

# Technical Analysis & Diagnostics

Detailed Engineering Report | Run ID: 20251208\_145610

## 1. Comprehensive Model Evaluation

Detailed breakdown of model performance across Validation and Test sets.

Metric	Validation Set	Test Set	Delta
CMAE (°)	0.8244	1.6337	+0.8093
CRMSE (°)	3.8297	9.9104	+6.0807
Max Error (°)	49.3931	141.2864	+91.8933
Acc @ 5° (%)	95.1157	94.8586	-0.2571
Acc @ 10° (%)	98.2005	96.9152	-1.2853

## 2. Hyperparameter Optimization Analysis

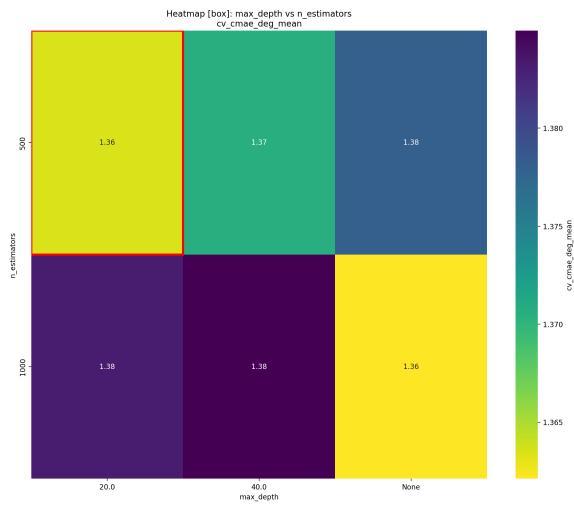
### Optimal Parameters: Summary

Parameter	Type	Optimal Values	Best Value	Optimal Min	Optimal Max
max_depth	Categorical	20.0	20	N/A	N/A
n_estimators	Numeric	N/A	500	500.0	500.0

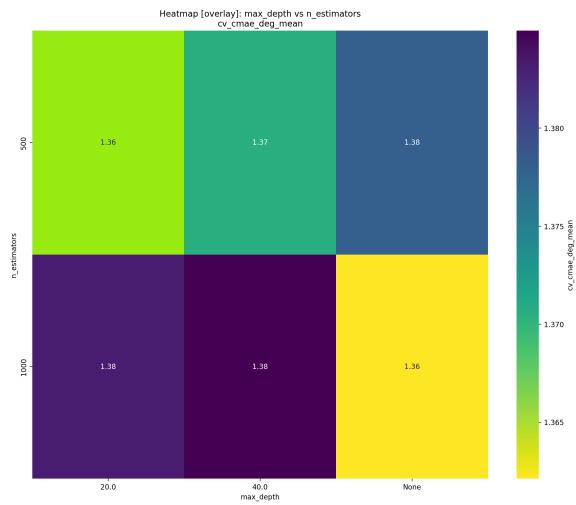
### Optimal Parameters: ExtraTreesRegressor

Parameter	Type	Optimal Values	Best Value	Optimal Min	Optimal Max
max_depth	Categorical	20.0	20	N/A	N/A
n_estimators	Numeric	N/A	500	500.0	500.0

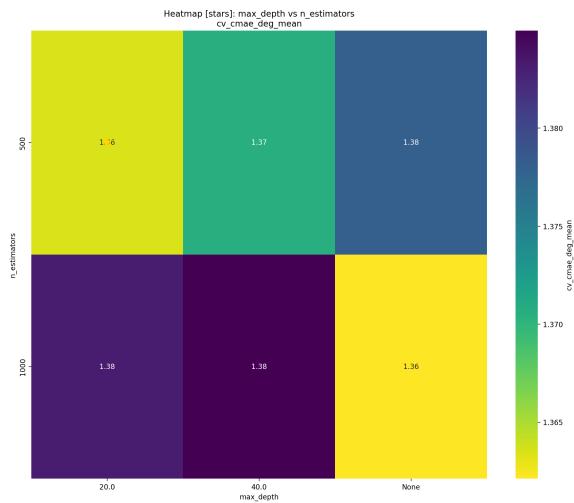
# Parameter Landscape Visualizations



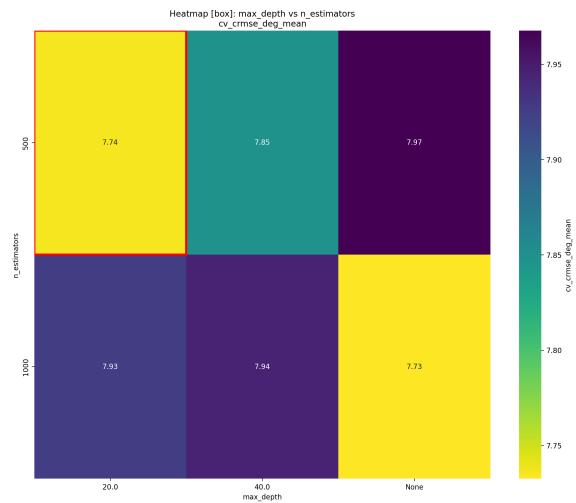
Max Depth Vs N Estimators



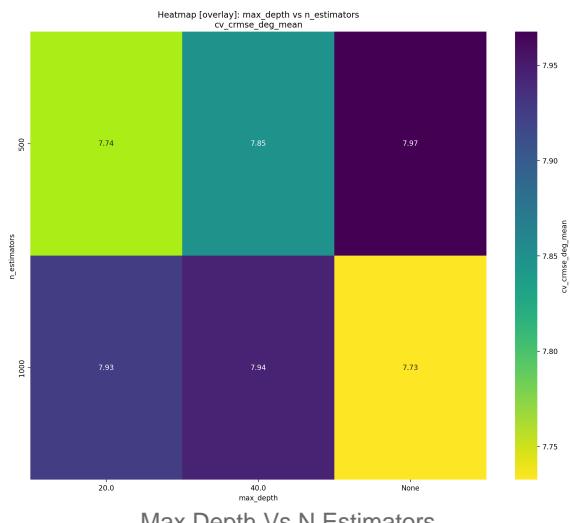
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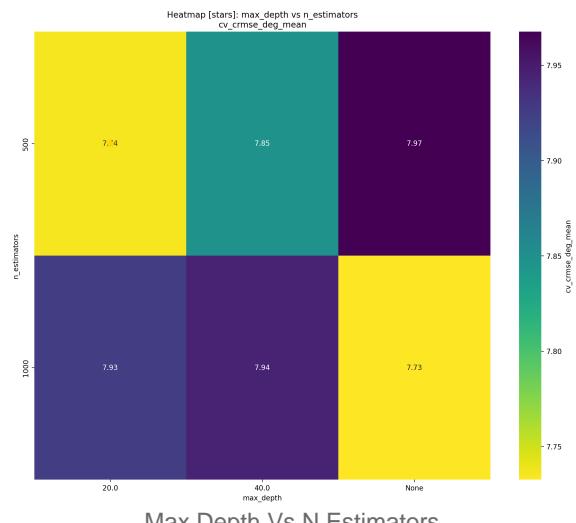
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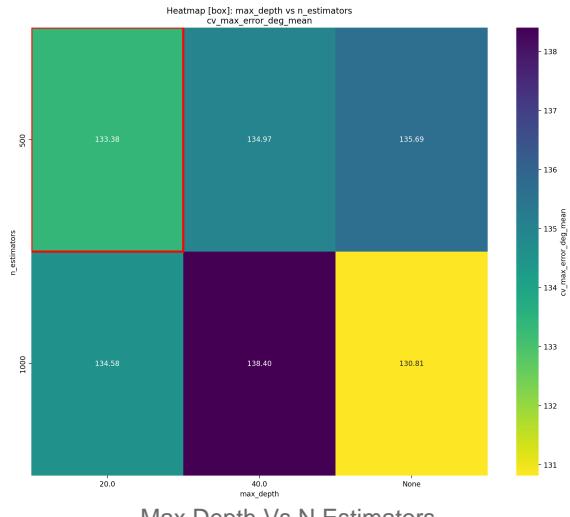
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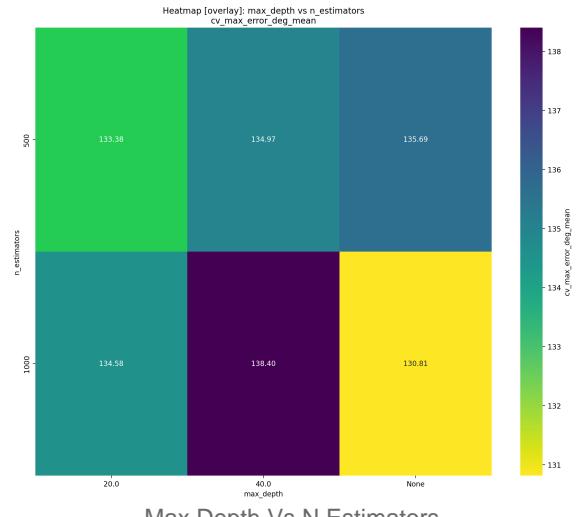
Max Depth Vs N Estimators



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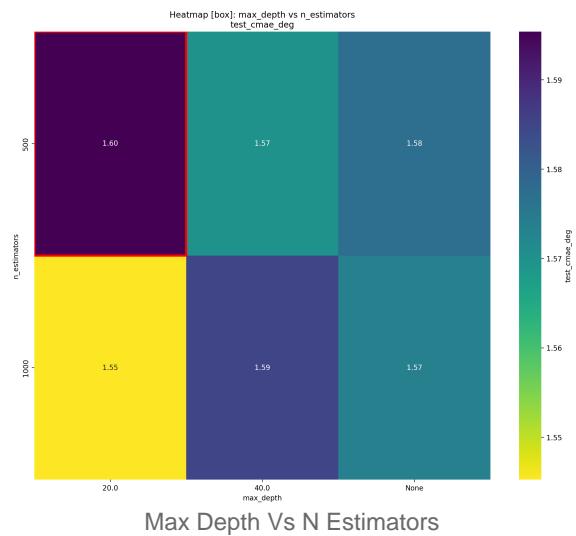
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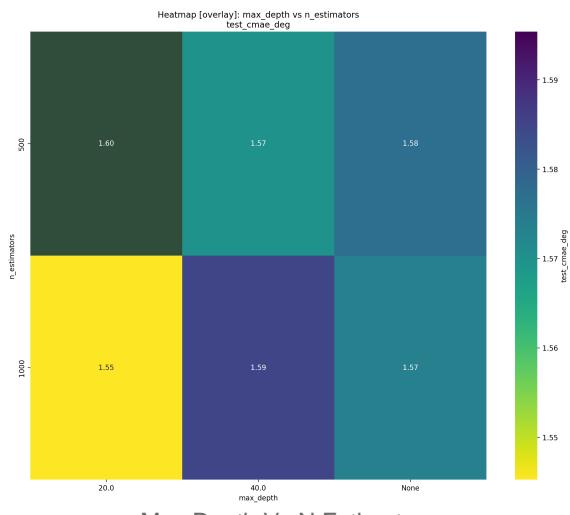
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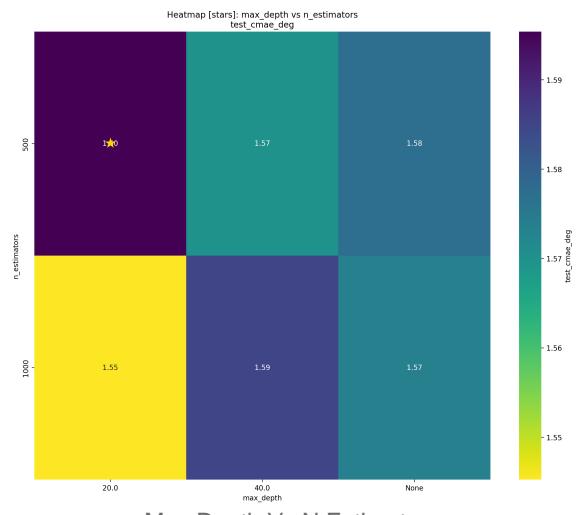
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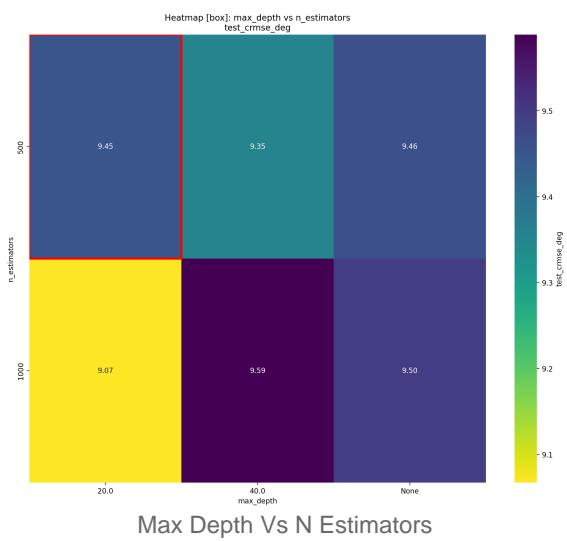
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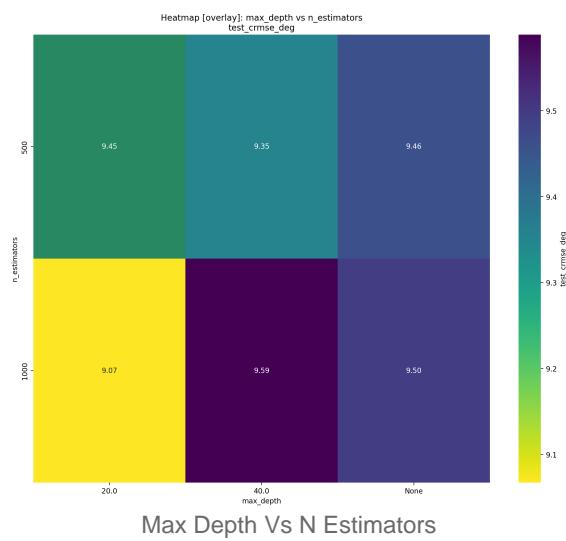
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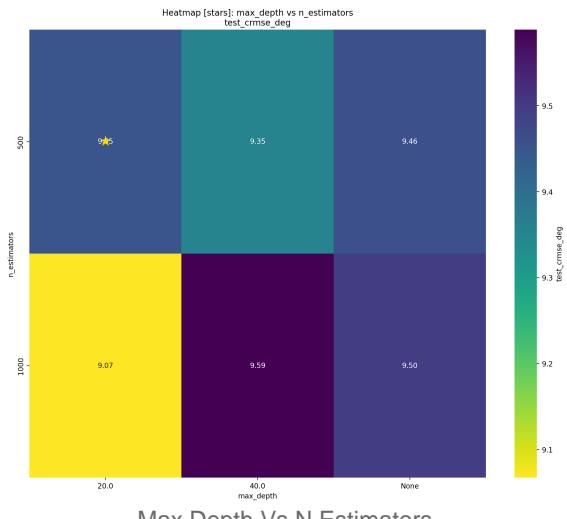
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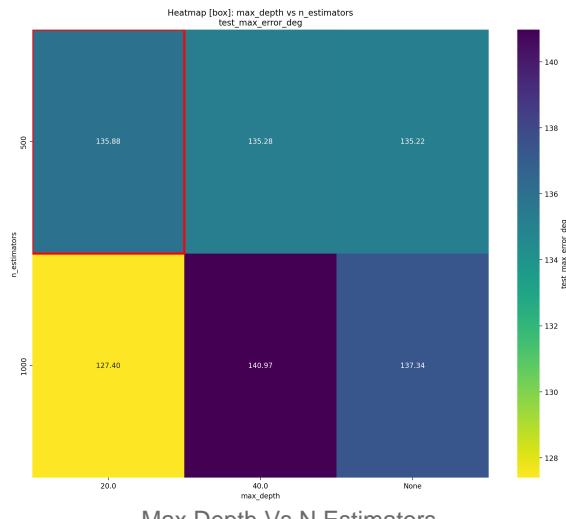
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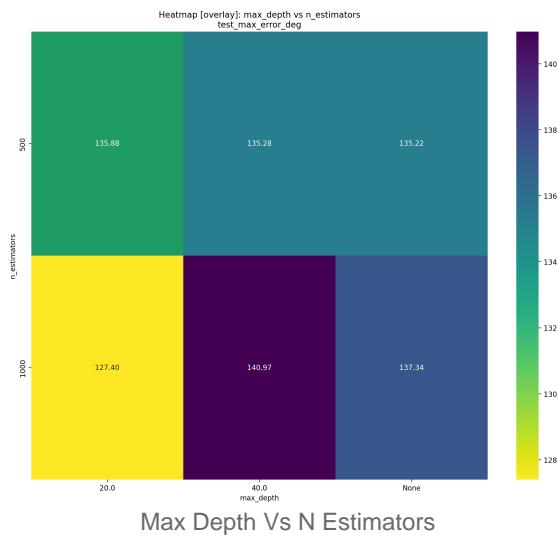
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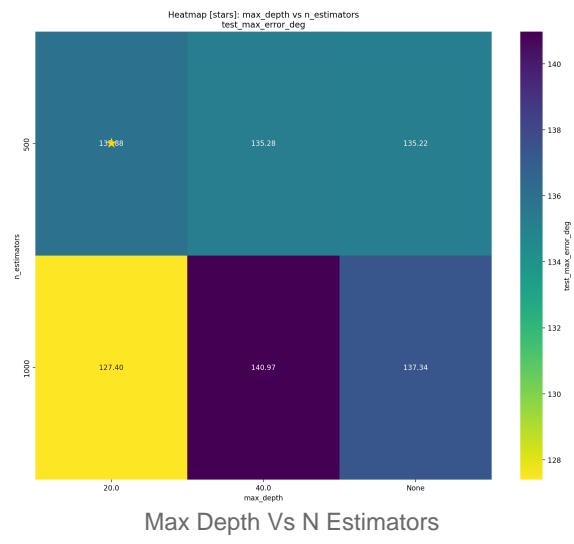
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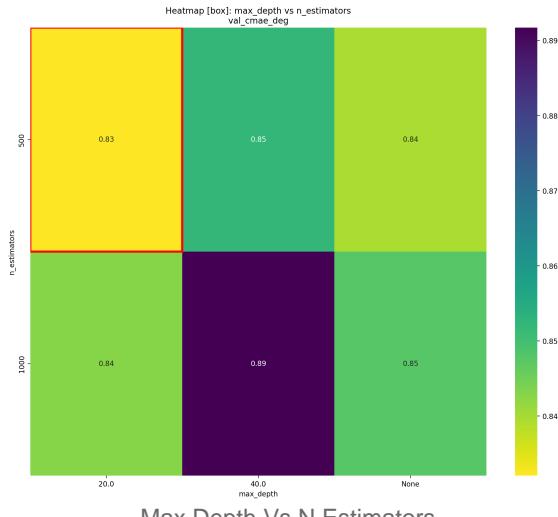
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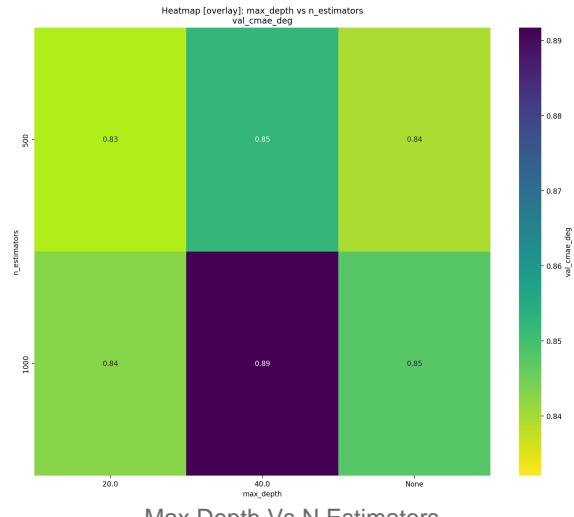
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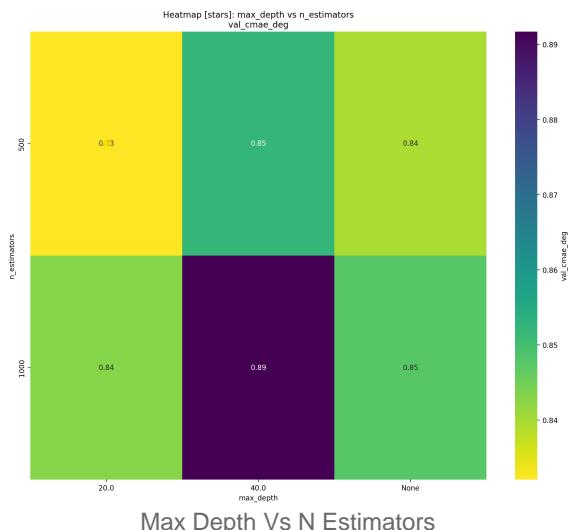
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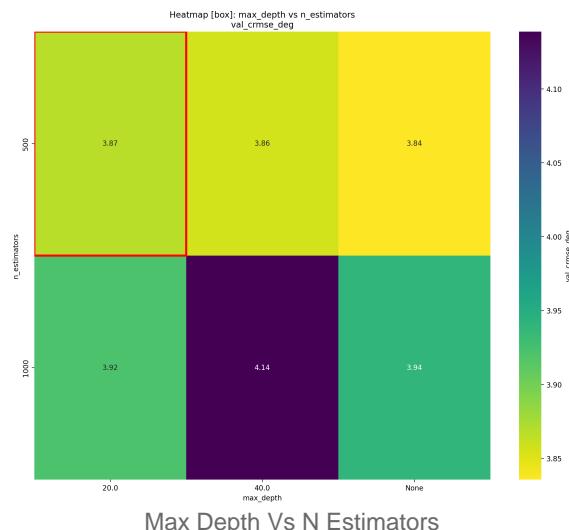
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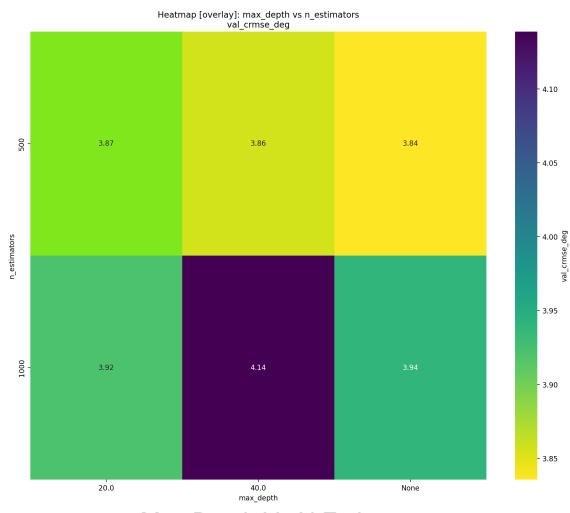
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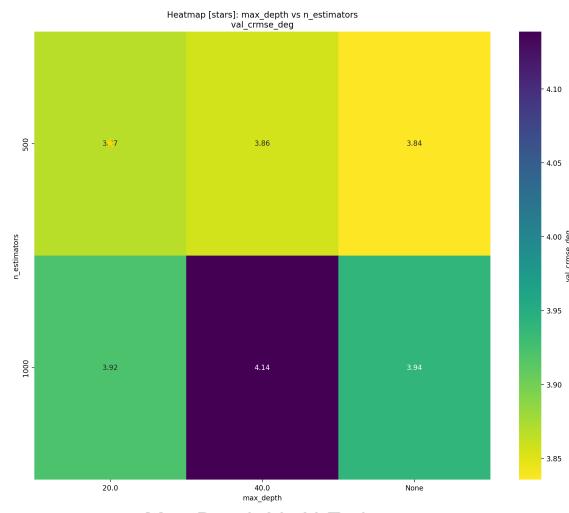
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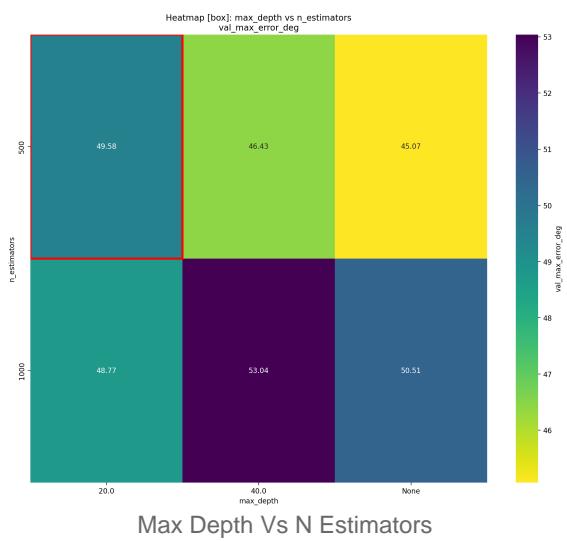
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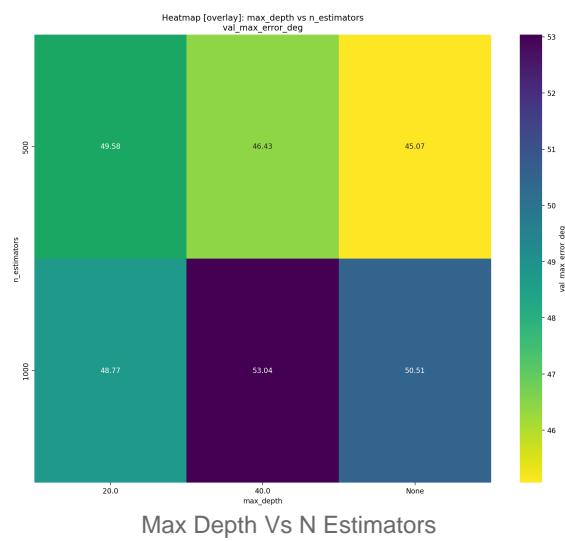
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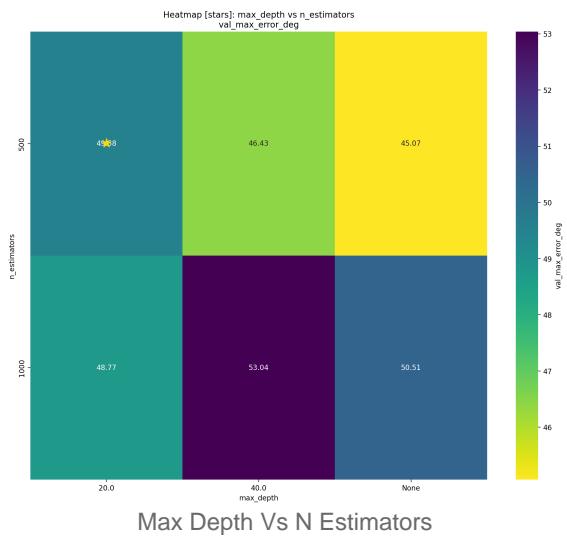
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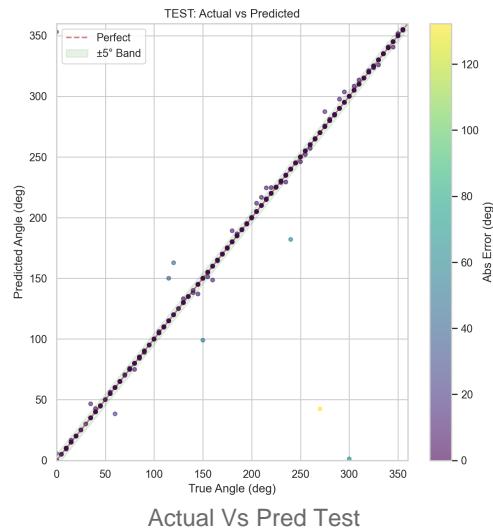
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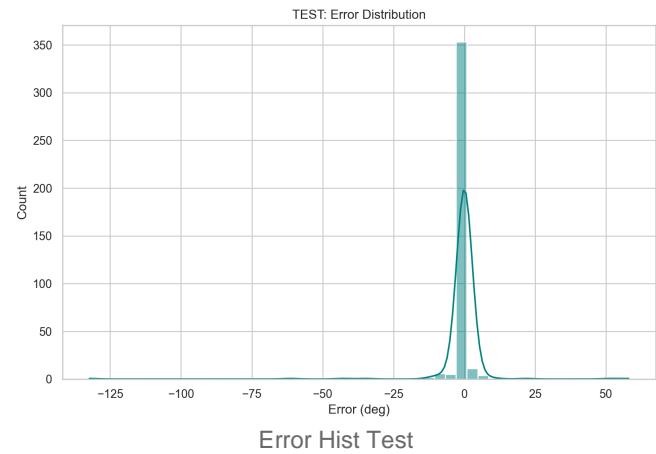
Max Depth Vs N Estimators

### 3. Full Diagnostic Suite

Visualizing residuals, distributions, and physics compliance.



Actual Vs Pred Test



Error Hist Test