AKPIK 2: AKPIK Poster Session

Time: Wednesday 16:15–18:15 Location: ZHG Foyer 1. OG

AKPIK 2.1 Wed 16:15 ZHG Foyer 1. OG

Exploring GNN-based trigger algorithms for underwater neutrino telescopes — •Avalon Rego[1,2], Francesca Capel[2], Christian Spannfellner[3], and Li Ruohan[3] — [1]Ludwig-Maximilians-Universität, München, Deutchland — [2]Max-Planck-Institut für Physik, Garching bei München, Deutchland — [3]Technical University of Munich , Munich, Germany

Neutrinos are a window into a deeper understanding of both beyond standard model physics and various high-energy astrophysical phenomena. This is because they can easily escape dense environments due to their weakly interacting nature and can pinpoint their sources since they are not deflected by magnetic fields. We detect these weakly interacting particles by embedding detectors into massive volumes of naturally available water or ice and then detecting the Cherenkov radiation produced by their interactions. These detectors are sensitive to complex backgrounds such as bioluminescence signals which are a challenge for standard trigger algorithms. In this work we investigate the use of Graphnet, a GNN-based python framework, for signal classification and improving discrimination for bioluminescence signals in particular comparing it to a standard coincidence trigger. We also explore the possibility of using this trigger to lower the energy threshold for neutrino detection.

AKPIK 2.2 Wed 16:15 ZHG Foyer 1. OG

Automated Metadata Verification and Experimental Validation Using Dual Neural Networks in Alignment with FAIR Principles — •Rebekka Murati[1], Johannes Marczinkowski[1], Cedric Kessler[1], Andrei Schliwa[2], Matthias Böhm[3], and Nina Owschimikow[1] — [1]IOAP, TU Berlin — [2]IFKP, TU Berlin — [3]Institut für Softwaretechnik und Theoretische Informatik, TU Berlin

The sustainable management of scientific data is guided by the principles of Findability, Accessibility, Interoperability, and Reusability (FAIR). In particular, the quality and accuracy of metadata, data that describes the measurement data, play a central role in ensuring the reproducibility and integrity of experimental results. We present an approach for the automated verification and validation of metadata and experimental results, using the example of an X-ray spectroscopy experiment. The approach is based on the use of an electronic lab notebook and two neural networks for detecting data quality issues of both meta data and experimental data. We synthetically generated metadata (aligned with the FAIR principles) and a wide variety of measurement data, as well as introduced a spectrum of realistic data corruptions (e.g. spelling errors) for training these models. By combining both outputs, it becomes possible to make precise judgments about whether the metadata for the experiment has been fully and correctly recorded and whether the experiment itself was conducted without errors and is consistent with the metadata. This approach enables improved quality assurance and provides real-time feedback to experimenters regarding the quality of their data and metadata.