Erik Hettwer Benitez

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Skills

Programming Languages: Python (advanced), C++ (basic)

Libraries & Tools: PyTorch, Numpy, Pandas, Scikit-learn, Matplotlib, Seaborn

Other Tools: Git, LaTeX, Linux, HPC environments

Experience

Karlsruhe Institute of Technology (KIT) & CERN, Research Assistant, High Energy Physics — Aug 2023 – Sept 2024

- Developed and implemented deep neural networks for signal-to-background discrimination in possible Higgs boson events using Python (PyTorch, Numpy, Pandas) resulting in up to 35% improvements when compared to classical methods.
- Created data selection algorithms for specific decay channels using C++, collaborating with a small team of specialists at CERN to prepare and transform data for training and testing.
- Utilized matplotlib and seaborn to create data visualizations that effectively presented analysis results, enhancing communication and understanding among collaboration members.

Physics Student Association at KIT, President — Sept 2021 – Sept 2023

- Represented student interests on the physics faculty and division 5 board, providing feedback on academic programs.
- Served on search committees for faculty positions, contributing to the selection of new professors in the physics department.

Projects

Automated Watering System: Designed and implemented an automated watering system for an off grid garden on an ESP32 microcontroller using C++ and Python.

Education

Karlsruhe Institute of Technology, **M.Sc.**, Physics — Sept 2022 – Sept 2024

- **Thesis:** "Probing deep learning methods to study $\mathbf{H \rightarrow \mu\mu}$ events in the VH and VBF production channels" with the CMS experiment at CERN.
- **Relevant Coursework:** Modern methods of data analysis, Computational methods in experimental particle physics, Data analysis at the Karlsruhe Tritium Neutrino Experiment, Quantum mechanics, Quantum field theory.

Additional Information

Leadership & Recognition: Strong leadership experience managing academic initiatives and recognized for Exceptional Extracurricular Commitment by the KIT president for contributions to curriculum development.

Multilingual Project Management: Led multiple initiatives as President of the Physics Student Association, managing projects and collaborating across international teams in English, German, and Spanish.