Report: Predict Bike Sharing Demand with AutoGluon Solution
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Initial Training
What did you realize when you tried to submit your predictions? What changes were needed to the output of the predictor to submit your results?
TODO:
Negative values are not accepted, we should ensure that all "count" values are not less than zero.

What was the top ranked model that performed?
TODO:
The top ranked model that performed is WeightedEnsemble_L3

Exploratory data analysis and feature creation
What did the exploratory analysis find and how did you add additional features?
TODO:
The exploratory analysis:
"datetime" feature have turned into datetime type.
"season", "weather", "holiday" , "workingday" turned into category

The Added additional features are:
"year", "month", "day" and "hour" features
"rush_hour_categ" that categorizes morning, lunch, and evening rush hour, 7-9am, 11am-1pm, and 5-6pm.
"temp_categ" categorizes hot/cold/mild temps from temp.
"atemp_categ" categorizes hot/cold/mild temps from atemp.
"wind_categ" categories very windy/mild wind.
"humidity_categ" categories very humid/ not humid.
then one hot encoding for all the previous categorical data,
then drop the old features
For both train and test dataframes.

How much better did your model preform after adding additional features and why do you think that is?
TODO:
before additional features The RMSE = 1.79707
after feature addition RMSE = 0.5059
features addition enhanced the RMSE

Hyper parameter tuning
How much better did your model preform after trying different hyper parameters?
TODO:
i tried two options:
Option 1 : change the individual model hyperparameters.
Option 2: change the AutoGluon higher level parameters
both cases i got score of 0.70521

If you were given more time with this dataset, where do you think you would spend more time?
TODO:
Examine extra models individually (XGBoost, NN, ..) ,
Examine other AutoGluon higher level parameters to have a clear idea about its direct impact.

Create a table with the models you ran, the hyperparameters modified, and the kaggle score.

model	hpo1 num_bag_folds	hpo2(num_bag_sets	hpo3(num_stack_levels	Kaggle score
initial	8	1	3	1.79707
add_features	8	1	3	0.5059
hpo	10	20	5	0.70521

Create a line plot showing the top model score for the three (or more) training runs during the project.
Create a line plot showing the top kaggle score for the three (or more) prediction submissions during the project.
TODO:

model	model _ score	kaggle_score
initial	-53.170359	1.79563
add_features	-37.899969	0.5059
hpo	-37.958752	0.70521
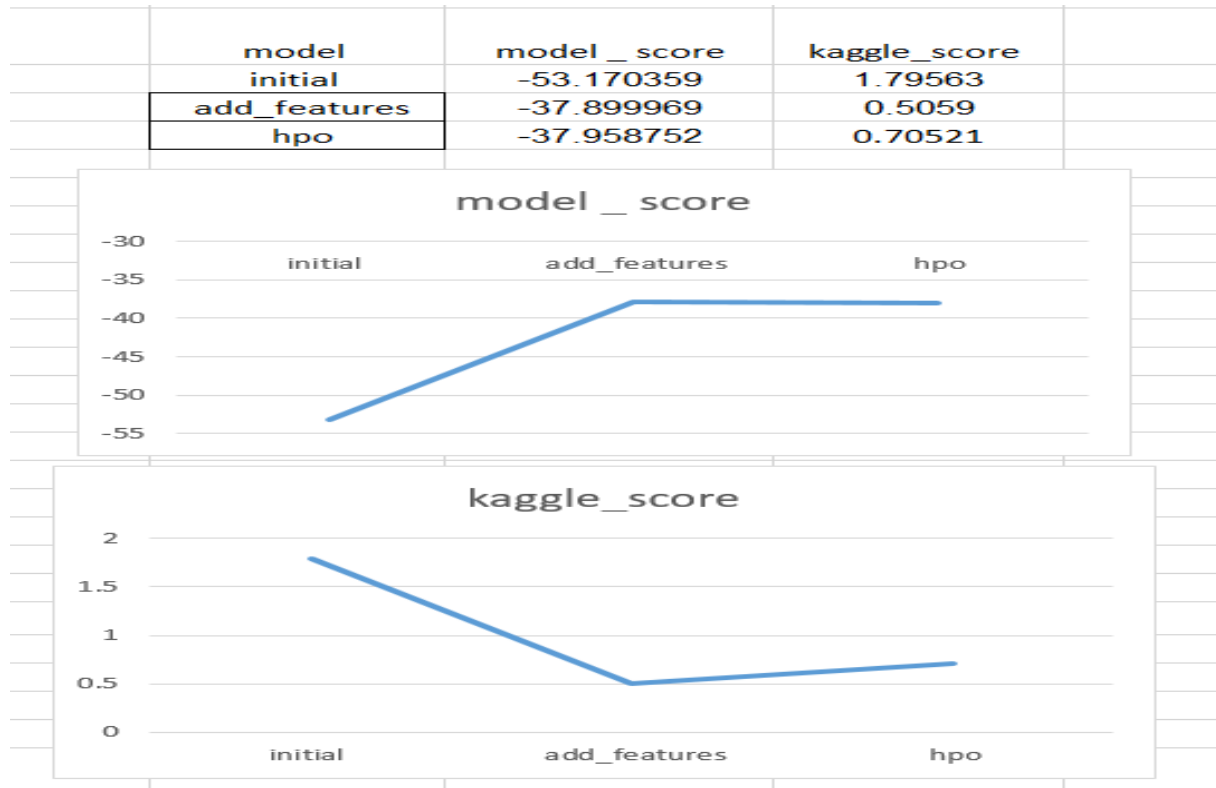
Summary
TODO:
It is a regression problem AutoGluon correctly recognized it,

The evaluation metric is "root_mean_squared_error", Best performed algorithm is "WeightedEnsemble_L3", the negative values of the validation RMSE means RMSE need to be minimized.

RMSE score enhanced by adding additional features as category and one hot encoding,

Arguments to fit that could be tunned are: hyperparameter_tune_kwargs, hyperparameters, num_stack_levels, num_bag_folds, num_bag_sets.

Although AutoGluon-Tabular can be used with model tuning, its design can deliver good performance using stacking and ensemble methods, meaning hyperparameter optimization is not necessary. Rather than focusing on model tuning, AutoGluon-Tabular succeeds by stacking models in multiple layers and training in a layer-wise manner.