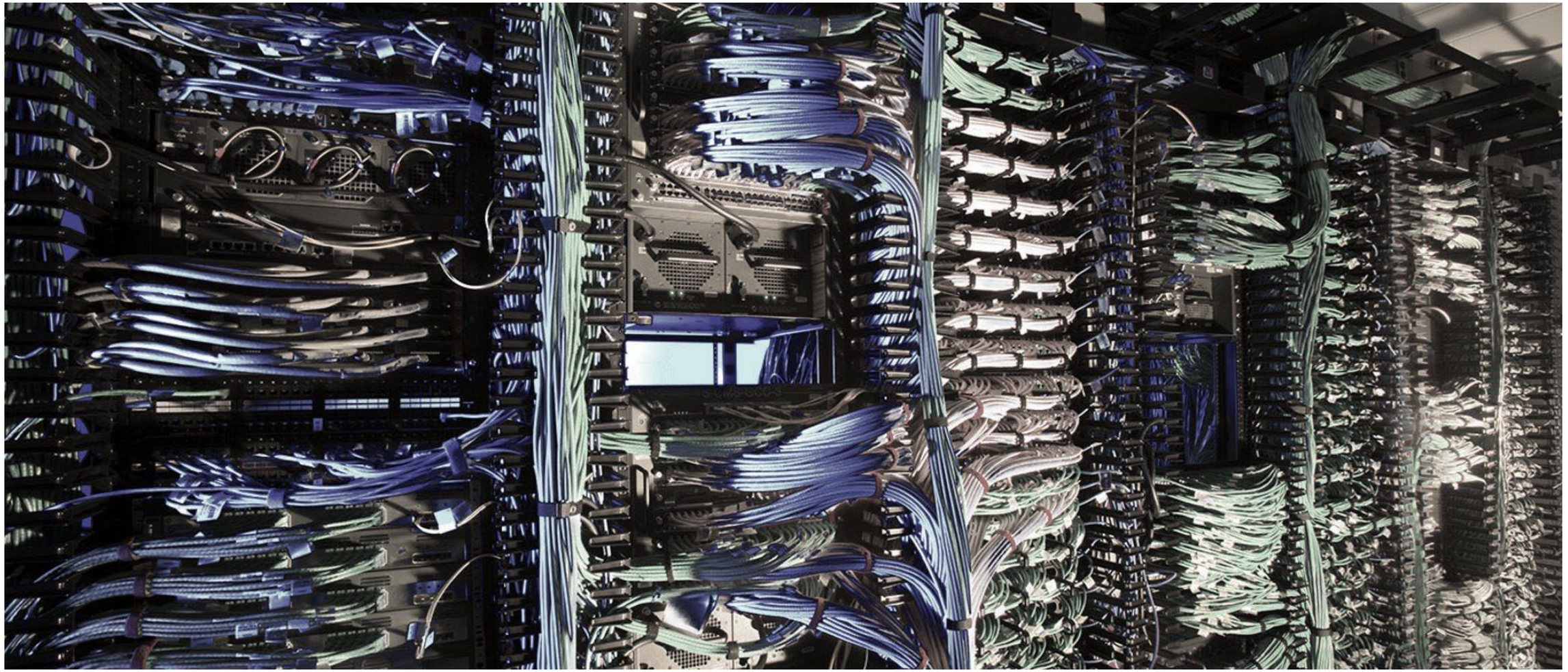
Tutorial: Jet Tagging with Deep Learning

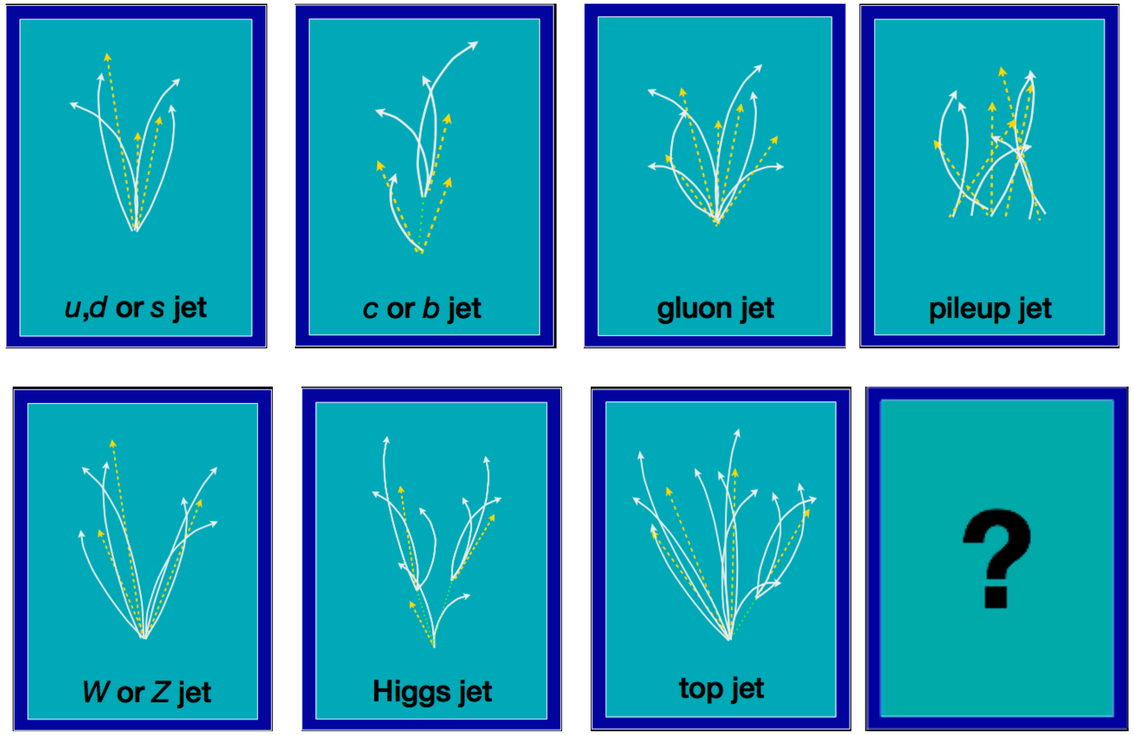
Maurizio Pierini



Dataset

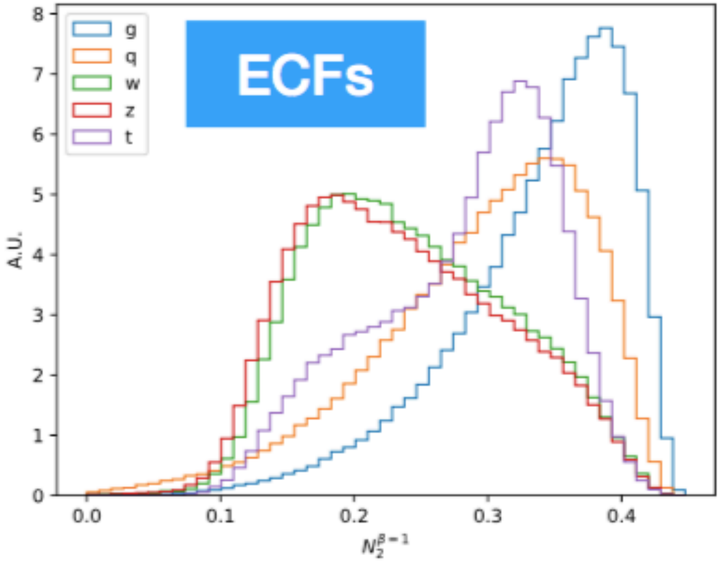
Example: jet tagging

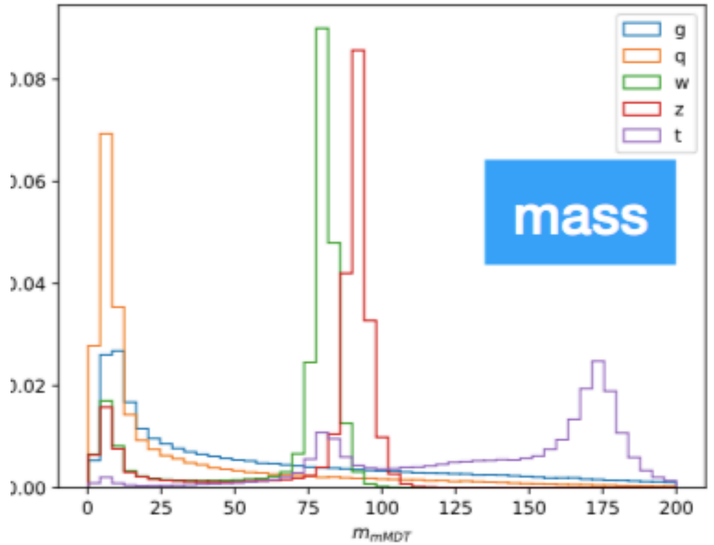
- *You have a jet at LHC: spray of hadrons coming from a "shower" initiated by a fundamental particle of some kind (quark, gluon, W/Z/H bosons, top quark)*
- *You have a set of jet features whose distribution depends on the nature of the initial particle*
- *You can train a network to start from the values of these quantities and guess the nature of your jet*
- *To do this you need a sample for which you know the answer*

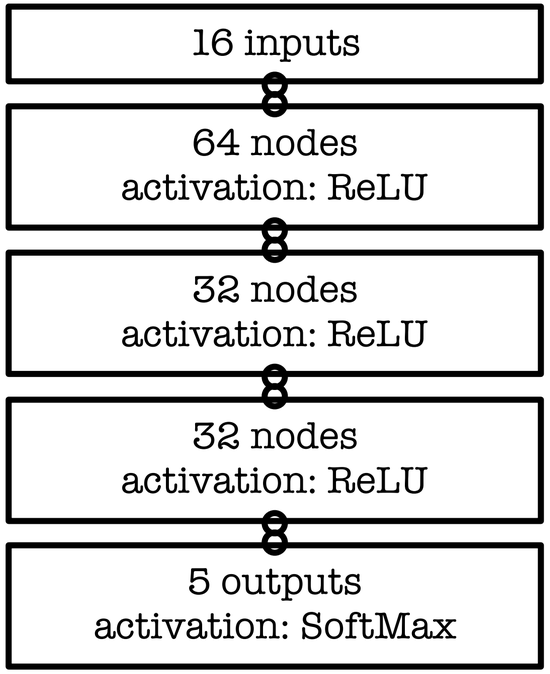


Example: jet tagging

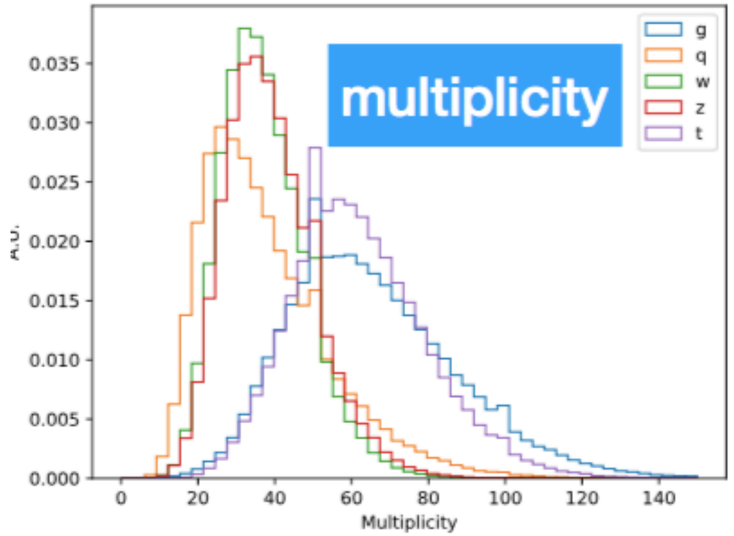
- *Simple DNN based on high-level features (jet masses, multiplicities, energy correlation functions)*







Each input layer transmits a feature to the following hidden layer



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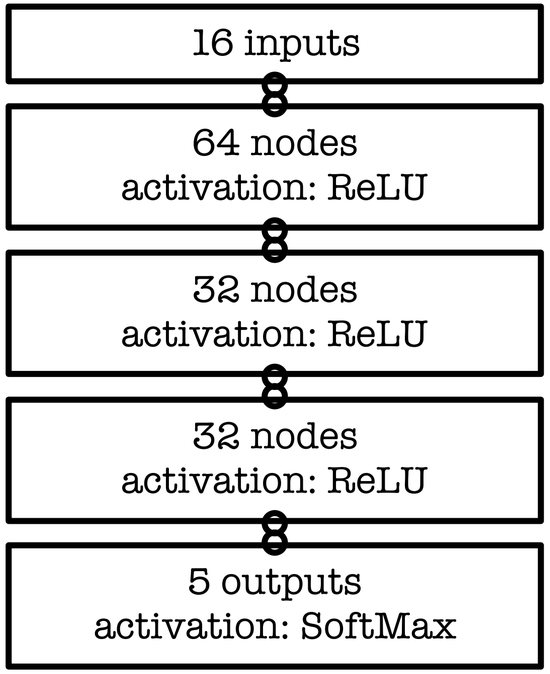

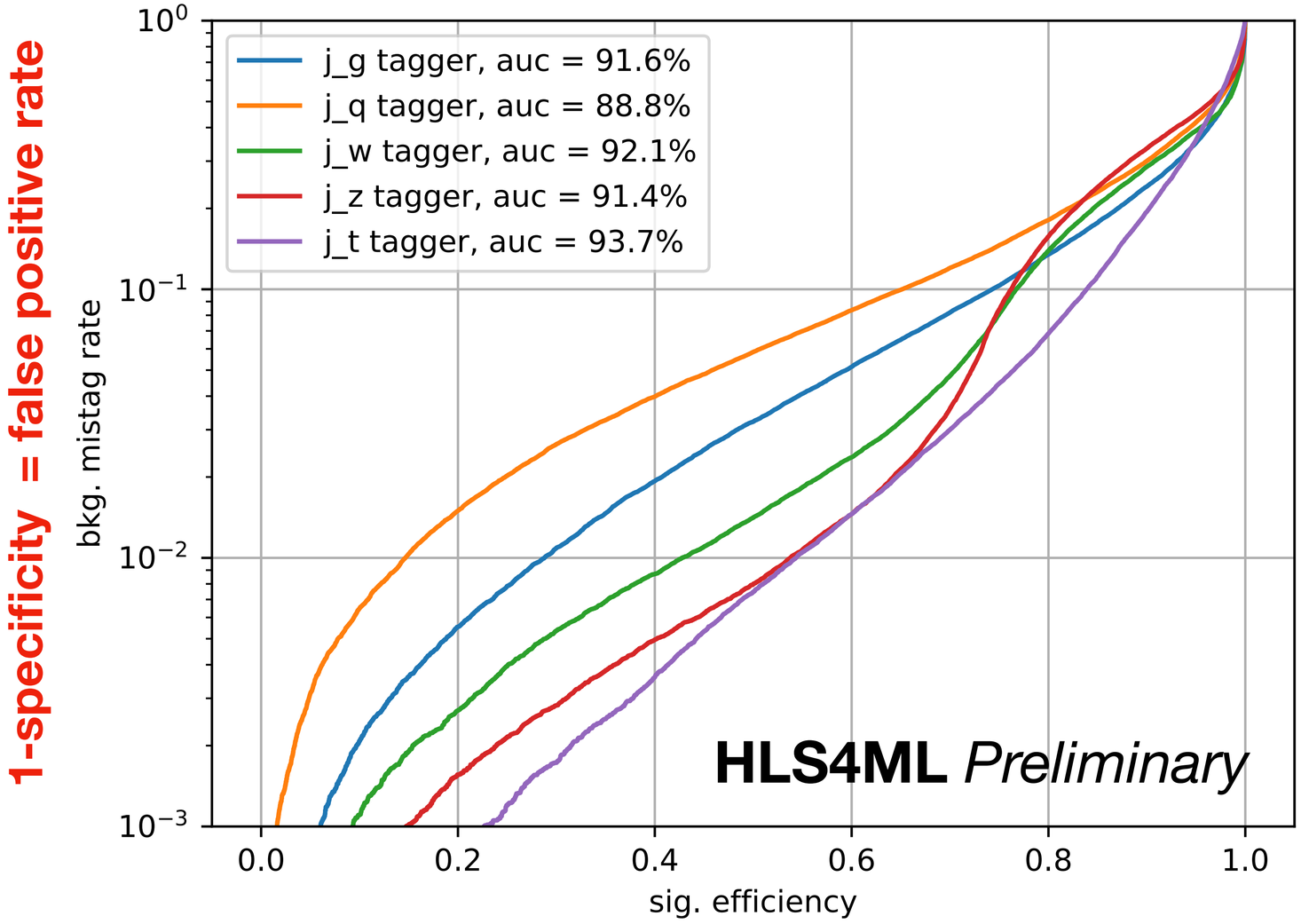

Sensitivity = True Positive Rate

The code

Get the code

- *Download the .tar.gz file at this URL*

  https://www.dropbox.com/s/or43zo8imt52l0x/SOSC18_Tutorial.tar.gz?dl=0

  and put it somewhere. In that directory, follow the instructions in next slide

Run the Notebook

```
# these are comments to read, not commands to type
> tar -xzf SOSC18_Tutorial.tar.gz
# or tar -xf SOSC18_Tutorial.tar
> cd SOSC18_Tutorial
# start a jupyter notebook
> jupyter-notebook
```

Open this one by clicking on it