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Using NLP to predict Alert Signals from the ATLAS TileCal Detector Control System at CERN

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Using NLP to predict Alert Signals from the ATLAS TileCal Detector Control System at CERN

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Particle physics data consists of patterns in measurements that can be separated into hot topics and more mundane data. This approach is analogous to looking for keywords or topics in huge text data by separating more specific words and phrases from the generalities of text through the application of NLP. This will be done using the TileCal DCS alarm data of the ATLAS experiment. The NLP models that were constructed or fine-tuned for text classification included SVM, BERT- basecased, RoBERTa-base, as well as stacked LSTM and bi-LSTM. This was done on Google Colab using Pytorch and Python libraries, and the hyperparameters were optimised using the WandB platform, in which an extensive Baye's optimisation search was performed. The idea is to use the bestperforming models i.e., BERT or RoBERTa and train them by fine-tuning their hyperparameters in order to classify the alarms, as well as predict future alarm signals, and then follow the same procedure for an LSTM model and compare the results. The inputs would contain information about the date and time the alarm was received, the physical variable involved, the type of error as well as the particular system, component or sub- component affected.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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