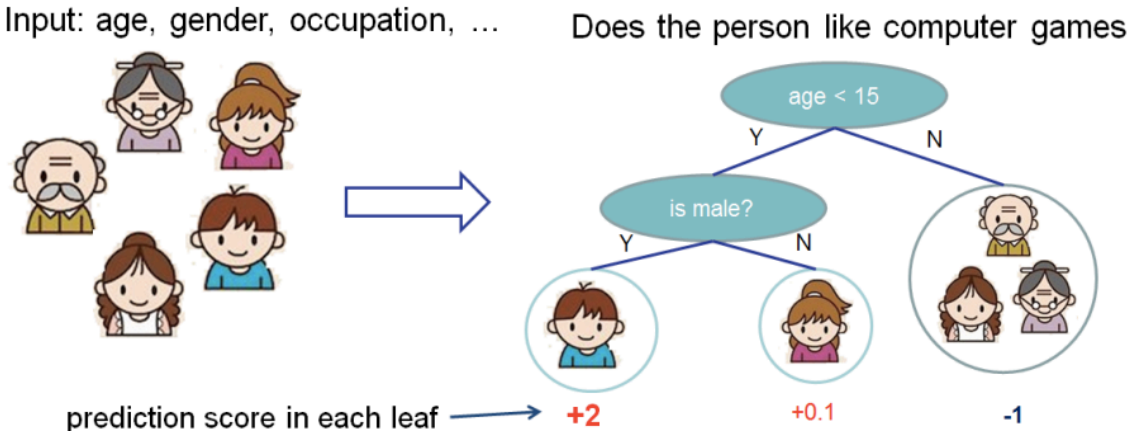
Reconstructing Low PT Electrons using Boosted Decision Trees

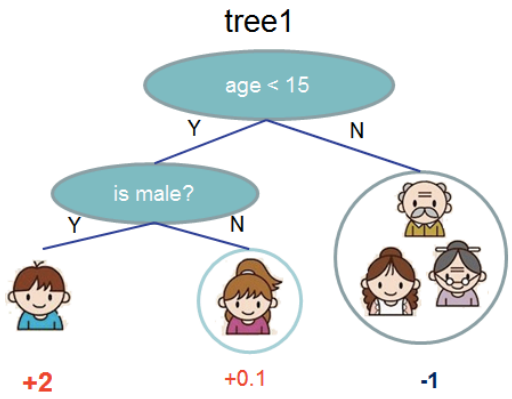
Warin Patrick McBlain
Mahidol University - Bangkok, Thailand

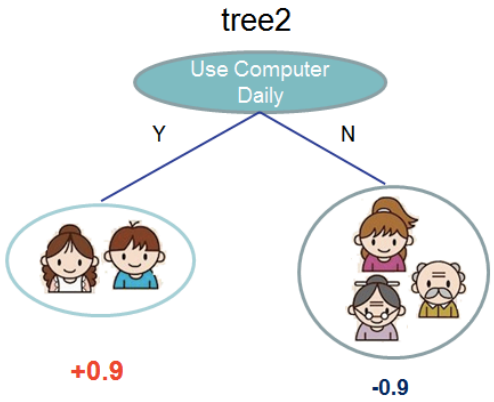
Motivation

- Electron reconstruction is CPU intensive.
- Refine results from CMS
- Hint at new physics.

Boosted Decision Trees







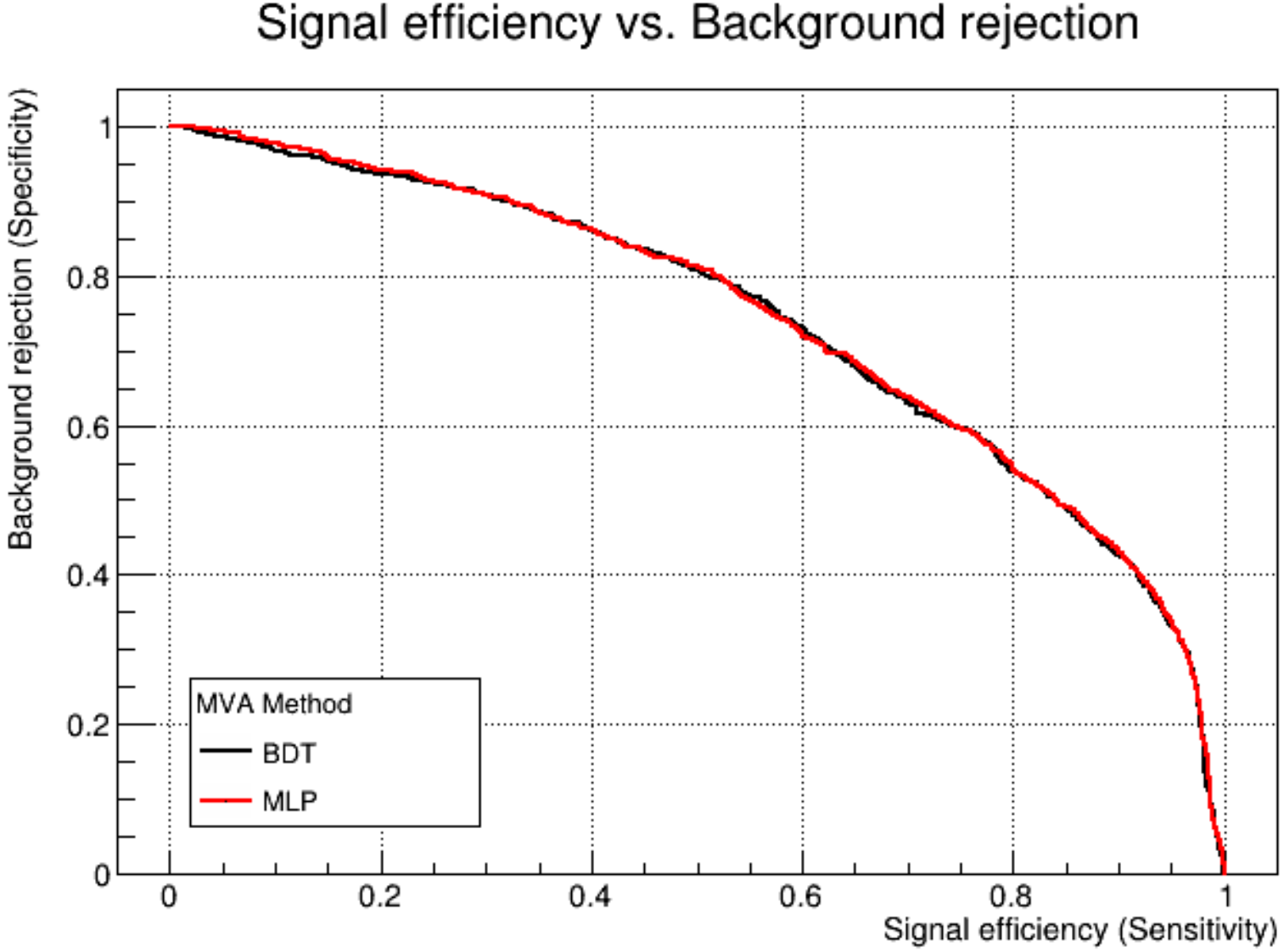
f( ) = 2 + 0.9= 2.9 f( )= -1 - 0.9 = -1.9

$$\hat{y}_i = \sum_{k=1}^{K} f_k(x_i), f_k \in \mathcal{F}$$

Platforms

TMVA

XGBoost


Signal efficiency vs. Background rejection
Background rejection (Specificity)
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1
Signal efficiency (Sensitivity)
MVA Method
BDT
MLP

What Next?

- More parameters
- Changing ML algorithms - Deep Neural Network
- Trying different platforms


CERN