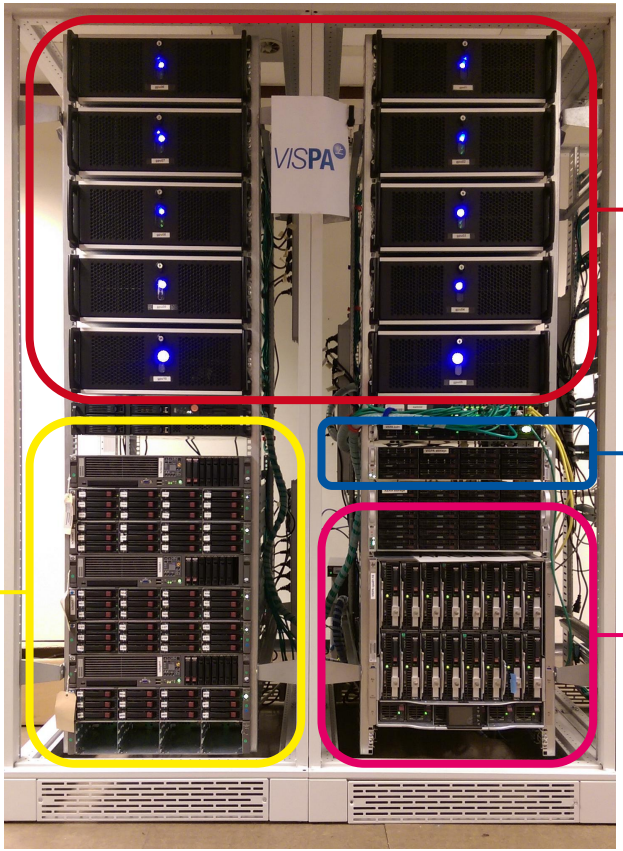
Workspace: any computing resource



Browser-based access to any computing resource

The VISPA Cluster

- operated since 2012
- System successfully used for outreach, education and research



10 machines with each
- 2 GeForce GTX 1080
- 64 GB RAM
- 8 CPU cores

VISPA server

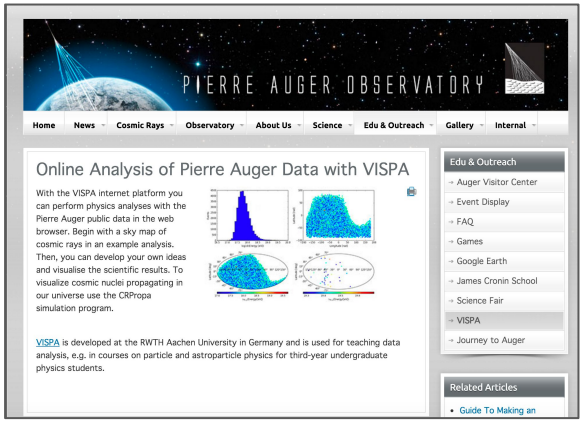
CPU cluster with 16 x 8 cores

Storage (NFS mounted)
- Shared home
- Experiment data
- Scratch

martin.urban@rwth-aachen.de

Real-life experiences beyond research

- Blended learning
  - Lecture with hands-on analysis for experiments live experiments
  - Undergraduate physics course
- Homework
  - Integration of computer-based data-analysis with exercises, including correction and discussion
- Outreach
  - Pierre Auger Observatory and CMS Open Data
  - View/analyze public datasets



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Big Data Workshop and University Class

Big data workshop in astroparticle physics

- Deep Learning hands-on tutorial, 3 days
- Simultaneous usage by ~70 users
- Only web browser required

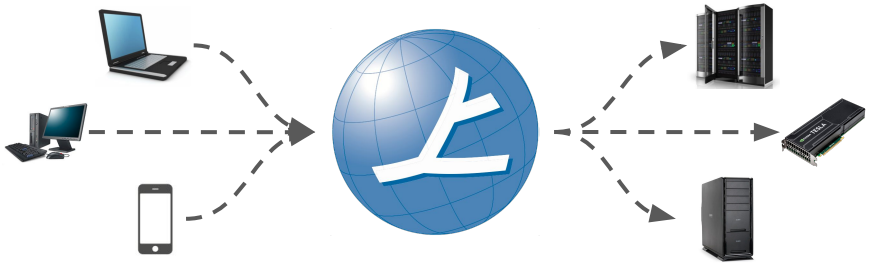
University class on deep learning in physics research

- Master level, entire semester
- Heavy load peaks from ~ 50 users
- Theory classes and weekly practical exercise
- Increasing computational requirements over semester

Summary and Conclusion

VISPA provides

- Access to remote computing resources
- Visualization in web browser
- Successfully employed in research, education and outreach



VISPA provides seamless access to computing infrastructure

- Guest accounts with limited resources
- Repository to set up your own instance
- https://vispa.physik.rwth-aachen.de/

martin.urban@rwth-aachen.de

Backup

martin.urban@rwth-aachen.de
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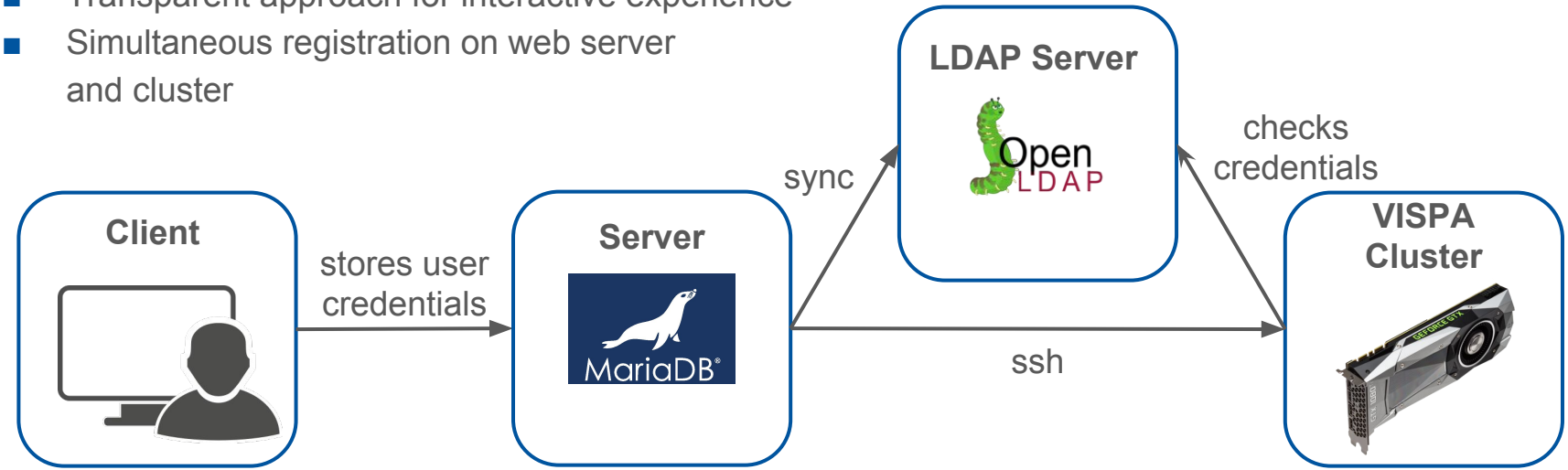
User Authentication at the VISPA Cluster

- Transparent approach for interactive experience
- Simultaneous registration on web server and cluster



- Automatic workspace connection to default workspace
- Different user groups, e.g. local research groups, students, guests

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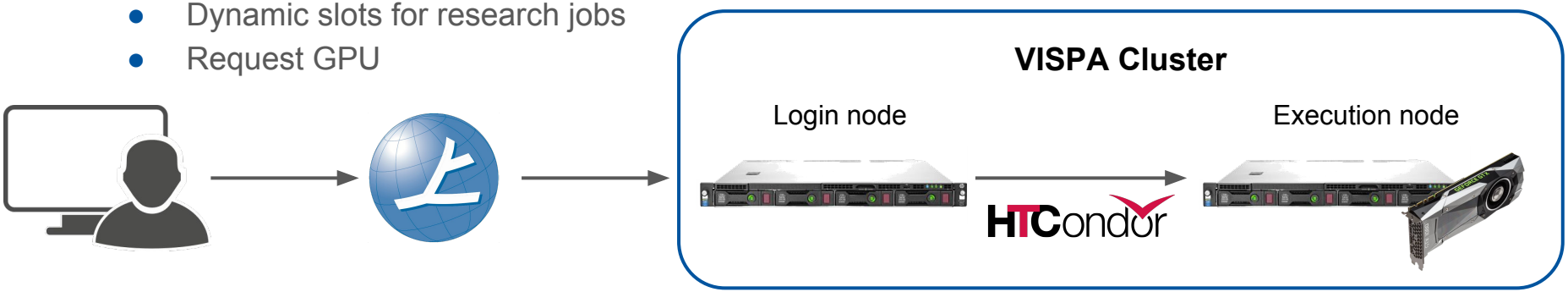
Job Scheduling

- Small interactive jobs on login node allowed
- Resource distribution using HTCondor (“fair share”)
  - Dynamic slots for research jobs
  - Request GPU



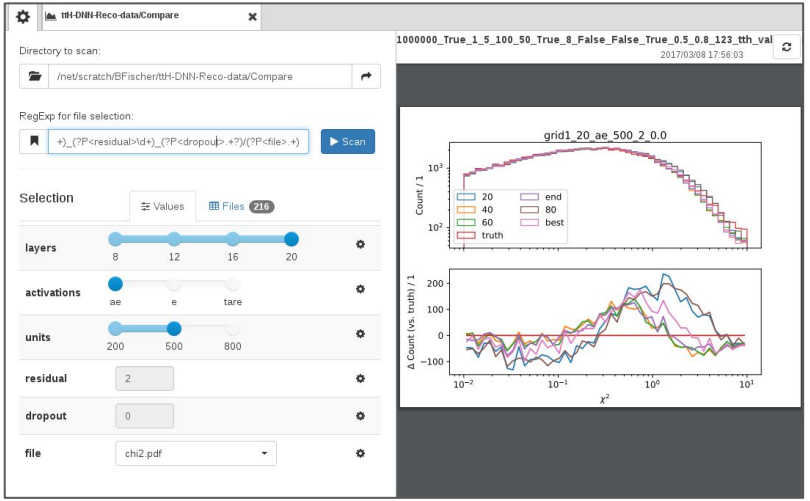
- Automatic job generation script
  - Submission for inexperienced users
  - Arguments for precise job definition
- Direct submission from CodeEditor
  - Shown output gives “almost interactive feeling”
  - Lowers entry barrier

martin.urban@rwth-aachen.de

Physics Research using the VISPA Cluster

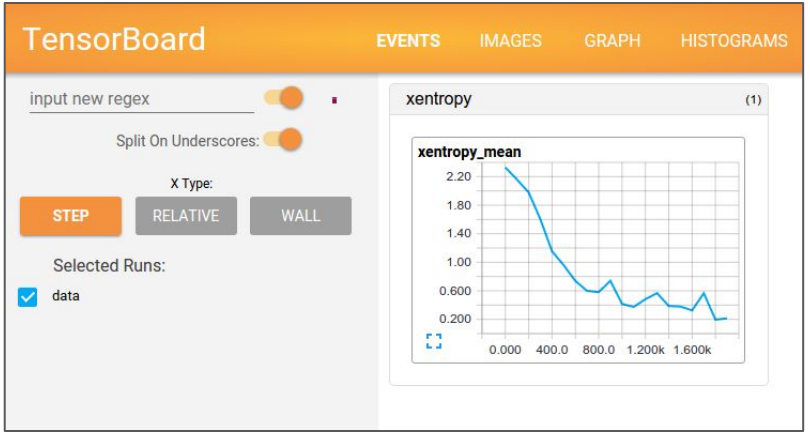
PScan Extension

- Explore high-dimensional file system structures: e.g. results of **p**arameter **scan**s
- Customize partitioning with regular expressions
- Display anything the browser can: images, pdfs, text, html



TensorBoard Integration

- For visualisation of information gathered by TensorFlow
- In active development



martin.urban@rwth-aachen.de

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