# Ensemble method (1)
# Random Forest

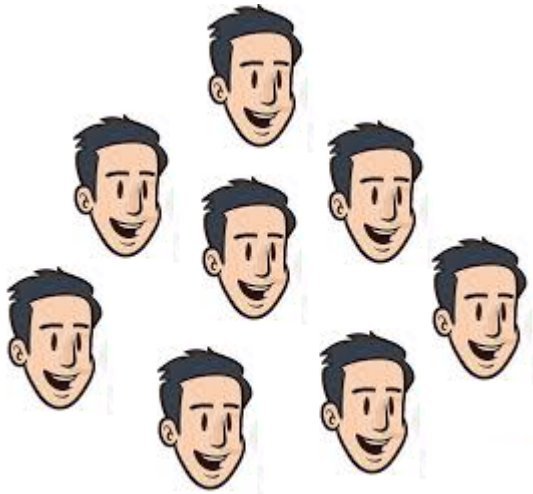
# Ensemble

## What is an Ensemble?

# What is an Ensemble?

- An individual model might be a weak-learner,
- Aggregated models can predict better

# Diversity matters

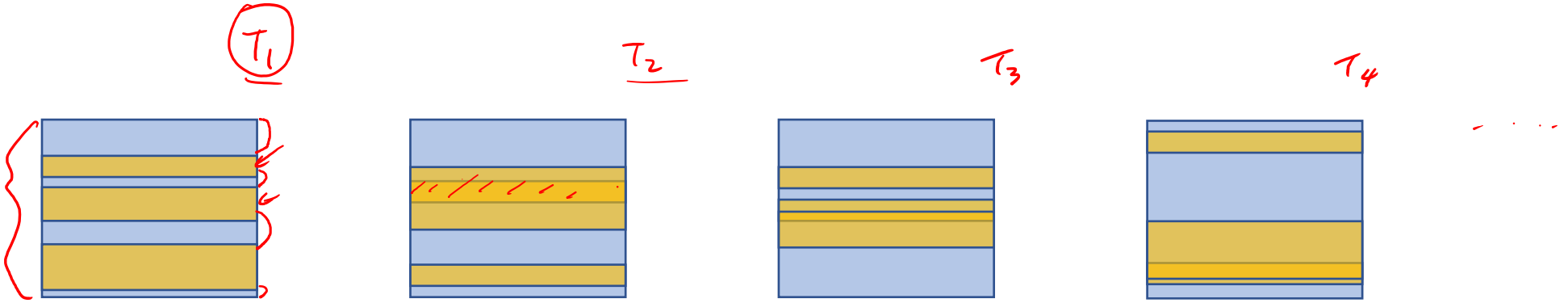


How do we diversify our models?

- Idea1: Models trained on different data subset

# Bagging

# Bagging (Bootstrap-Aggregation)




STEP1: Randomly sample a subset of training data with replacement (Bootstrap)

STEP2: Grow a tree (without pruning) on the subset of data

STEP3: Ensemble the result (regression : average, classification : vote)

Out of Bag error (OOB) : test the grown tree on the rest of data, then average

# Random Forest

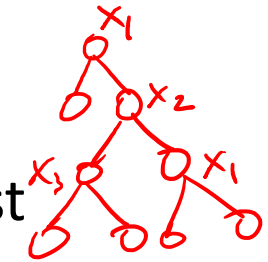
Bagging : random sampling of data

+

Decorrelation : random sampling of features

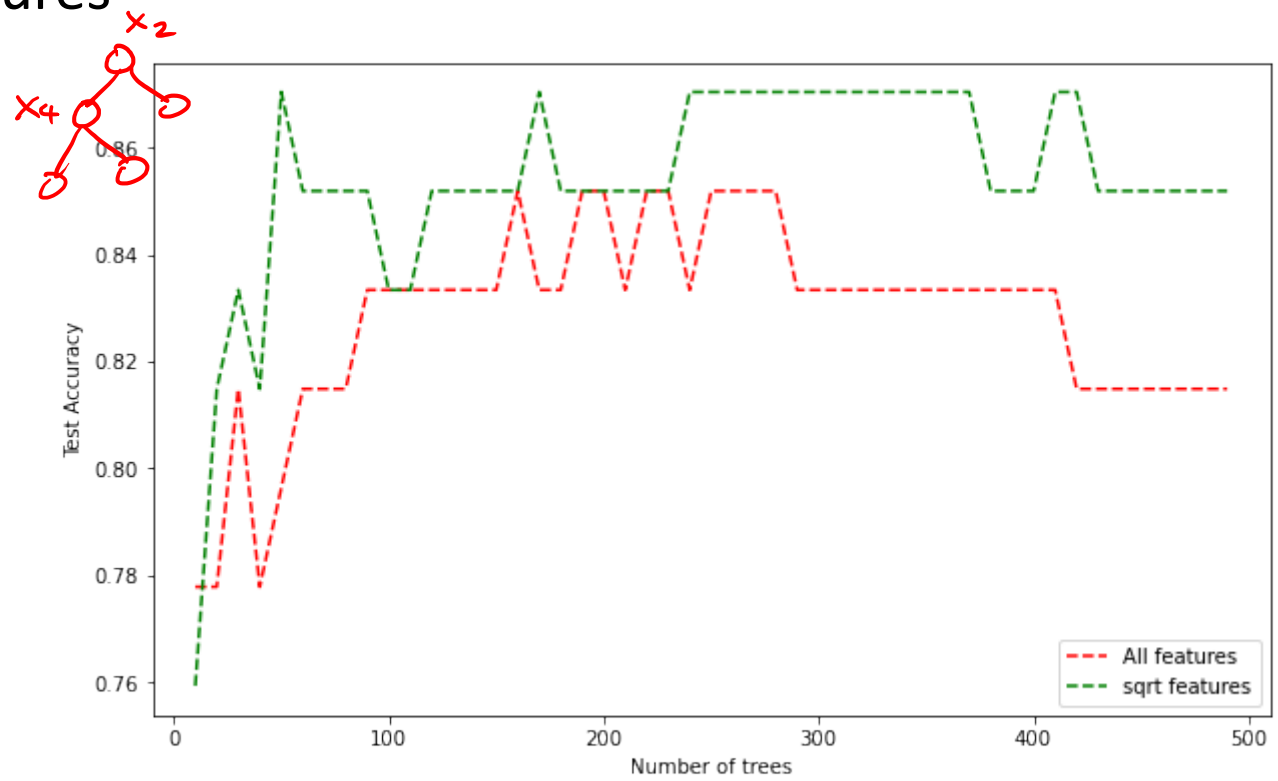
=

Random Forest

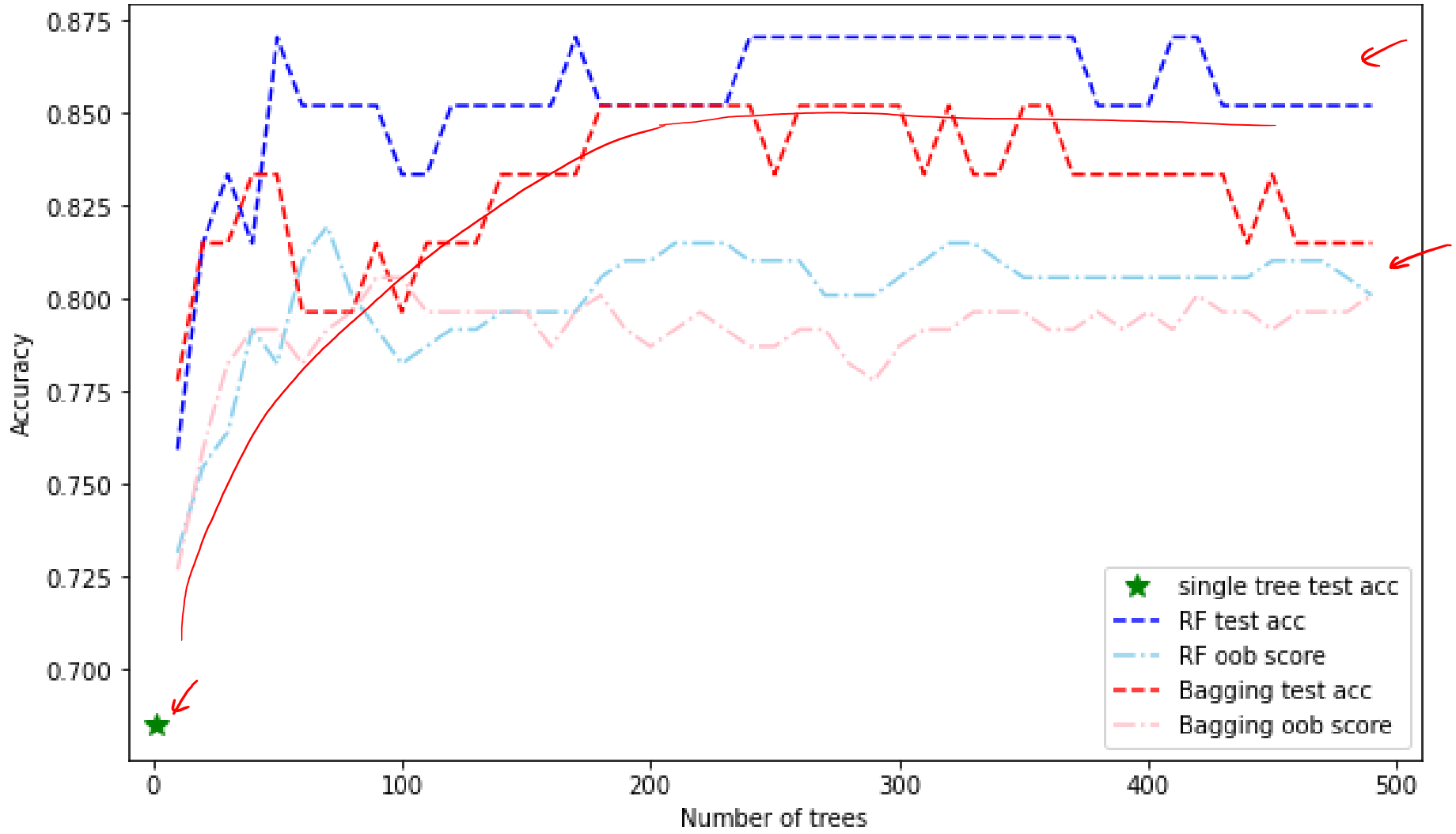



How do we sample features?

-> Rule of thumb : $\sqrt{n}$



# Power of an ensemble of trees



# Built-in feature importance