Application of random forest algorithm to autism spectrum disorder (ASD) surveillance data

1. Random forests: training one tree

Sample N observations
with replacement
(leaves out ~37%, or 1/e)

2008 Training Data
N = 1,162 Children
K = 13,135 phrases

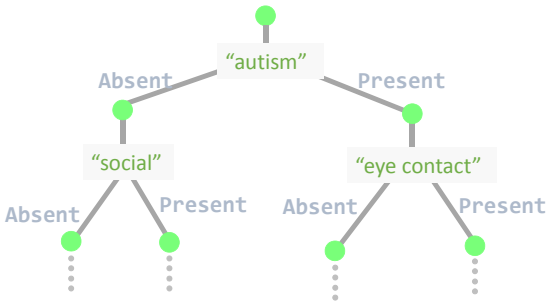
2. Training one tree (cont'd)

2. Random subset of sqrt(K) words/phrases; choose term that best separates outcomes

3. Training one tree (cont'd)

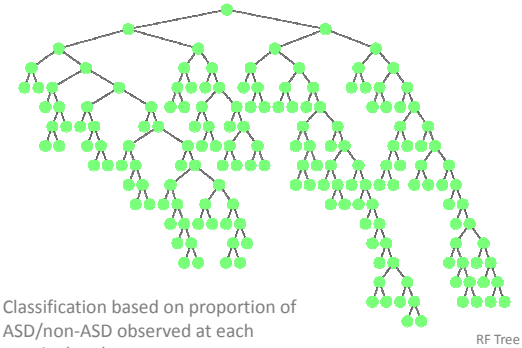
3. **Split sample** using the values of the selected term

4. Training one tree (cont'd)



Repeat selection and splitting until tree is fully grown.

5. Classification



Classification based on proportion of ASD/non-ASD observed at each terminal node

RF Tree
1 of 10,000

6. Voting on ASD case status

Each tree predicts every child's ASD case status.

Child's classification score = $\frac{1}{nTree}\sum_{i=1}^{nTree}(Prediction_i)$