IRIS-HEP Project Proposal

[Maxym Naumchyk](#) / AI-ML for Network Problem Identification

Research and Education networks are critical for modern, distributed scientific infrastructures. Networks enable data and services to operate across data centers and across the world.

The IRIS-HEP/OSG-LHC team has members working on network measurement, analytics and pre-emptive problem identification and localization. I would like to propose to develop machine learning algorithms suitable for identifying one or more types of network problems based upon annotated datasets provided by the IRIS-HEP/OSG-LHC team.

My project would be split into three phases:

1. Learning about the existing analytics system, network measurement tools and associated data being archived into Elasticsearch (1 month)
   a. **Phase 1 outcome**: A document summarizing the data, network measurement tools and what I learned about the analytics tools and how to use them.
2. Exploration of various types of machine learning (ML) that could be suitable for analyzing the pre-created annotated datasets from the project (1 month)
   a. **Phase 2 outcome**: A document describing the types of ML that I explored which describes their various strengths and weaknesses for use in network problem identification.
3. Training, tuning and evaluating one or more ML models to provide network event identification (1.5 months)
   a. **Phase 3 outcome**: One or more trained ML models to be used for network problem identification, along with the results of applying the model to a new annotated dataset not used in the original training.

Project goal: To provide a more effective method of identifying certain types of network issues using machine learning so that such problems can be quickly resolved before they impact scientists who rely on these networks.

I plan to participate in a weekly group meeting (Fridays at 10 AM EDT) focused on network measurement, analytics, monitoring and alarming, which will allow me to report on my progress, ask questions related to any part of my project and better understand the overall work of the group.

My project will be a part of creating improved user-facing alerting and alarming related to the research and education networks used by HEP, WLCG and OSG communities.