

HAMMEROFLIGHT

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INSTRUCTIONS FOR INSTALLATION FOR FIRST TIME:

Any one of the following methods can be chosen. The most preferred way is direct installation from the Jupyter Notebook. (Note that the '!' must be used before pip without spaces as shown.)

1. **In command prompt:** pip install hammeroflight
2. **In Jupyter Notebook:** !pip install hammeroflight
3. **In Anaconda Powershell prompt:** pip install hammeroflight

INSTRUCTIONS FOR INSTALLING AND UPGRADE:

1. **In command prompt:** pip install hammeroflight==x.x.x (Version Number)
2. **In Jupyter Notebook:** !pip install hammeroflight==x.x.x
3. **In Anaconda Powershell prompt:** pip install hammeroflight==x.x.x

**The latest Version Number is written in the Header Section, or can be found in the README.txt

** Follow Github to know version number.

DEMO OF SOME AVAILABLE FUNCTIONS:

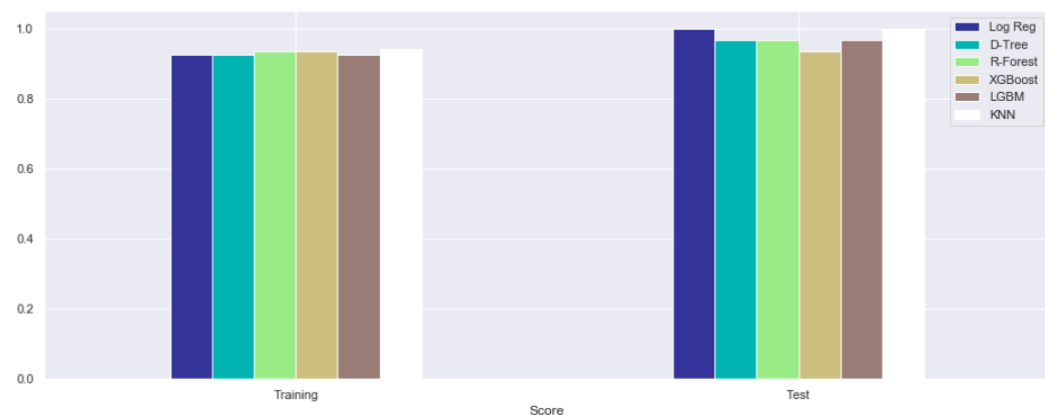
HAMMEROFLIGHT.MODELCOMPARATOR

CLF_COMPARATOR()

```
In [8]: from hammeroflight.modelcomparator import clf_comparator
clf_comparator(X_train, X_test, y_train, y_test, 10)
```

Out[8]:

	Log Reg	D-Tree	R-Forest	XGBoost	LGBM	KNN
Score						
Training	0.925	0.925000	0.933333	0.933333	0.925000	0.941667
Test	1.000	0.966667	0.966667	0.933333	0.966667	1.000000



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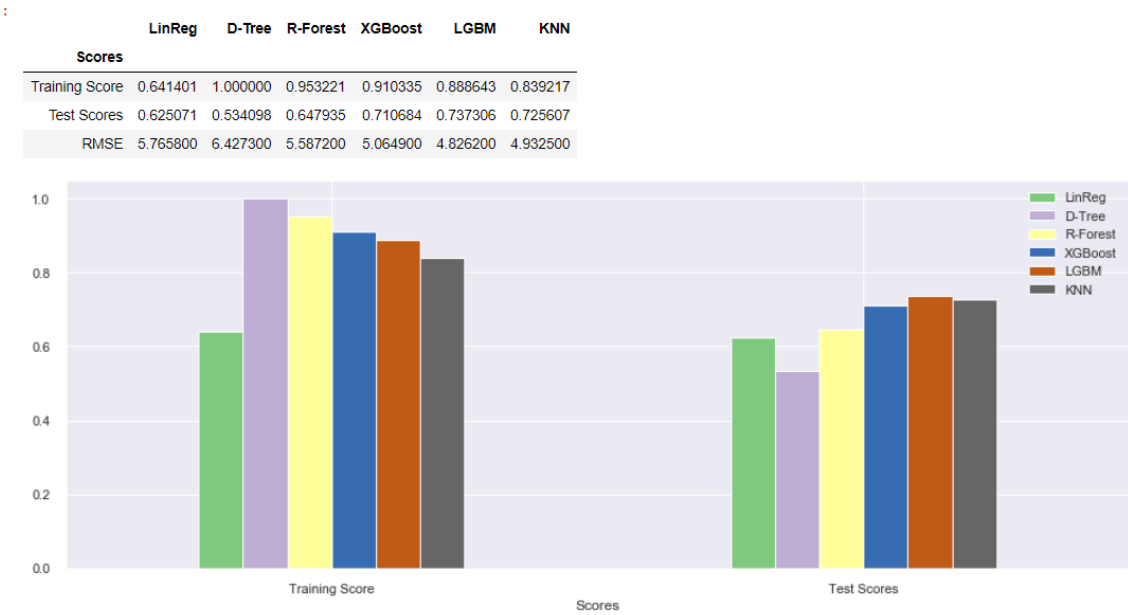
HAMMEROFLIGHT.MODELCOMPARATOR

REG_COMPARATOR()

```
: from hammeroflight.modelcomparator import reg_comparator
: from hammeroflight.modelfitter import fit_regress

: reg_comparator(X_train, X_test, y_train, y_test)

[12:00:11] WARNING: C:/jenkins/workspace/xgboost-win64_release_0.90/src/objective/regression_obj.cu:152: reg:linear is now deprecated in favor of reg:squarederror.
```



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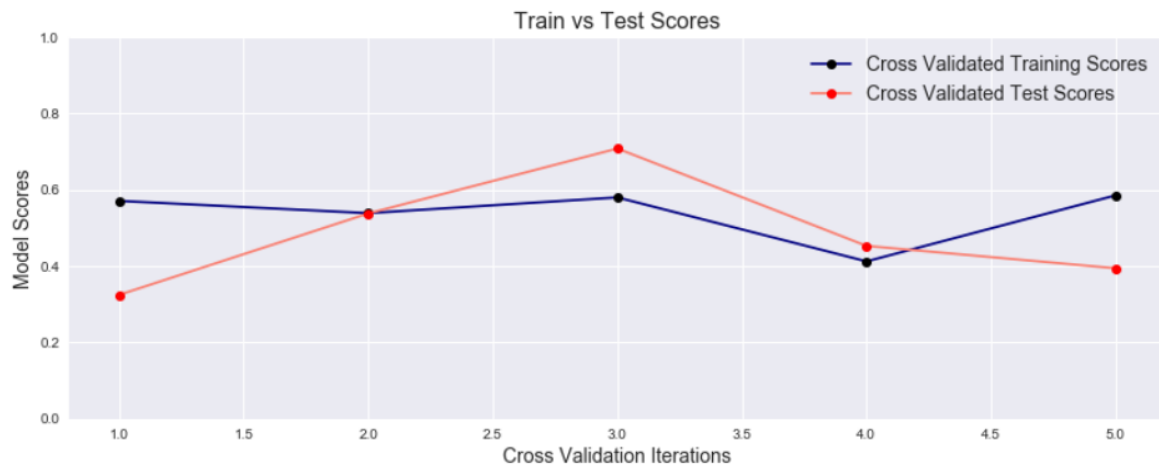
HAMMEROFLIGHT.MODEL FITTER

RUN_REGRESSOR()

```
from lightgbm import LGBMRegressor
from sklearn.linear_model import LinearRegression
lr = LinearRegression()
lg = LGBMRegressor(learning_rate=0.01)
run_regressor(lr, X_train, X_test, y_train, y_test, 5)
```

Predictions stored in global variable "pred".

Score	
CV Training Score	53.7573
CV Test Score	48.3721
RMSE	6.23072
MAE	4.5521
MAPE %	22.7647
Fit Over-Fitted	



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HAMMEROFLIGHT.MODEL FITTER

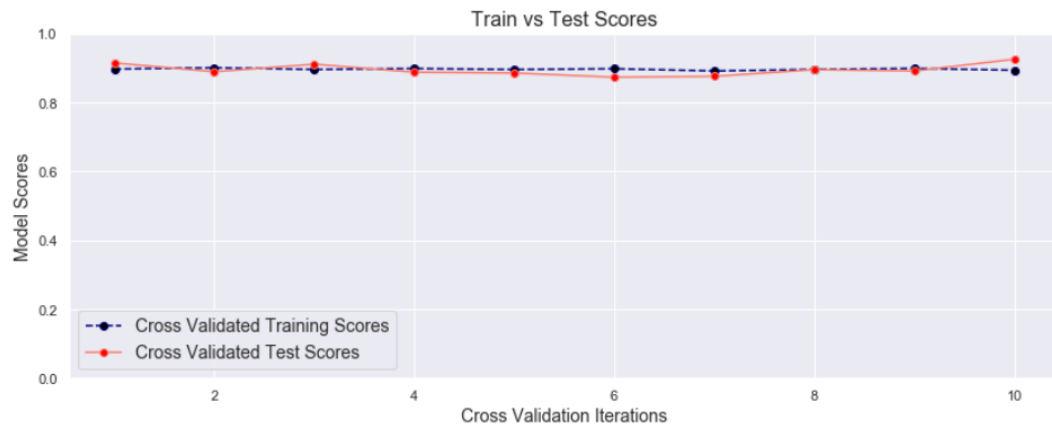
RUN_CLASSIFIER()

```
In [22]: from hammeroflight.modelfitter import run_classifier
from sklearn.ensemble import RandomForestClassifier
rf = RandomForestClassifier(n_estimators=20)
run_classifier(rf, X_train, X_test, y_train, y_test, 10)
```

Predictions stored in global variable "pred".

Out[22]:

Score	
CV Training Score	89.5842
CV Test Score	89.4153
Precision	0.868108
Recall	0.894638
F1-Score	0.249601
Fit	Good Fit



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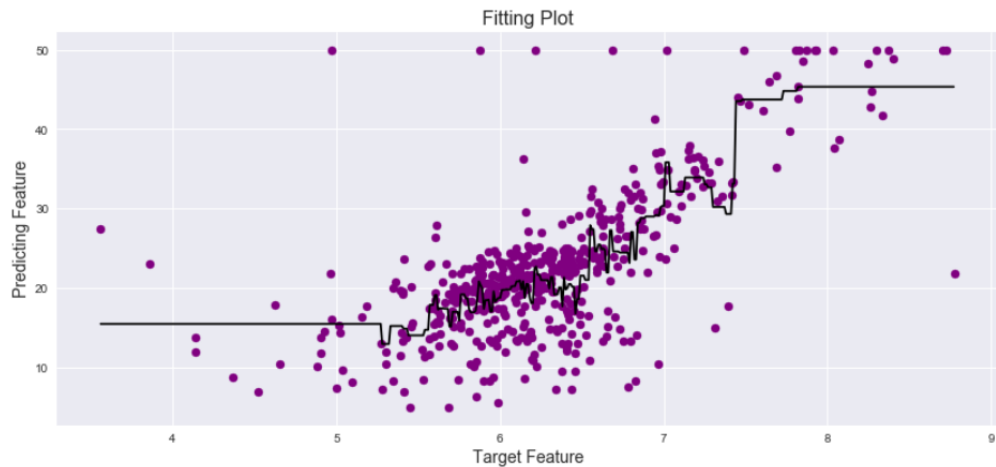
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HAMMEROFLIGHT.PLOTTER

FITTINGPLOT()

```
In [28]: A = df['RM']  
b = df['MEDV']  
  
A = np.asarray(A).reshape(-1,1)
```

```
In [29]: from hammeroflight.modelfitter import fittingplot  
fittingplot(lg, A, b)
```

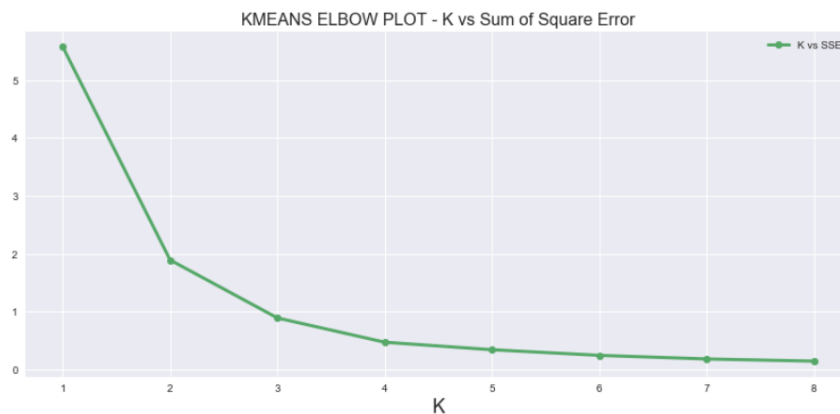


HAMMEROFLIGHT.MODELITTER

KMEANS_KFINDER()

```
In [9]: from hammeroflight.modelfitter import kmeans_kfinder
```

```
In [11]: kmeans_kfinder(df1)
```



K value seems best at 2 - 4. We will test clustering for all three values.

Elbow Plot to determine best value of K in KMeans Clustering (Unsupervised Learning)

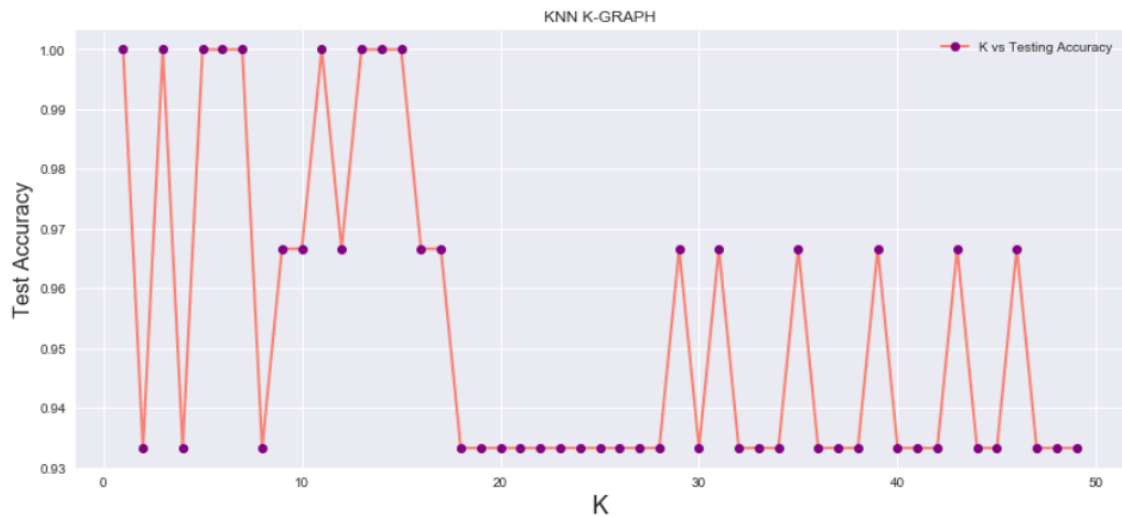
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HAMMEROFLIGHT.MODELFITTER

KNN_KFINDER()

```
: from hammeroflight.modelfitter import knn_kfinder  
k = knn_kfinder(X_train, X_test, y_train, y_test, 1, 50)
```



Graph to display best Values of K. In this case, K is best between 13 and 17 as further down the test accuracy fluctuates below 0.97.

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HAMMEROFLIGHT.ARUFUNCTIONS

QUALITYREPORT()

Best used as from hammeroflight.arufunctions import qualityreport as qr

```
from hammeroflight.arufunctions import qualityreport, cleanandencode, featureselector
from hammeroflight.modelfitter import fit_classify, fittingplot
from hammeroflight.modelcomparator import clf_comparator
```

Viewing Quality report of the dataset.
qualityreport(df)

Categorical Features: 9 | Numerical Features: 26 | Dataset Shape: (1470, 35) | DataSet Integrity: 100.0 %

	Dtype	Available Rows	Missing Values	Percent Missing	Mean-Mode	Min	Max	No. Of Uniques	Unique Values
Age	int64	1470	0	0.0	35	18	60	43	[41, 49, 37, 33, 27, 32, 59, 30, 38, 36, 35, 2...
Attrition	object	1470	0	0.0	No	No	Yes	2	[Yes, No]
BusinessTravel	object	1470	0	0.0	Travel_Rarely	Non-Travel	Travel_Rarely	3	[Travel_Rarely, Travel_Frequently, Non-Travel]
DailyRate	int64	1470	0	0.0	691	102	1499	886	[1102, 279, 1373, 1392, 591, 1005, 1324, 1358, ...]
Department	object	1470	0	0.0	Research & Development	Human Resources	Sales	3	[Sales, Research & Development, Human Resources]
DistanceFromHome	int64	1470	0	0.0	2	1	29	29	[1, 8, 2, 3, 24, 23, 27, 16, 15, 26, 19, 21, 5...
Education	int64	1470	0	0.0	3	1	5	5	[2, 1, 4, 3, 5]
EducationField	object	1470	0	0.0	Life Sciences	Human Resources	Technical Degree	6	[Life Sciences, Other, Medical, Marketing, Tec...
EmployeeCount	int64	1470	0	0.0	1	1	1	1	[1]
EmployeeNumber	int64	1470	0	0.0	1	1	2068	1470	[1, 2, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16, ...]
EnvironmentSatisfaction	int64	1470	0	0.0	3	1	4	4	[2, 3, 4, 1]

HAMMEROFLIGHT.ARUFUNCTIONS

IMPUTE_ENCODE()

	Emp_ID	Name	Age	Income	Department	Posting
0	P001	Aru	35	11000.0	AI	Tier 1
1	P002	Mahesh	28	6000.0	Sales	Tier 2
2	P003	Ranjit	36	9000.0	ML	NaN
3	P004	Abhishek	34	8700.0	Marketing	Tier 2
4	P005	Supriya	36	13000.0	Top Management	Tier 1

```
from hammeroflight.arufunctions import impute_encode
df = impute_encode(df)
df.head()
```

	Age	Income	Department	Posting
0	35	11000.0	AI	0
1	28	6000.0	Sales	1
2	36	9000.0	ML	0
3	34	8700.0	Marketing	1
4	36	13000.0	Top Management	0

EMP_ID dropped

Posting Label Encoded

Department not touched

Missing Values imputed by mean/mode

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With Dummy set to true: All the remaining unencoded variables are transformed to One Hot Encoded, drop_first=True.

IMPUTE_ENCODE (dummy=True)

```
: df = impute_encode(df, dummy=True)
df.head()
```

	Age	Income	Posting	Department_Assistant	Department_ML	Department_Marketing	Department_Sales	Department_Top Management
0	35	11000.0	0	0	0	0	0	0
1	28	6000.0	1	0	0	0	1	0
2	36	9000.0	0	0	1	0	0	0
3	34	8700.0	1	0	0	1	0	0
4	36	13000.0	0	0	0	0	0	1

```
: qr(df)
```

Categorical Features: 0 | Numerical Features: 8 | Dataset Shape: (19, 8) | DataSet Integrity: 100.0 %

	Dtype	Available Rows	Missing Values	Percent Missing	Mean-Mode	Min	Max	No. Of Uniques	Unique Values
Age	int64	19	0	0.0	37.315789	28.0	63.0	13	None
Income	float64	19	0	0.0	9508.333333	3400.0	22000.0	18	None
Posting	int32	19	0	0.0	0.736842	0.0	2.0	3	None
Department_Assistant	uint8	19	0	0.0	0.157895	0.0	1.0	2	None
Department_ML	uint8	19	0	0.0	0.263158	0.0	1.0	2	None
Department_Marketing	uint8	19	0	0.0	0.105263	0.0	1.0	2	None
Department_Sales	uint8	19	0	0.0	0.157895	0.0	1.0	2	None
Department_Top Management	uint8	19	0	0.0	0.157895	0.0	1.0	2	None

OTHER USEFUL FUNCTIONS:

1. `featureselector()` – Correlation based Feature Selector for ML algorithms
2. `arima_ordertuner()` – p, d, q values for ARIMA forecasting model hypertuning.
3. `plot_forecast()` – Forecast plotting of Truth and Predicted Values
4. `cleanandencode()` – Similar to `Impute_Encode` except no imputation of NaNs.