Comparing Learning Curve Performance Prediction Models

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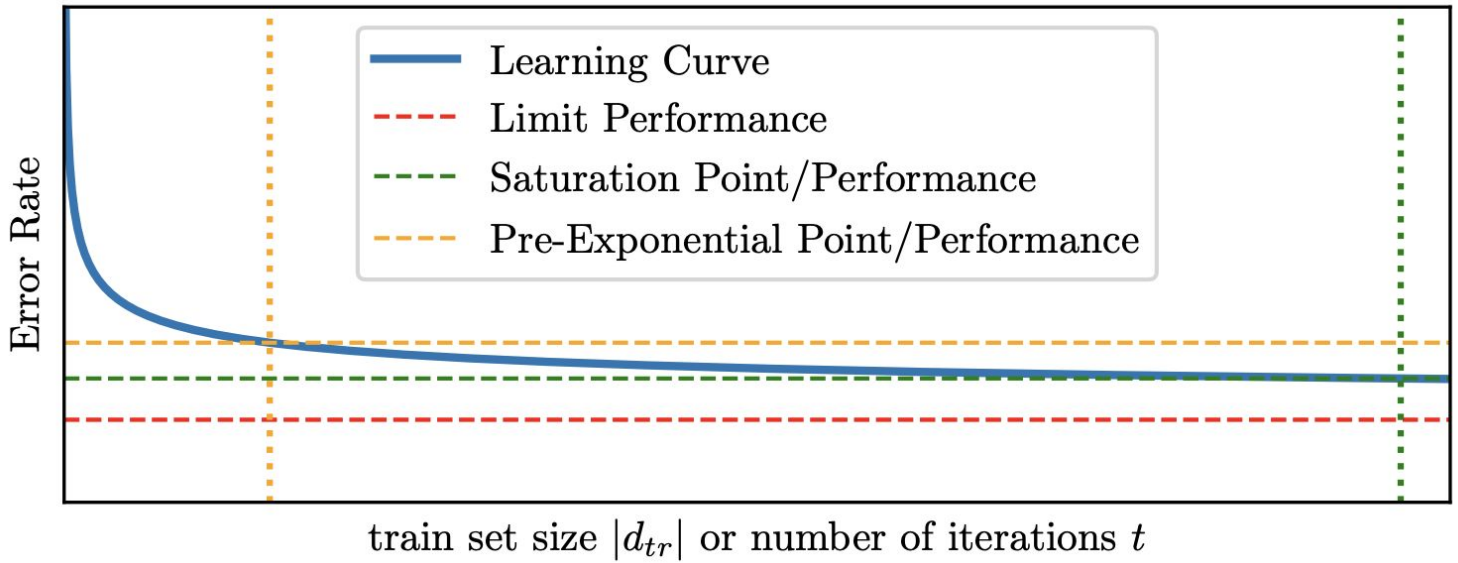
Learning Curves

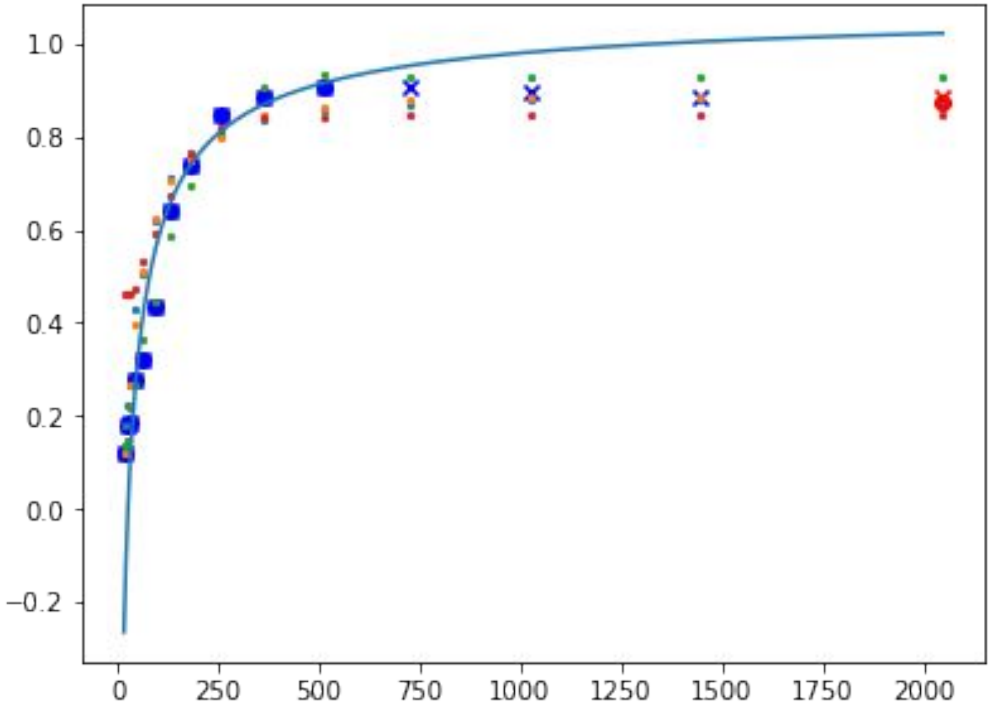


Approaches for predicting on learning curves

- Meta-learning approach
  - MDS (meta learning on datasets) - Rui, Pavel
- Model based approach
  - MMF (vapor model) - Felix, Tom Viering
  - $(ab + cx^d)/(b + x^d)$
- Last one
- Random forest

Learning Curves

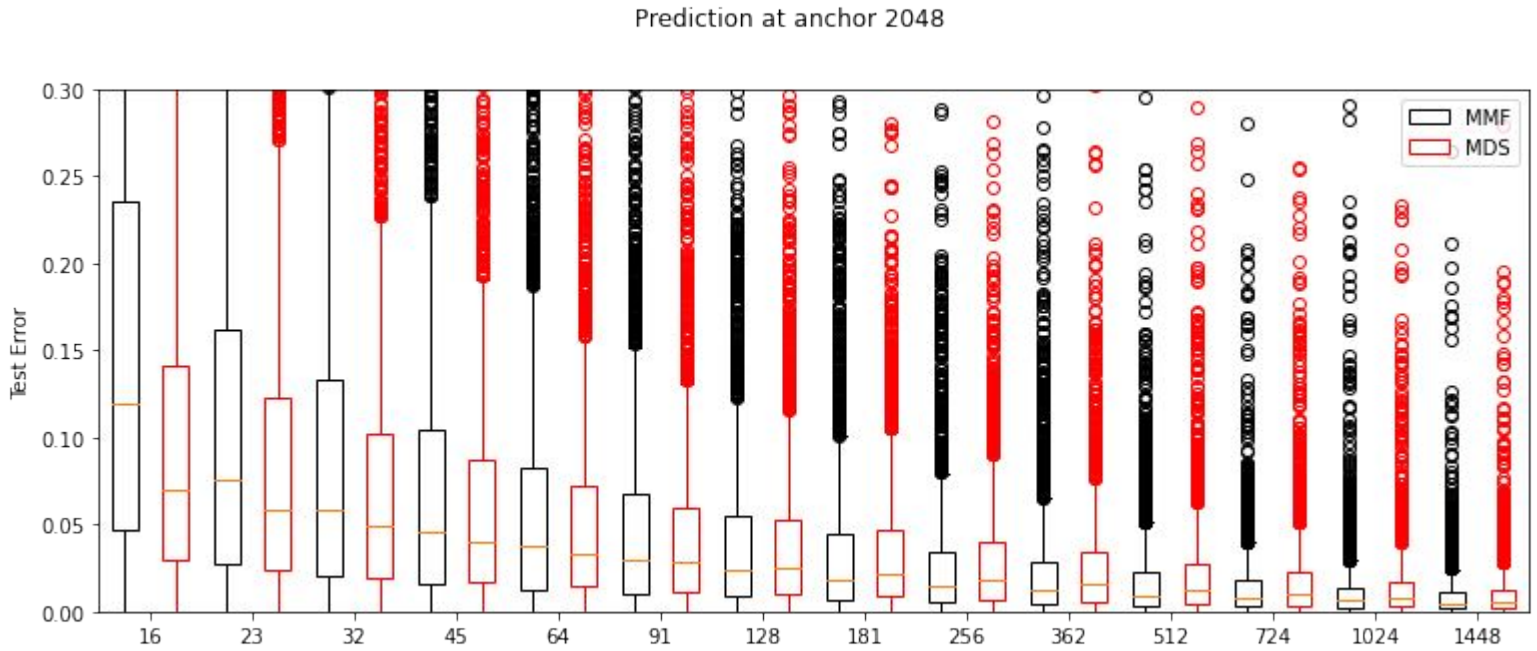
- Blue Squares: Given part of curve
- Blue X: Rest of the curve
- Red X: Point to predict
- Blue line: MMF fit
- Colored dots: MDS nearest curves
- Red O: MDS prediction



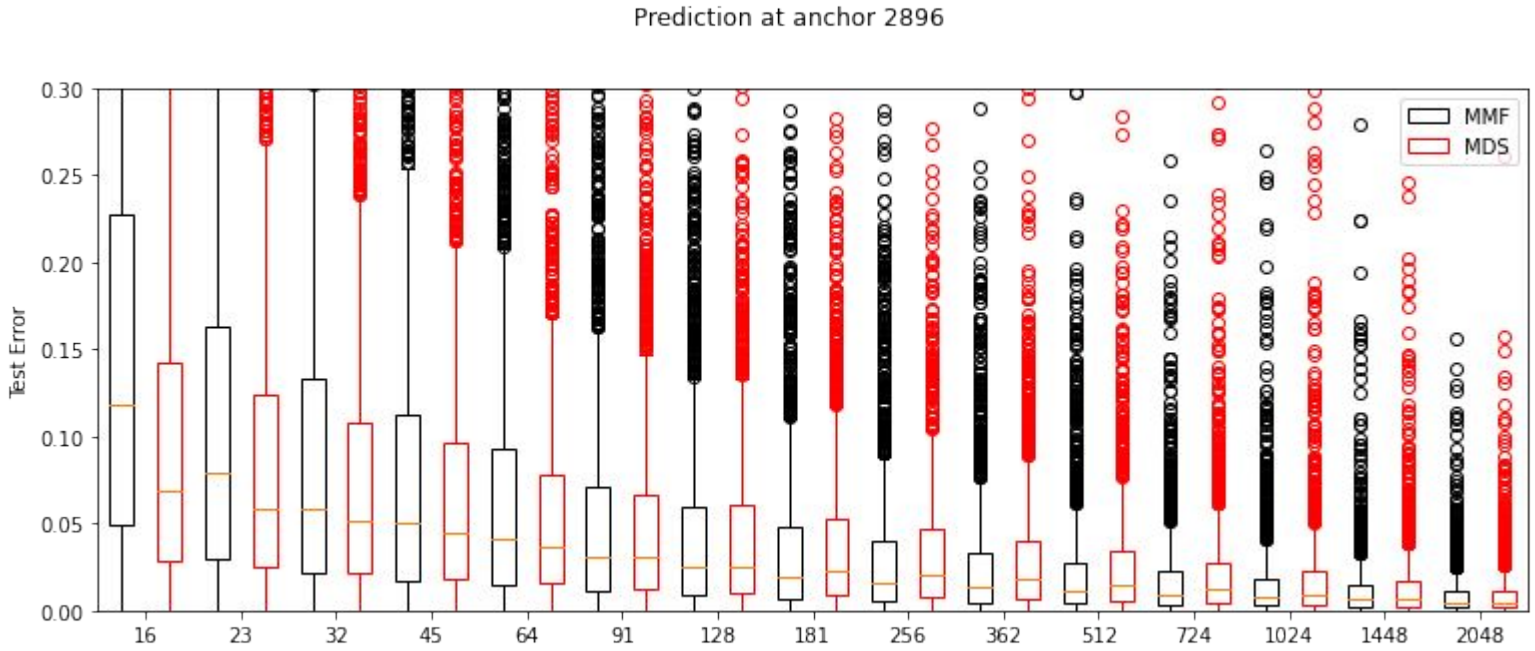
Method - Using LCDB database

- Dataframe containing Learning curves for:
  - Approx 200 datasets
  - 20 learners
  - Max 200 points per learning curve
- See how well each approach predicts for a given window

Results


Prediction at anchor 2048
Test Error
0.30
0.25
0.20
0.15
0.10
0.05
0.00
16
23
32
45
64
91
128
181
256
362
512
724
1024
1448
MMF
MDS

Results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1448
2048
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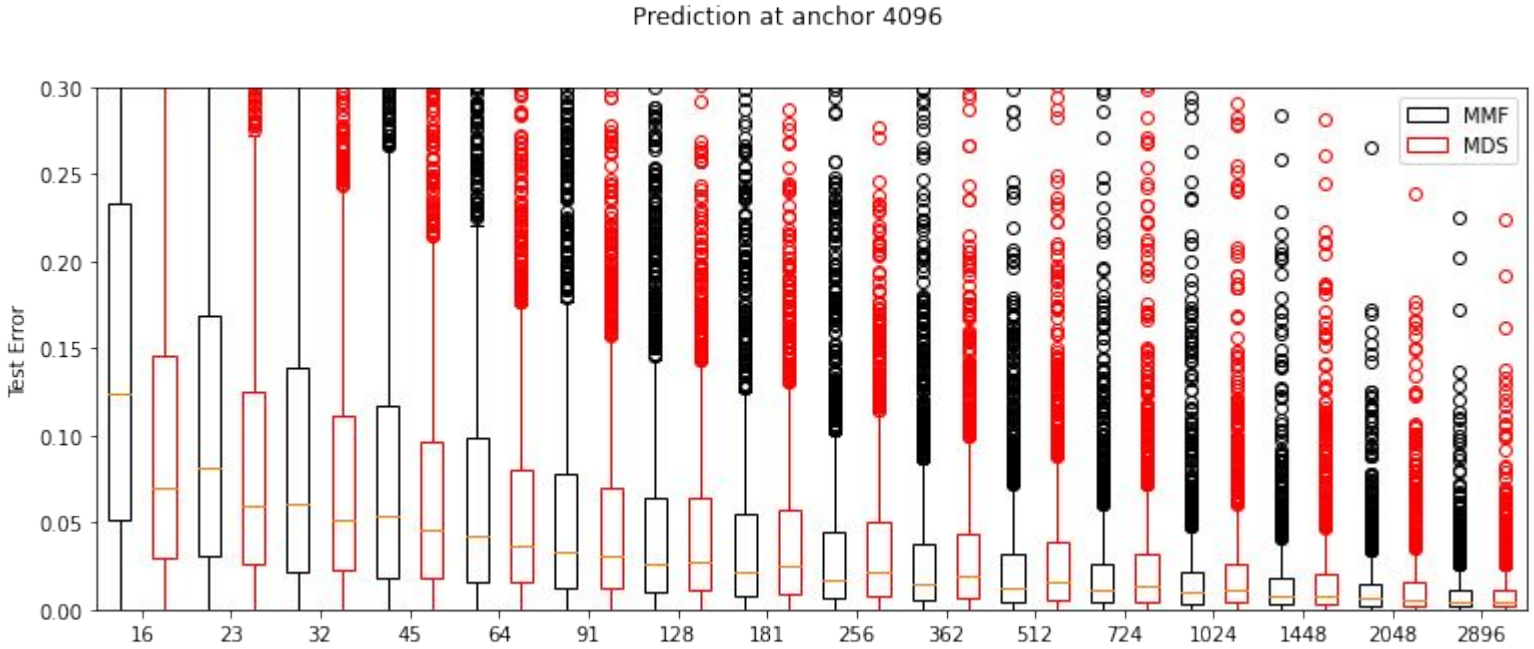
Results


Prediction at anchor 4096
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128
181
256
362
512
724
1024
1448
2048
2896
MMF
MDS

Motivation

- **Insight into how learning curves work**
- Early Stopping
- Early Discarding / Model Selection