Contribution ID: **8** Type: **not specified**

Quark/gluon jet discrimination: a reproducible analysis using R

Tuesday 21 March 2017 12:20 (20 minutes)

The power to discriminate between light-quark jets and gluon jets would have a huge impact on many searches for new physics at CERN and beyond. This talk will present a walk-through of the development of a prototype machine learning classifier for differentiating between quark and gluon jets at experiments like those at the Large Hadron Collider at CERN. A new fast feature selection method that combines information theory and graph analytics will be outlined. This method has found new variables that promise significant improvements in discrimination power. The prototype jet tagger is simple, interpretable, parsimonious, and computationally extremely cheap, and therefore might be suitable for use in trigger systems for real-time data processing. Nested stratified k-fold cross validation was used to generate robust estimates of model performance. The data analysis was performed entirely in the R statistical programming language, and is fully reproducible. The entire analysis workflow is data-driven, automated and runs on very modest hardware with no human intervention. New data visualisation techniques will also be introduced.

Presenter: Dr LOWE, Andrew (Hungarian Academy of Sciences (HU))

Session Classification: Identification and Tagging Mini-Workshop