5MIN RESPONSE TO

Deep Learning Applications in the Natural Sciences

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TWO POINTS

• Automated scientist? We need to fix the epistemology.
• Deep learning in HEP: the rawer the better.
AUTOMATED SCIENTIST
• Yes, the scientific method can/will be automated
  • come up with model, build experiments/detectors, observe data, reject model, iterate
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• The epistemology of automated hypothesis generation is a mess: the “come up with a model” part.
  • for a lot of people, this is the big data revolution: we will find stuff that we could/would have not thought of
Deep learning in HEP

• There is no real success story yet
  • deep learning was important to win the HiggsML challenge, but the improvement was marginal
  • simulated data sets are too small
  • digested/engineered features are too uncorrelated
  • the systematics is killing you
• Go back to raw data
  • tracker, pixel calorimeter

• Work on the convolutional layers
  • type of input, detector geometry

• Figure out how to include the systematics into the training
  • see Kyle’s stuff