LSTM Tagger

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The Setup

Goal

Train a binary neural-network based classifier that can distinguish between b- and non-b-jets, using the raw jet data as input.

- use *tracks* as the primary source of information
- number of tracks is unknown a-priori $\rightarrow$ cannot use an architecture that expects a fixed number of inputs
- currently looking into recurrent neural networks / LSTM networks

The Workflow

Training

- match tracks to their associated jets (contained in different ROOT trees)
  - done *ahead* of training
- save matched tracks / jets to disk (HDF5)
- for each track in the jet, feed the track parameters into the classifier network during training
  - (may) use p_T ordering, i.e. hardest track first
- supervised training: provide a binary (0/1) output value for each jet (from MC truth)

Results so far (work in progress)

trained a number of LSTM networks, scanned the hyperparameters:

- number of nodes in each layer
- number of layers
- number of training epochs

Details of the training:

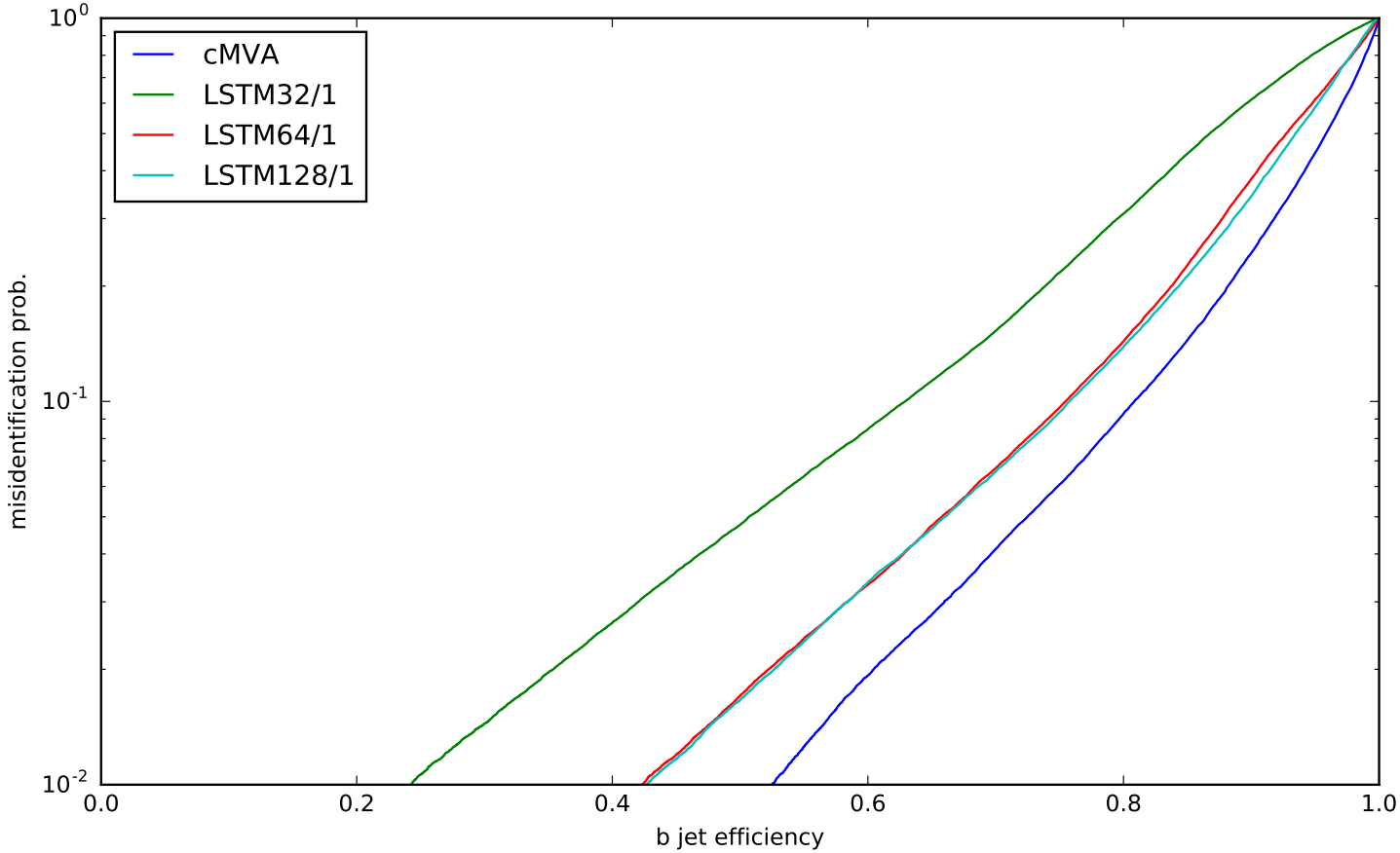
- training dataset contains 100-150k jets
- training/validation split 80:20
- batch size: 1k jets (also tried unbatched training)

Progress w.r.t. last time:

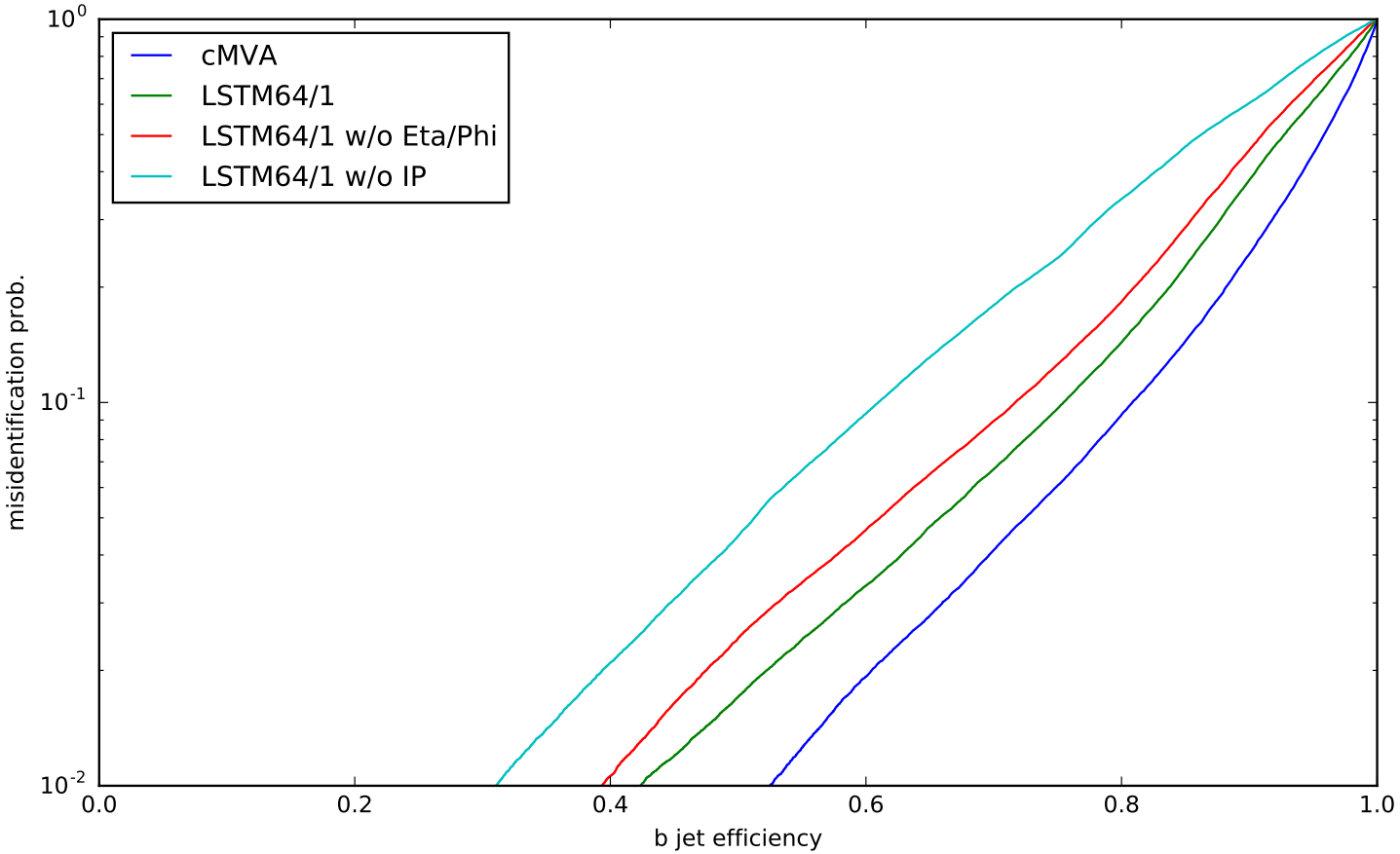
- made code (much) more flexible
- ready to efficiently ramp up training & try different network types

different network shapes (unbatched)

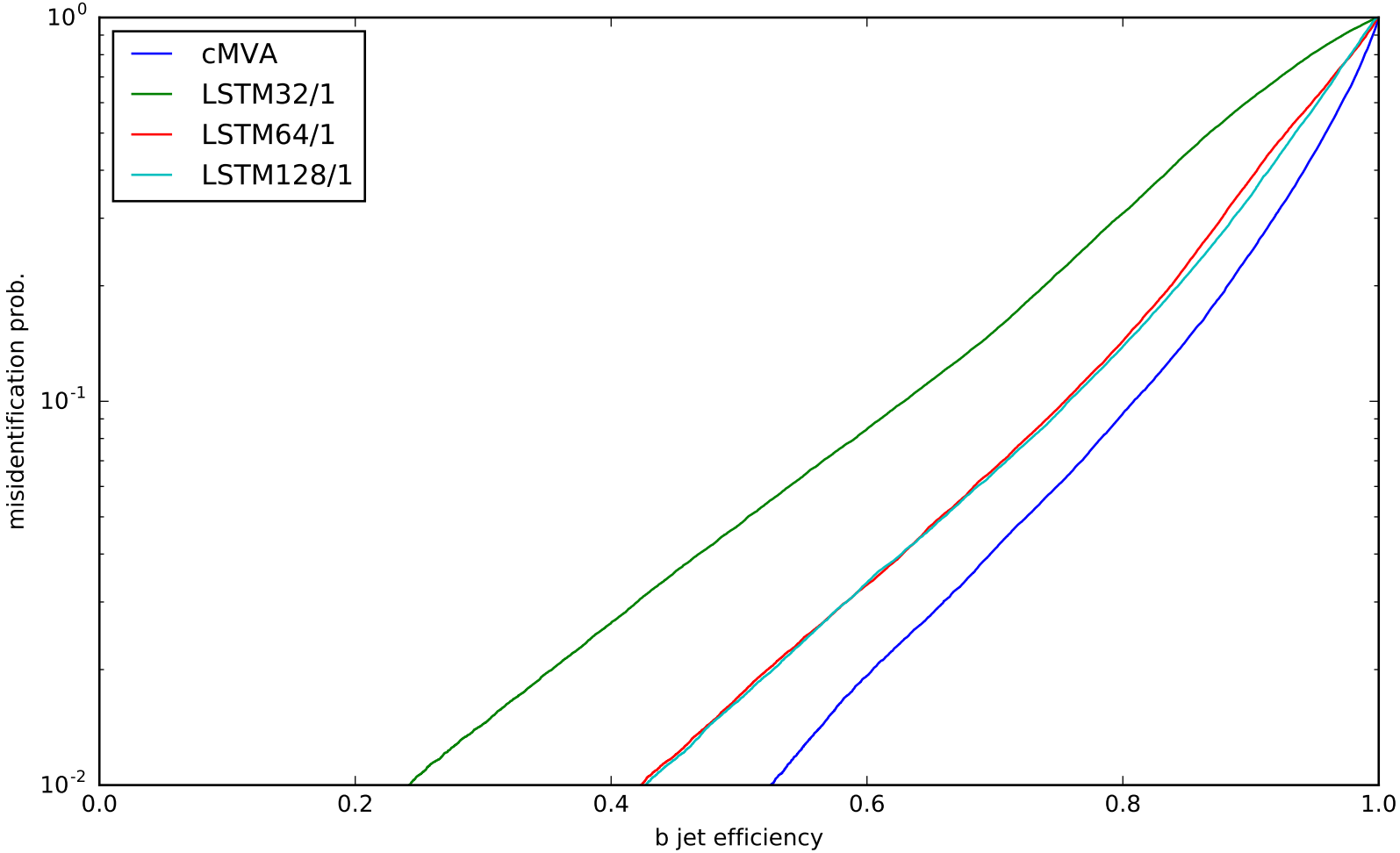
- batch size = 1
- labelling: *number nodes / number layers*



using less information



discovering the amenities of batched training



Conclusions