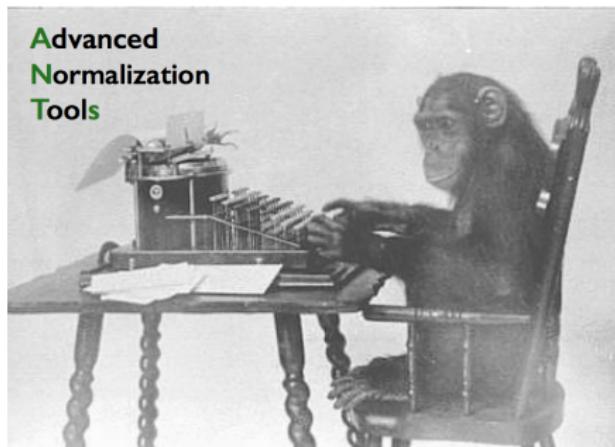


# ASHS revisited — can we do better?

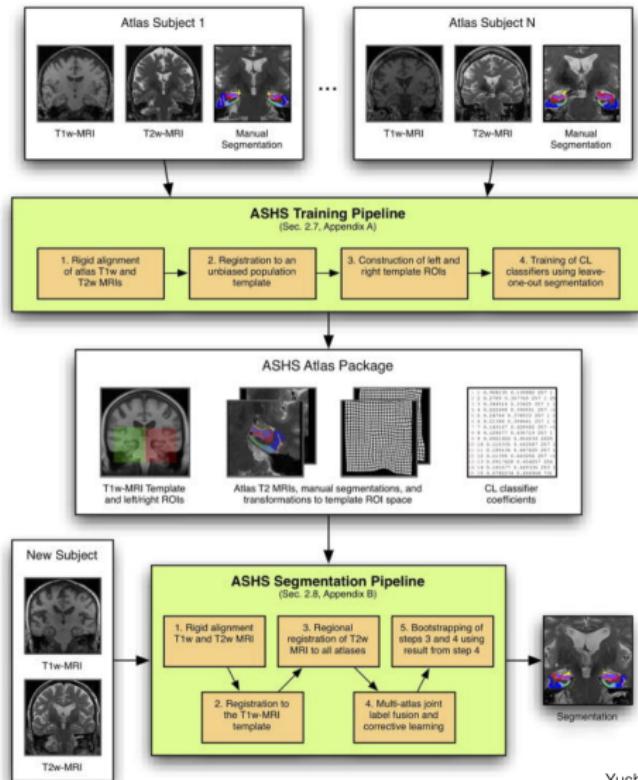
Nick Tustison and Mike Yassa

UCI



# Motivation

# Main components of ASHS



## Training steps

1. atlas registration
2. joint label fusion
3. AdaBoost training

## Segmentation steps

1. atlas registration
2. joint label fusion
3. corrective learning
4. repeat 1\*, 2, 3
5. heuristics

Yushkevich et al., Human Brain Mapping, 36:258-287, 2015.

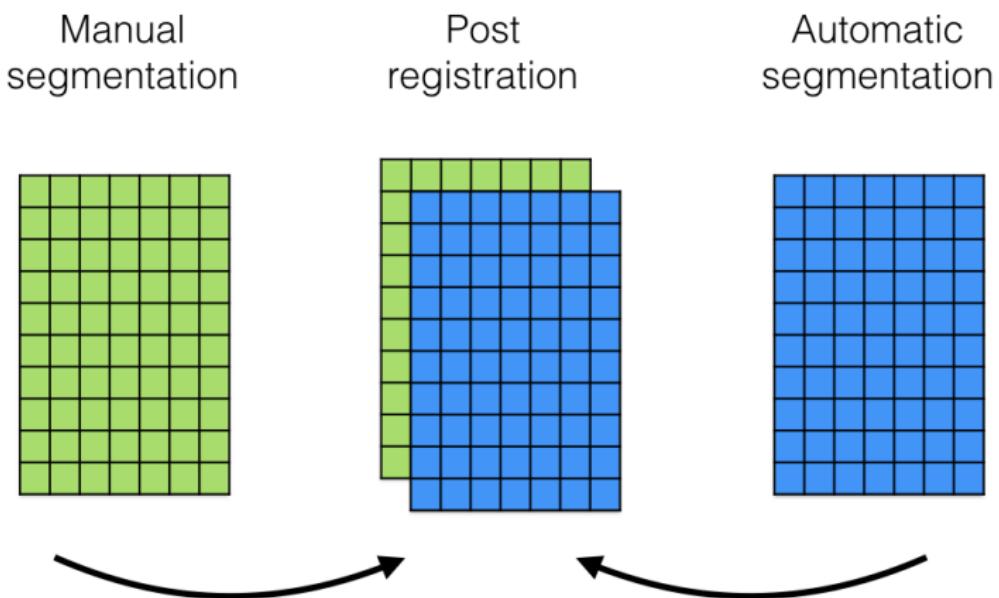
# Joint Label Fusion

# Modifications

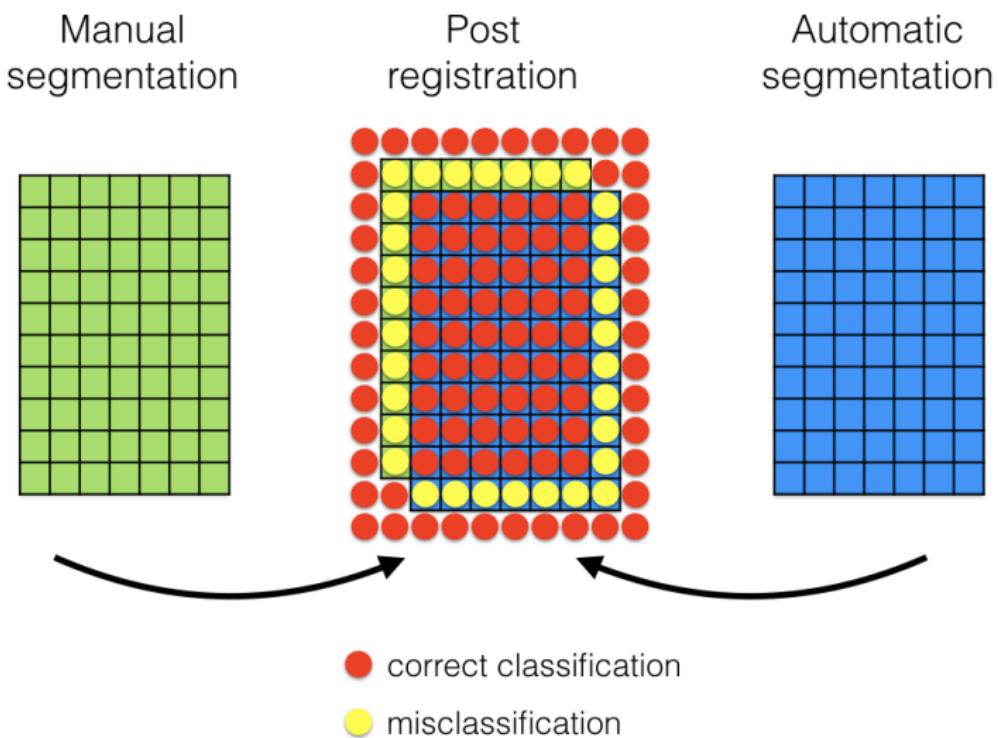
- Registration
  - antsRegistration
  - B-spline SyN (“-t BSplineSyN[...]”)
  - generic label interpolation (“-n GenericLabel[Linear]”)
- jointfusion → antsJointFusion
  - non-negative least squares option (vs. SVD)
  - joint intensity fusion
  - multi-threaded
  - memory issues

# Corrective learning

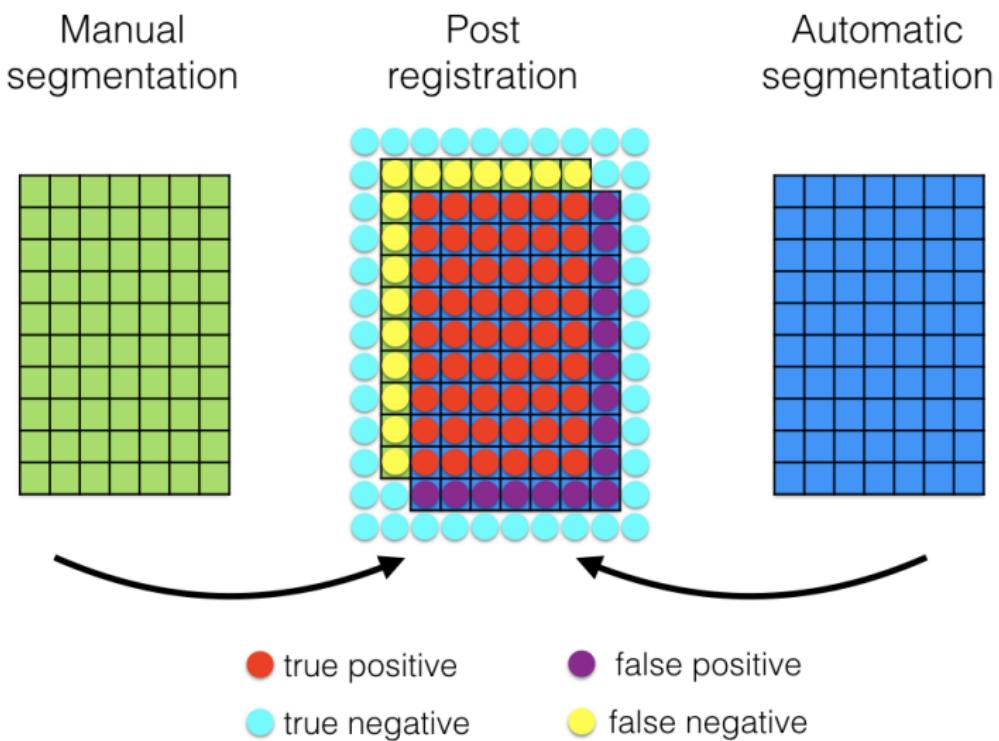
# Incorporate more prior knowledge



# Two-Class AdaBoost



# Four-Class Random Forest or Extreme Gradient Boosting



## Results: Penn Data

# Results: UCI Data