

# Classify and Predict

## Computational ClassNotes

dara@lossogenerality.com

```
In[ ]:= data = ResourceData["Sample Data: Boston Homes"]
```

Out[ ]:=

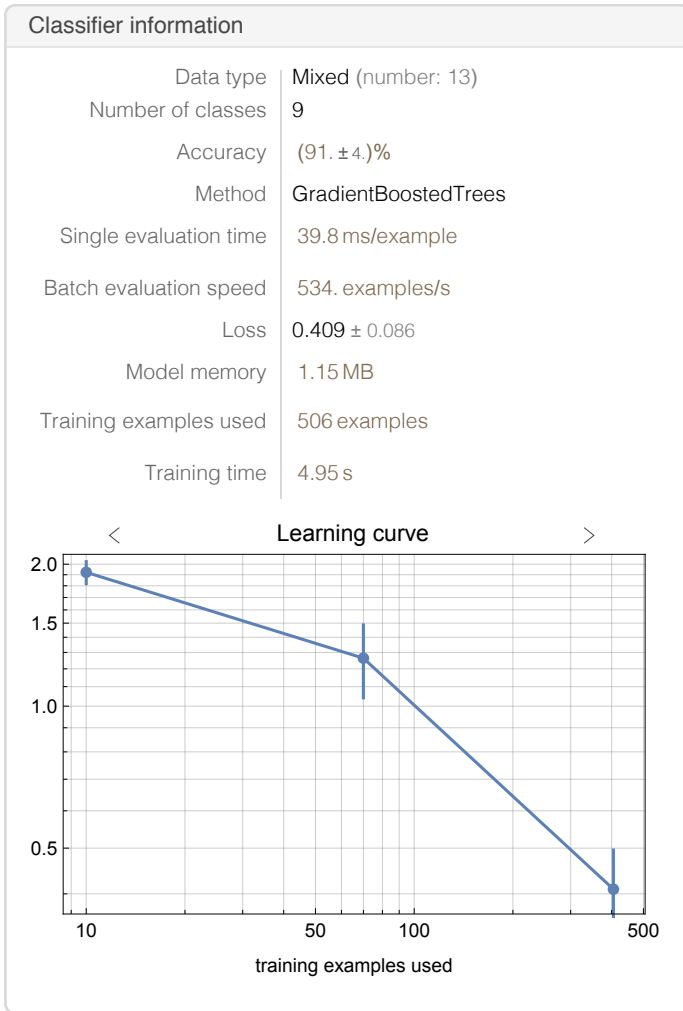
CRIM	ZN	INDUS	CHAS
0.00632	18	2.31	tract does not bound Charles river
0.02731	0	7.07	tract does not bound Charles river
0.02729	0	7.07	tract does not bound Charles river
0.03237	0	2.18	tract does not bound Charles river
0.06905	0	2.18	tract does not bound Charles river
0.02985	0	2.18	tract does not bound Charles river
0.08829	12.5	7.87	tract does not bound Charles river
0.14455	12.5	7.87	tract does not bound Charles river
0.21124	12.5	7.87	tract does not bound Charles river
0.17004	12.5	7.87	tract does not bound Charles river
0.22489	12.5	7.87	tract does not bound Charles river
0.11747	12.5	7.87	tract does not bound Charles river
0.09378	12.5	7.87	tract does not bound Charles river
0.62976	0	8.14	tract does not bound Charles river
0.63796	0	8.14	tract does not bound Charles river
0.62739	0	8.14	tract does not bound Charles river
1.05393	0	8.14	tract does not bound Charles river
0.7842	0	8.14	tract does not bound Charles river
0.80271	0	8.14	tract does not bound Charles river
0.7258	0	8.14	tract does not bound Charles river

K < showing 1-20 of 506 > ↘

## Classifier:RAD

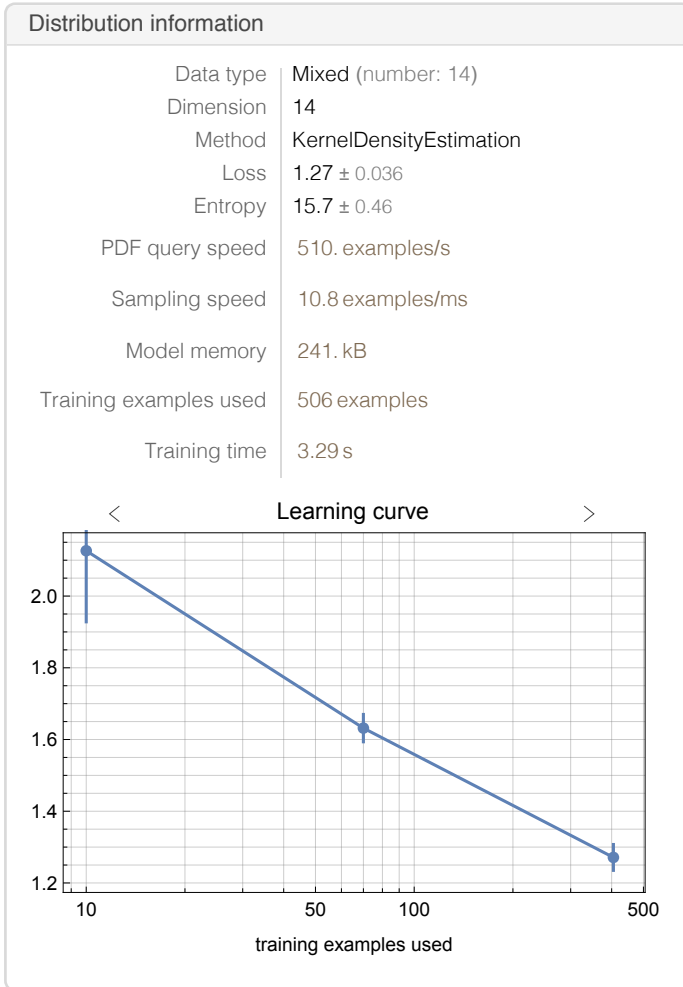
**RAD** (Risks Attaching During) contracts will cover all policies that incept during the contract period, irrespective of when the losses occur. Depending on how the original policies are worded, the losses

could emerge several years after the policy itself has expired.



# Simulation: Learn Distribution

AI simulator to simulate the incoming applications or market data.



Classifier classifies the RAD as an integer class, Learn Distribution simulates the new data, we removed the RAD to see if Classifier computed the RAD with good accuracy:

Out[4]=

CRIM	0.40475
ZN	-2.73644
INDUS	6.77379
CHAS	tract does not bound Charles river
NOX	0.523849 ppm
RM	6.23158
AGE	86.0103
DIS	3.06672
RAD	4
TAX	312.732
PTRATIO	20.9734
BLACK	399.151
LSTAT	12.6453%
MEDV	22.9633

Out[5]=

5

Out[6]=

CRIM	0.417587
ZN	22.2515
INDUS	2.04564
CHAS	tract does not bound Charles river
NOX	0.366552 ppm
RM	6.2949
AGE	47.4545
DIS	8.56311
RAD	7
TAX	364.108
PTRATIO	20.1447
BLACK	406.08
LSTAT	8.54864%
MEDV	16.5082

Out[7]=

7

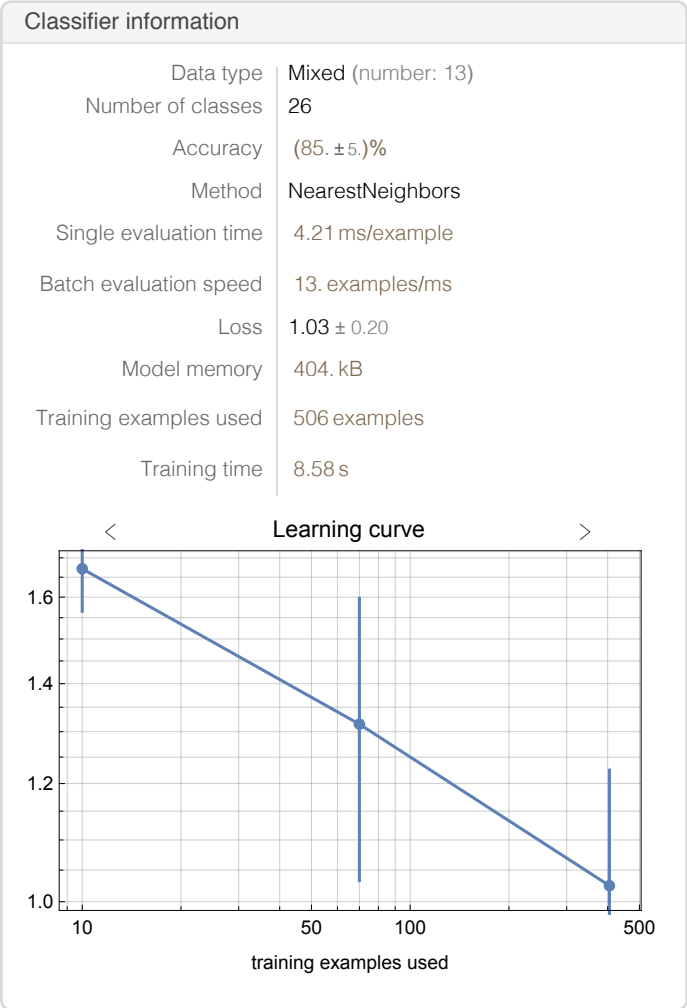
Out[ ]=

CRIM	0.0945317
ZN	-2.92725
INDUS	4.45613
CHAS	tract does not bound Charles river
NOX	0.54427 ppm
RM	6.37194
AGE	74.3882
DIS	3.36624
RAD	3
TAX	302.598
PTRATIO	15.9184
BLACK	391.025
LSTAT	5.8883%
MEDV	22.5295

Out[ ]=

5

Classifier:ZN



Out[ ]=

CRIM	0.885624
ZN	0
INDUS	11.7946
CHAS	tract does not bound Charles river
NOX	0.443872 ppm
RM	5.5643
AGE	90.6549
DIS	2.85246
RAD	2.87143
TAX	236.723
PTRATIO	18.6814
BLACK	456.205
LSTAT	23.3311%
MEDV	18.3284

Out[ ]=

0

Out[ ]=

CRIM	0.225251
ZN	0
INDUS	9.2243
CHAS	tract does not bound Charles river
NOX	0.533117 ppm
RM	6.4759
AGE	71.4564
DIS	2.73768
RAD	4.10227
TAX	212.513
PTRATIO	17.403
BLACK	361.21
LSTAT	9.88298%
MEDV	23.2423

Out[ ]=

0

CRIM	0.136632
ZN	36
INDUS	2.8734
CHAS	tract bounds Charles river
NOX	0.462541 ppm
RM	7.74461
AGE	62.653
DIS	4.44241
RAD	3.49221
TAX	173.899
PTRATIO	14.9538
BLACK	363.365
LSTAT	1.07451%
MEDV	44.6102

Out[ ]=

Out[ ]=

20

CRIM	0.73777
ZN	1
INDUS	22.3596
CHAS	tract does not bound Charles river
NOX	0.611938 ppm
RM	6.19174
AGE	98.8422
DIS	2.85819
RAD	1.45208
TAX	460.866
PTRATIO	21.4965
BLACK	394.859
LSTAT	12.8091%
MEDV	19.1905

Out[ ]=

Out[ ]=

0



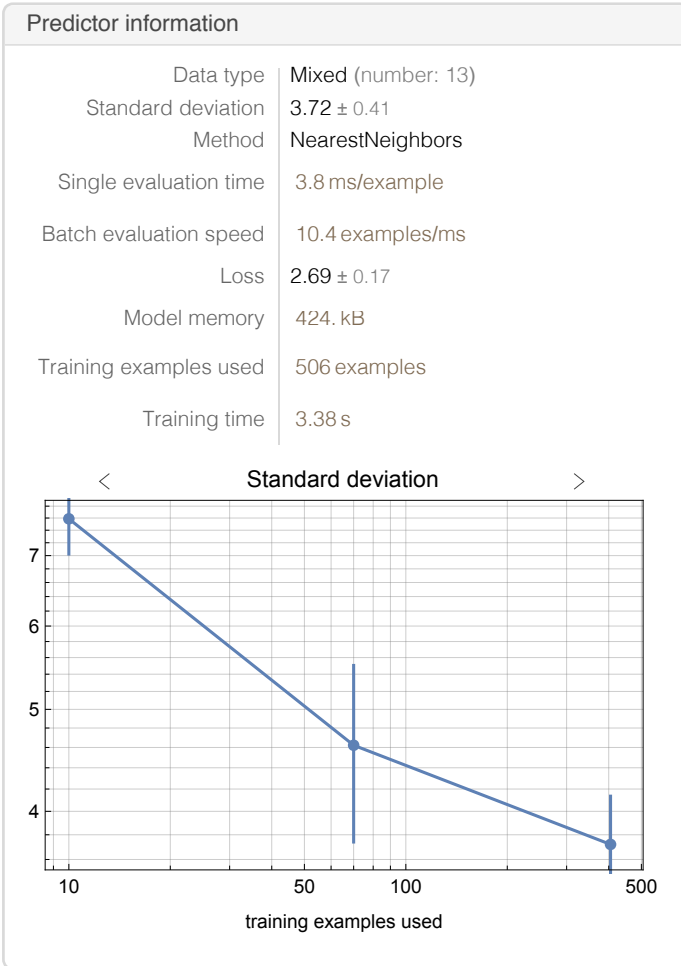
CRIM	0.155819
ZN	19
INDUS	3.44386
CHAS	tract does not bound Charles river
NOX	0.452927 ppm
RM	6.26359
AGE	14.1029
DIS	8.02615
RAD	6.30966
TAX	242.996
PTRATIO	19.1246
BLACK	348.712
LSTAT	3.91879%
MEDV	24.3728

Out[ ]=

Out[ ]=

22

# Predict: MEDV



Out[ ]=-

CRIM	12.3004
ZN	-8.43252
INDUS	19.2906
CHAS	tract does not bound Charles river
NOX	0.68698 ppm
RM	6.80739
AGE	103.281
DIS	2.72957
RAD	25.2203
TAX	640.768
PTRATIO	19.4191
BLACK	4.87738
LSTAT	16.2322%
MEDV	14.3725

Out[ ]= 14.15

CRIM	0.195152
ZN	24.2413
INDUS	3.78832
CHAS	tract does not bound Charles river
NOX	0.700466 ppm
RM	7.52375
AGE	92.5713
DIS	0.457996
RAD	3.08768
TAX	260.034
PTRATIO	13.2746
BLACK	354.983
LSTAT	8.27602%
MEDV	35.6481

Out[ ]= 39.55

CRIM	2.96116
ZN	-10.4214
INDUS	18.7289
CHAS	tract does not bound Charles river
NOX	0.722273 ppm
RM	5.41367
AGE	48.1486
DIS	2.57085
RAD	24.9792
TAX	712.93
PTRATIO	20.0811
BLACK	305.395
LSTAT	14.4858%
MEDV	19.2159

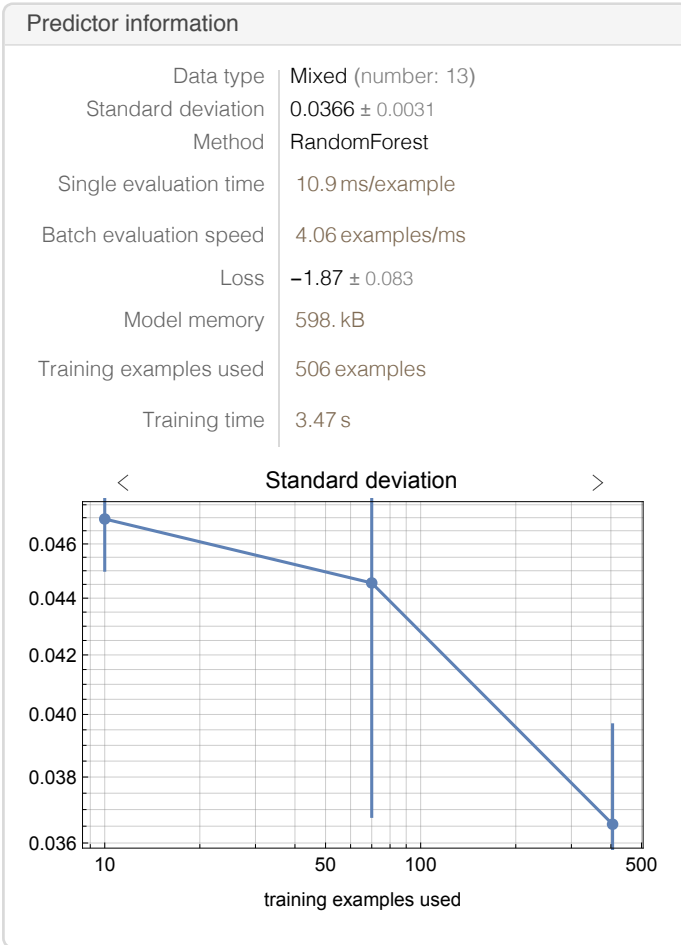
Out[ ]= 20.25

CRIM	0.0164148
ZN	28.9146
INDUS	5.83826
CHAS	tract does not bound Charles river
NOX	0.393389 ppm
RM	5.71962
AGE	45.0389
DIS	6.46589
RAD	4.3704
TAX	300.836
PTRATIO	18.0025
BLACK	396.513
LSTAT	8.35089%
MEDV	26.2965

*Out[ ]=**Out[ ]=*

21.9

# Predict: LSTAT



Out[ ]=

CRIM	28.8338
ZN	-6.45625
INDUS	17.4062
CHAS	tract does not bound Charles river
NOX	0.699702 ppm
RM	6.40792
AGE	107.177
DIS	1.5265
RAD	23.164
TAX	647.867
PTRATIO	21.3145
BLACK	274.744
LSTAT	16.0799%
MEDV	14.8989

Out[ ]= 18.8596%

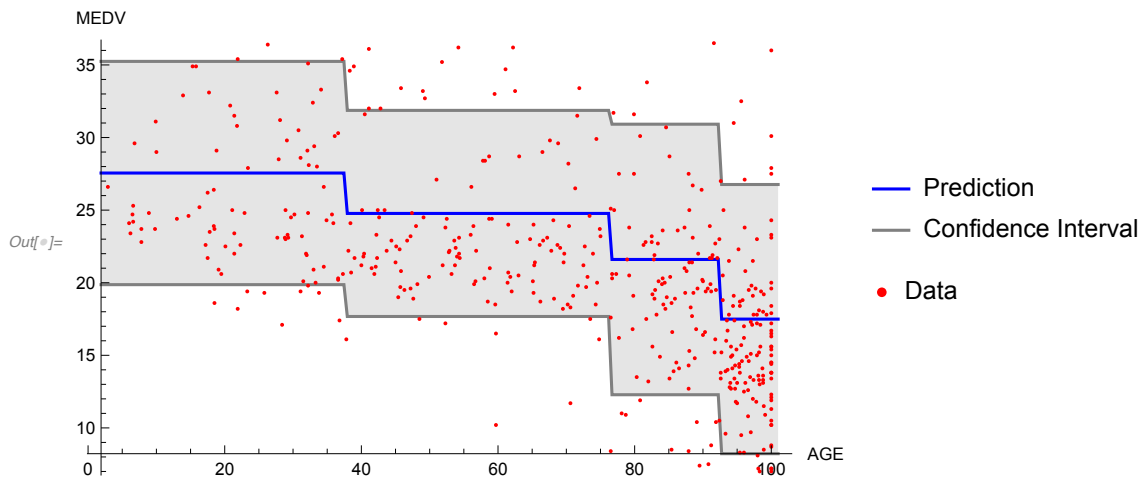
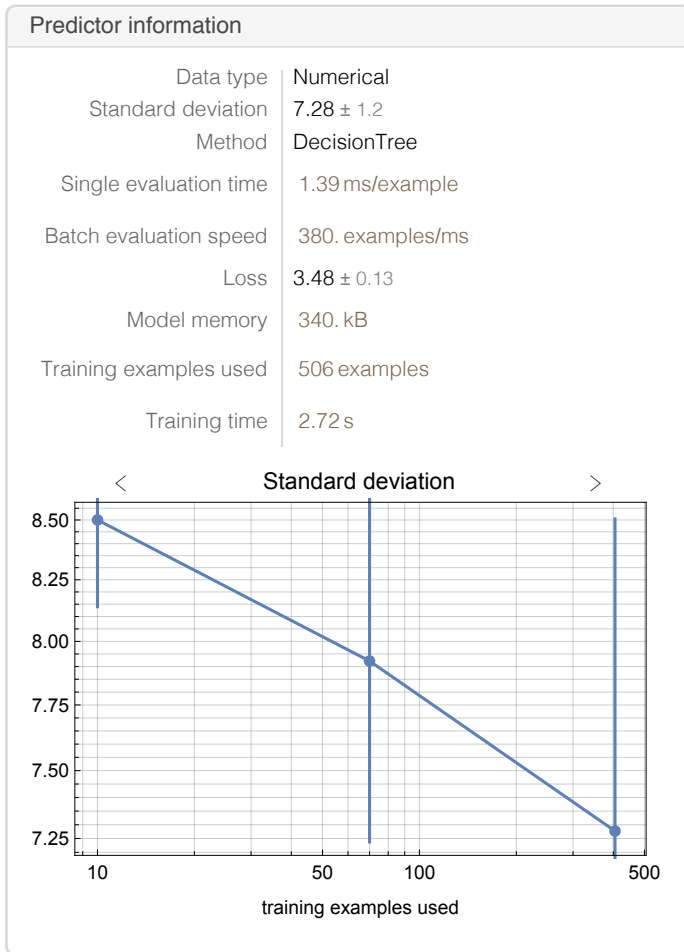
CRIM	0.0294805
ZN	39.2945
INDUS	6.69036
CHAS	tract does not bound Charles river
NOX	0.393033 ppm
RM	5.97433
AGE	25.5017
DIS	7.44537
RAD	-1.27121
TAX	267.853
PTRATIO	17.3348
BLACK	347.498
LSTAT	8.34849%
MEDV	17.3722

Out[ ]= 11.6543%

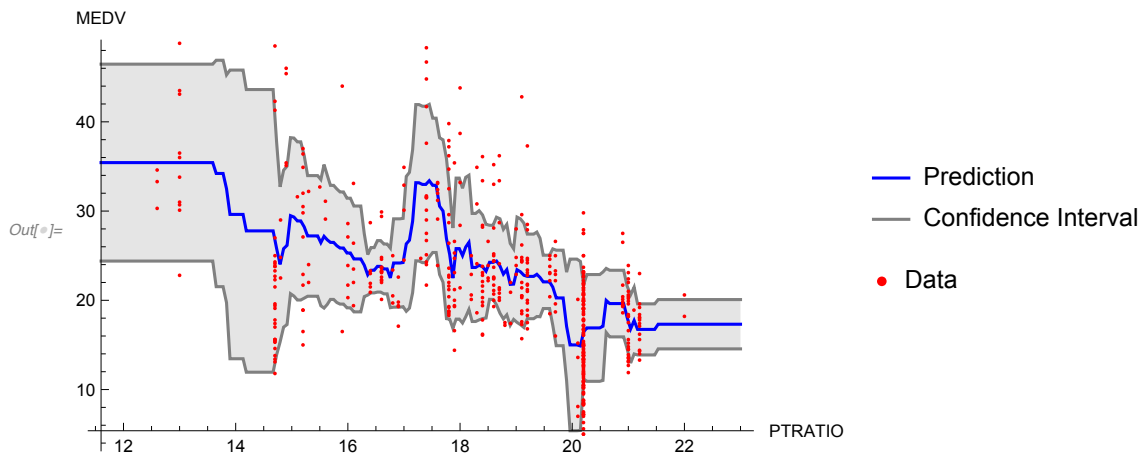
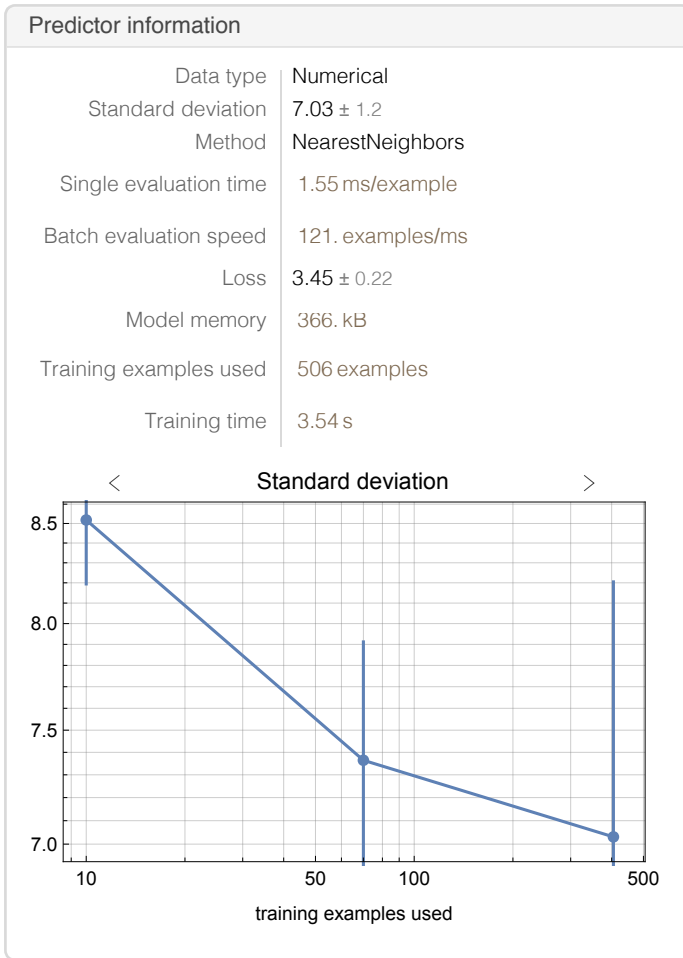
CRIM	-0.279585
ZN	104.336
INDUS	2.96985
CHAS	tract does not bound Charles river
NOX	0.37455 ppm
RM	7.47729
AGE	22.3205
DIS	6.59823
RAD	2.74974
TAX	302.073
PTRATIO	15.2284
BLACK	378.118
LSTAT	8.56842%
MEDV	37.2384

Out[ ]= 5.51906%

# Dependency: AGE vs. MEDV

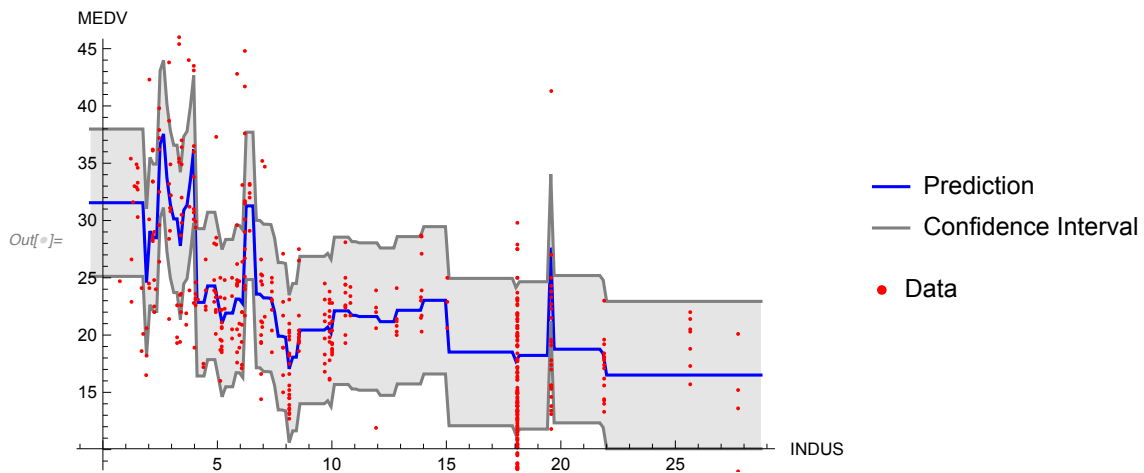
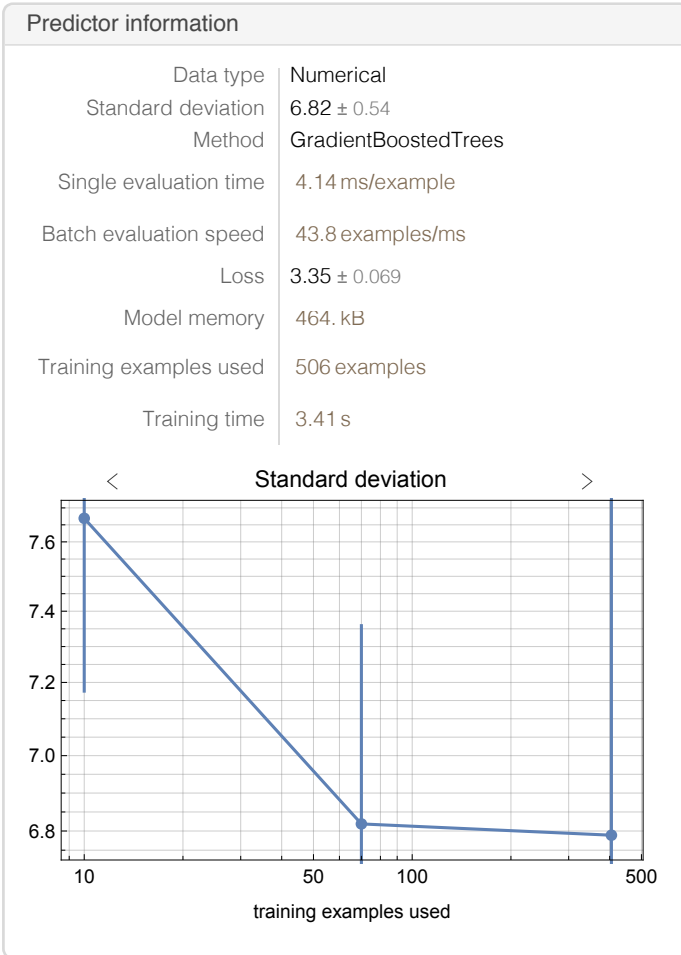


# Dependency: PTRATIO vs. MEDV

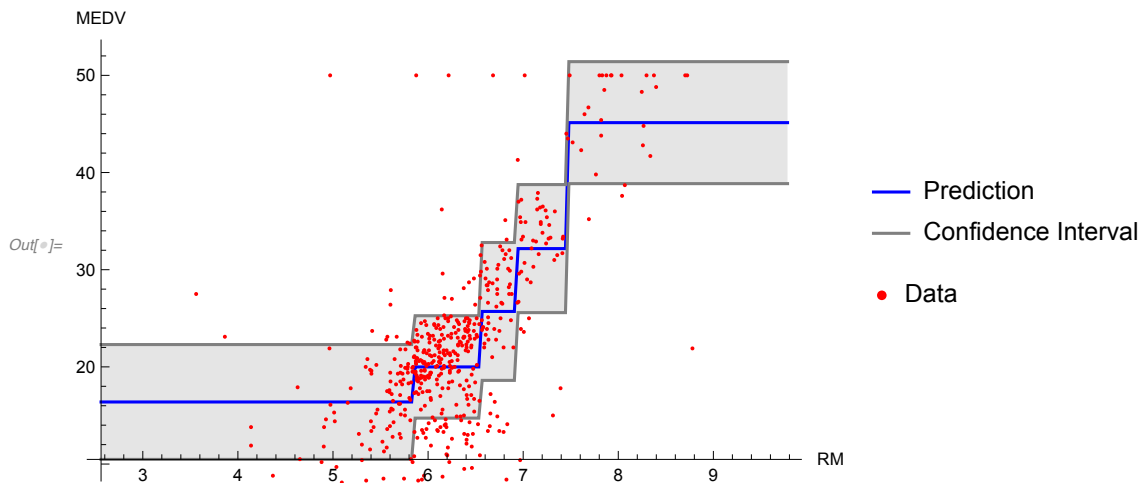
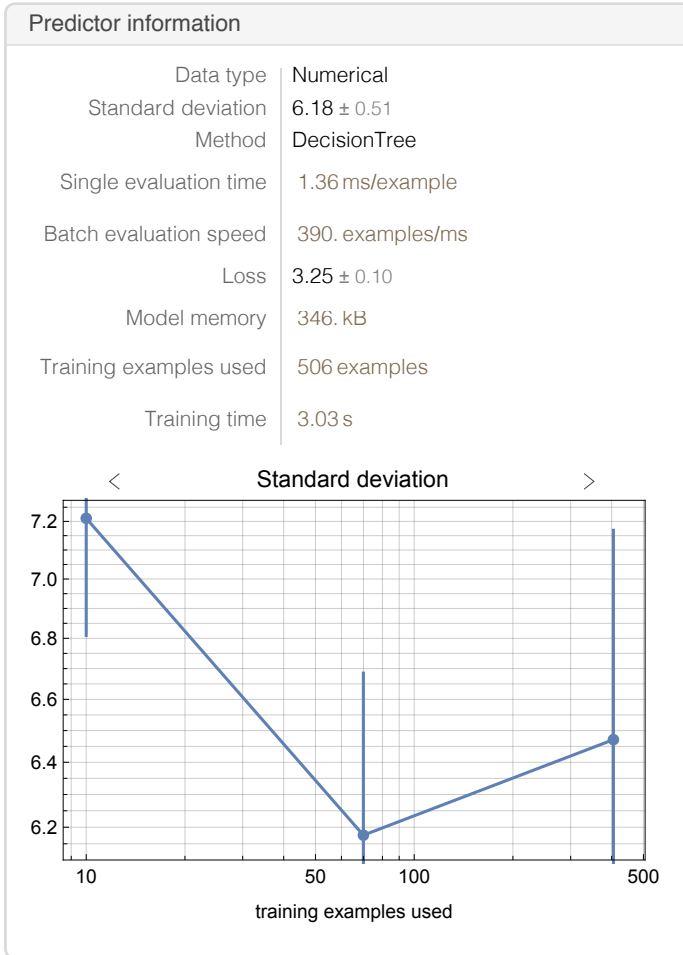


# Dependency: INDUS vs. MEDV

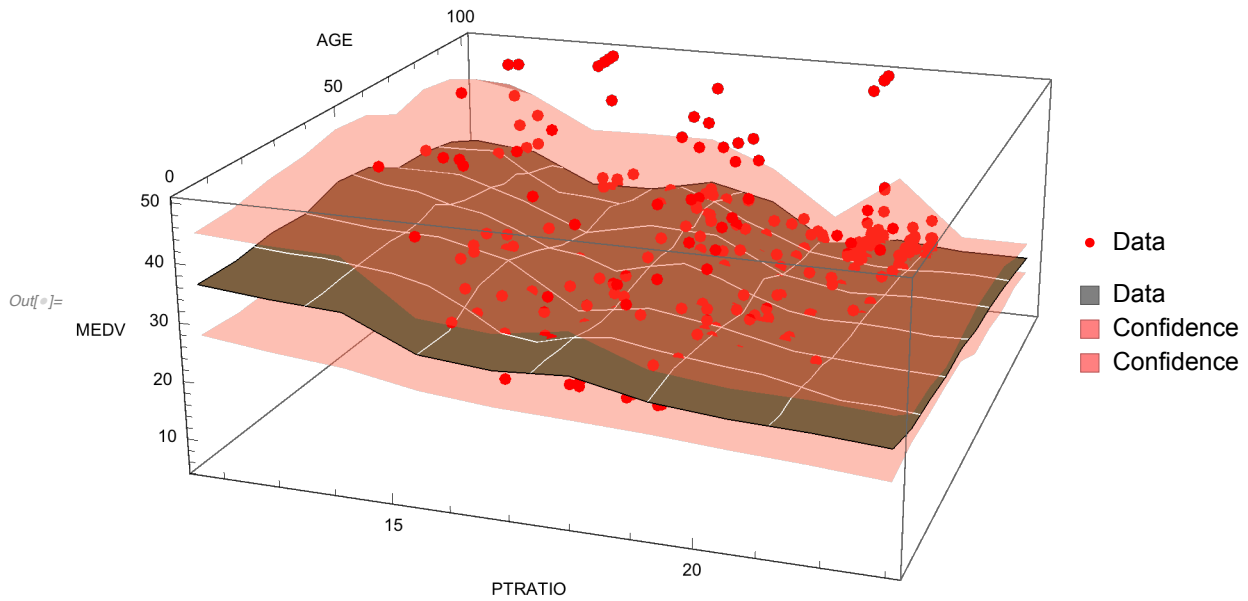
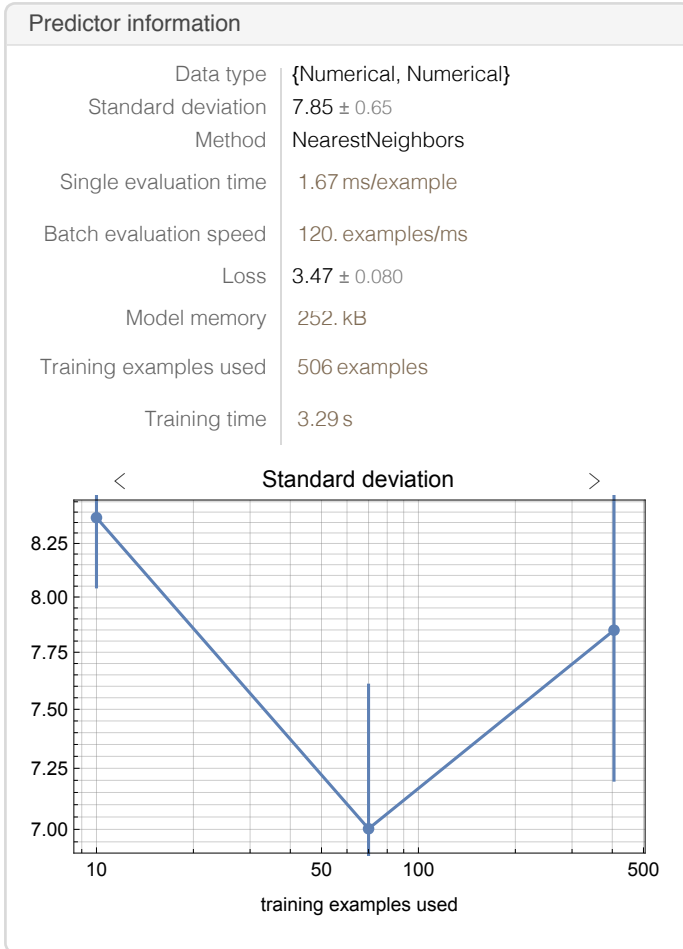




# Dependency: RM vs. MEDV



Dependency: PTRATIO + AGE vs.  
MEDV



**Dependency: RM + AGE vs. MEDV**

