Big Data and Machine Learning with Python

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Decision Trees, Random Forests and Neural Networks

Decision Tree

- Learn a hierarchy of if/else questions
- 3 main parameters:
  1. How deep, i.e. how many iterations?
  2. How many samples at least at a leaf?
  3. How many samples at most at a leaf?
- Typically you adjust one parameter only

\+ Easy to understand and no scaling necessary

\- Tend to overfit

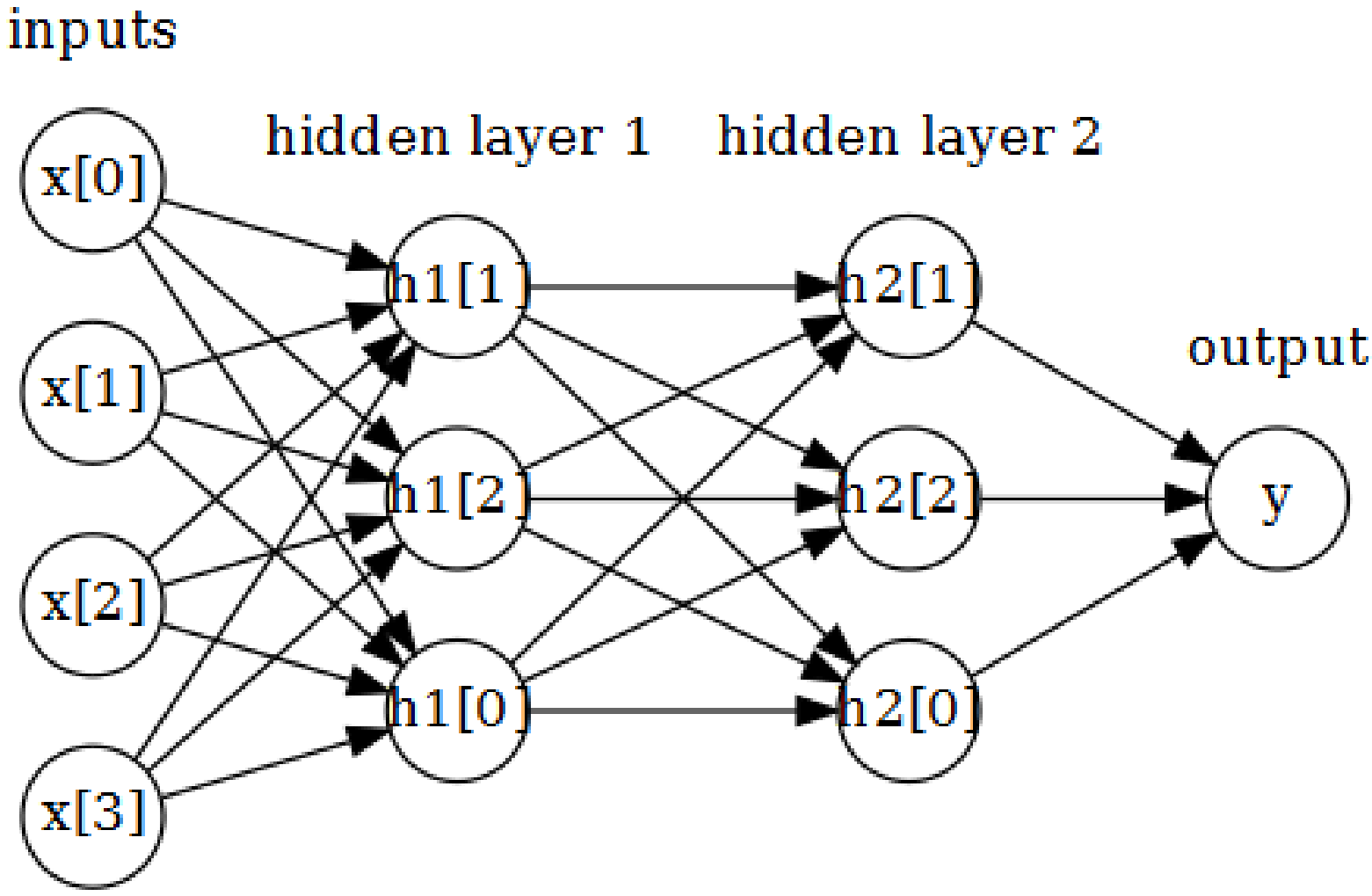
Random Forests

- Ensembles of Decision Trees, that are slightly different from each other
- To reduce overfitting
- Two parameters (on top of each tree's parameter):
  1. How many trees?
  2. How many features at most should each tree look at?

\+ All the benefits of trees, yet less overfitting

\- No inspection possible, heavy CPU usage (but easy to parallelize), and not replicable

Neural Networks



from: Andreas Müller and Sarah Guido (2016): Introduction to Machine Learning with Python, O'Reilly

Neural Networks, cont.

- Expects standardized data.
- Many parameters
  1. How many layers?
  2. How many units (nodes) (per layer)?
  3. Which activation function?
  4. Regularization strength?
  5. Underlying algorithm? (and their respective parameters)

\+ Can be infinitely complex, often beat other algorithms

\- Much slower than other algorithms