AutoRecSys vs AutoML on MovieLens-100k dataset

Vamsi Gunturi
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The research goal of this study is to identify how well AutoRecSys tools perform compared to AutoML tools, when used on MovieLens 100K recommendation systems dataset [6].

For this study, we did analysis on following AutoML and AutoRec libraries,

- Auto-surprise [1]
- Auto-sklearn [3] [2]
- TPOT [7]
- Auto-Keras [4]
- H2O Auto ML [5]

1 Baseline using Scikit-learn

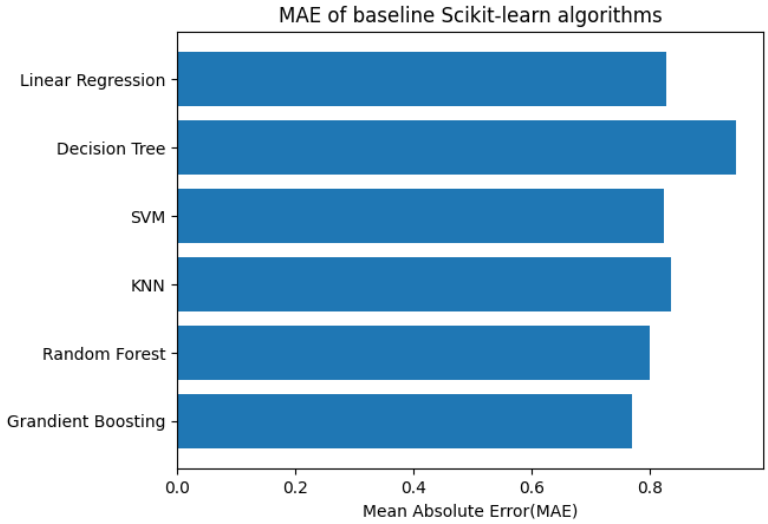

Figure 1.1:

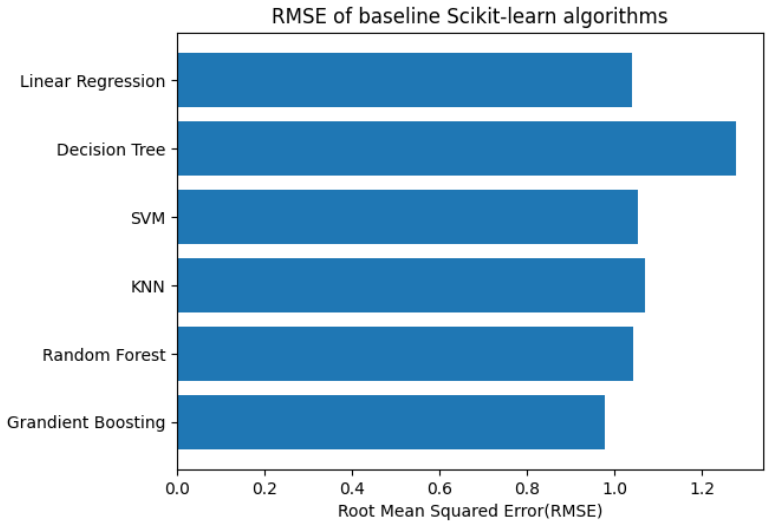

Figure 1.2:

Gradient Boosting is the best performing algorithm with Root mean squared error(RMSE) as **0.9778** and Mean absolute error(MAE) as **0.7708**

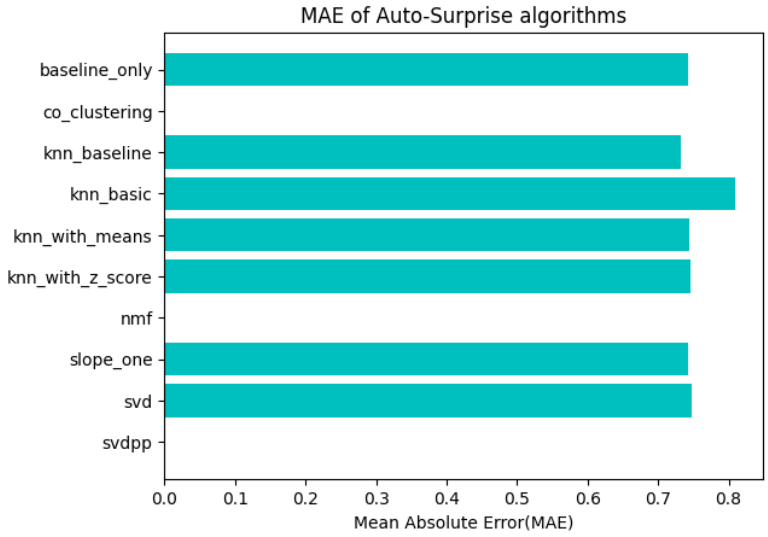

Figure 2.1:

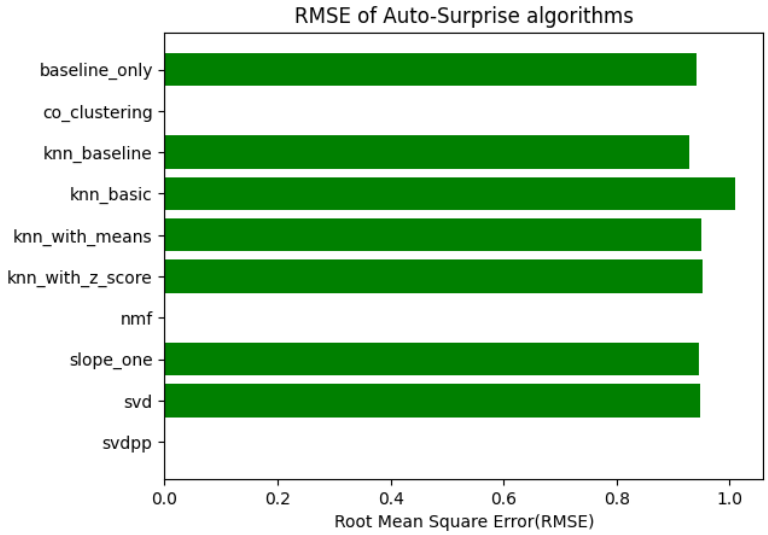

Figure 2.2:

knn_baseline is the best performing algorithm with Root mean squared error(RMSE) as **0.9279** and Mean absolute error(MAE) as **0.7315**

3 Comparison of Auto-Surprise with AutoML libraries

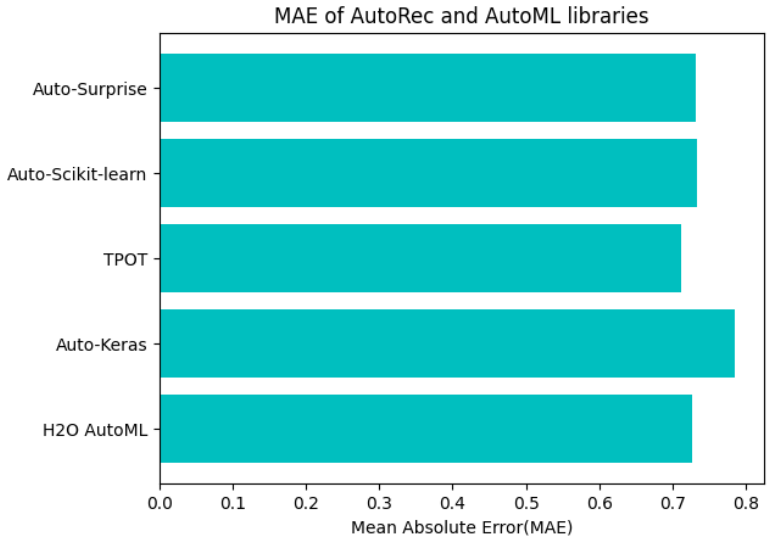

Figure 3.1:

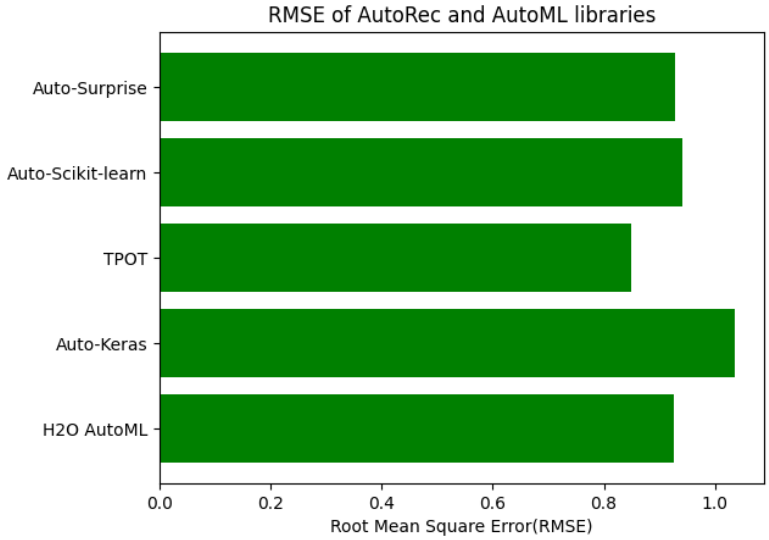

Figure 3.2:

As we can observe, **TPOT** library has the best performance with RMSE as **0.8491** and MAE as. **0.7112**, compared to other AutoML libraries and Auto-surprise but by very less margins.

4 H20 AUTOML LEADER BOARD

model_id	mean_residual_deviance	rmse	mse	mae	rmsle
StackedEnsemble_AllModels_AutoML_20210115_191607	0.858878	0.926757	0.858878	0.726354	0.247382
StackedEnsemble_BestOfFamily_AutoML_20210115_191607	0.867075	0.931168	0.867075	0.723846	0.24995
XGBoost_grid__1_AutoML_20210115_191607_model_1	0.877164	0.93657	0.877164	0.731772	0.251504
GBM_4_AutoML_20210115_191607	1.03747	1.01856	1.03747	0.811097	0.271089
GBM_3_AutoML_20210115_191607	1.04534	1.02242	1.04534	0.814428	0.271873
GBM_5_AutoML_20210115_191607	1.05093	1.02515	1.05093	0.816439	0.272812
GBM_grid__1_AutoML_20210115_191607_model_1	1.05216	1.02575	1.05216	0.816484	0.272803
GBM_2_AutoML_20210115_191607	1.05791	1.02855	1.05791	0.818203	0.273351
GBM_1_AutoML_20210115_191607	1.07241	1.03557	1.07241	0.823277	0.274831
GLM_1_AutoML_20210115_191607	1.08146	1.03993	1.08146	0.827454	0.275764

Figure 4.1:

```
MSE: 0.8588780678874272
RMSE: 0.9267567468799065
MAE: 0.7263537121139809
RMSLE: 0.2473816420314158 3
R^2: 0.2069012529085094 7
Mean Residual Deviance: 0.8588780678874272
Null degrees of freedom: 20192
Residual degrees of freedom: 20186
Null deviance: 21868.68751719775
Residual deviance: 17343.324824850817
AIC: 54249.32456439552
```

Figure 4.2: H2O AutoML Metrics

REFERENCES

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