Machine Learning

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INPT- 2020

Content

1. The Big Picture

2. Supervised Learning
   - Linear Regression, Logistic Regression, Support Vector Machines, Trees, Random Forests, Boosting, Artificial Neural Networks
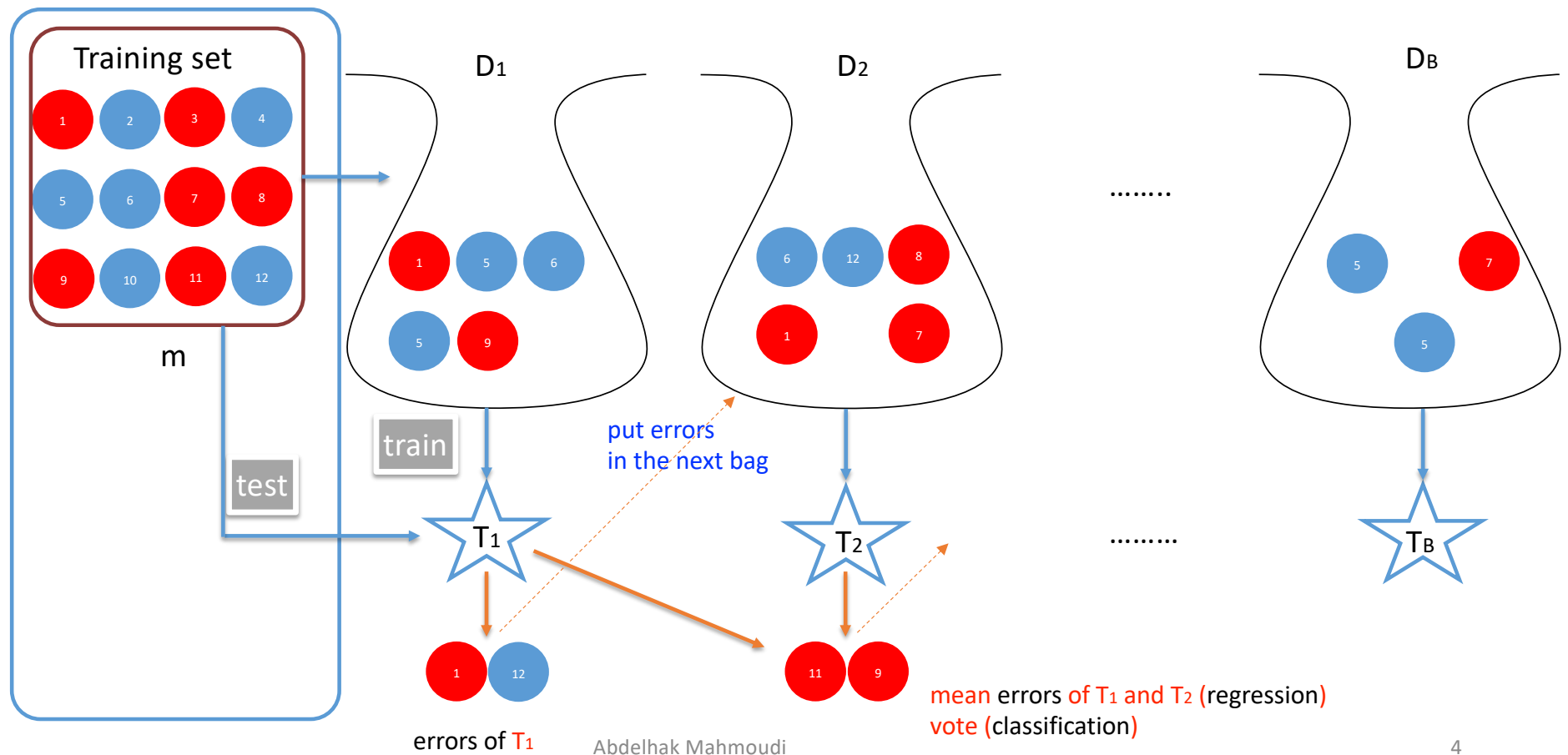
3. Unsupervised Learning
   - Principal Component Analysis, K-means, Mean Shift

Supervised Learning

- Linear Regression

- Logistic Regression

- Support Vector Machines

- Trees (Decision and Regression)

- Random Forests

- **Boosting**

- Artificial Neural Networks

Boosting

Training set

1	2	3	4
5	6	7	8
9	10	11	12

m

D_1

1 5 6
5 9

train

D_2

6 12 8
1 7

put errors
in the next bag

D_B

5 7
5

....

test

T_1

T_2

....

T_B

1 12

errors of T_1

11 9

mean errors of T_1 and T_2 (regression)
vote (classification)

4

Boosting

- Outperforms RF

- Smaller Trees (depth = 1) are
sufficient because the growth of a
particular tree takes into account
preceding trees.

- Smaller trees can aid in
interpretability.

- Boosting (Freund & Schapire 1990)

- Adaboost (Adaptive Boosting), 1996