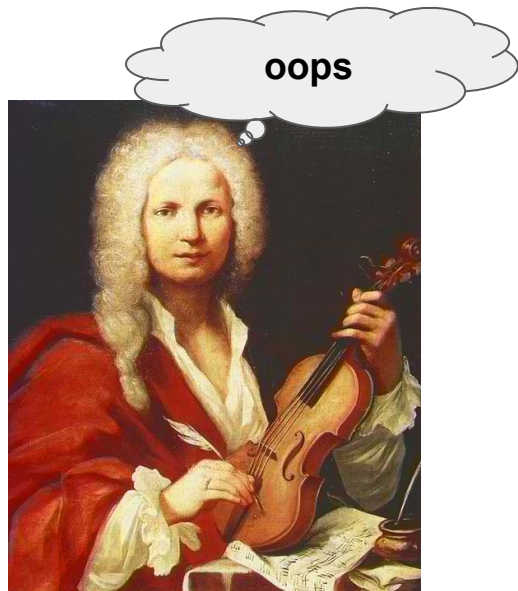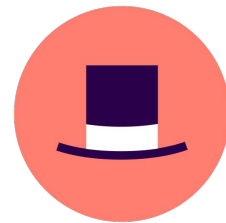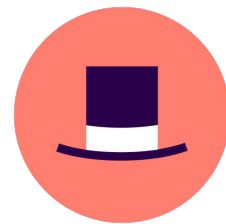# annif tutorial

Ensembles

Algorithms make silly mistakes

Some reasons for mistakes:

- errors and skew in training data
- correlation ≠ causation
- homonyms (e.g. rock)
- misinterpreted names (e.g. Smith, AIDS)
- random noise

Image source: Wikimedia Commons

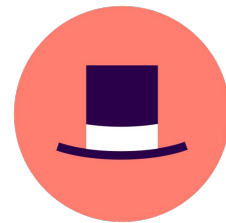# Each algorithm makes different mistakes

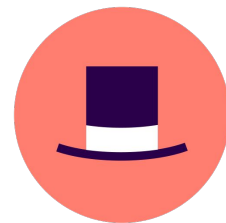Image source: Wikimedia Commons

Ensembles

- Combine the predictions of multiple algorithms

- Idea:

    - Retain individual strengths

    - Reduce weaknesses

Image source: Wikimedia Commons

The three ensembles

Simple ensemble

Averages the scores given by different backends for all subjects.

No training of the ensemble

PAV ensemble

Applies *isotonic regression* to estimate the relationship between given scores and probability of relevance of a subject.

Must be trained

Wilbur, W. J., & Kim, W. (2014). **Stochastic Gradient Descent and the Prediction of MeSH for PubMed Records**. *AMIA Annual Symposium proceedings. AMIA Symposium, 2014,* 1198-207.

Neural network ensemble

A lot like PAV. Starts off like a simple averaging ensemble, but fine-tunes the scores based on training.

Must be trained

Can learn further after training