
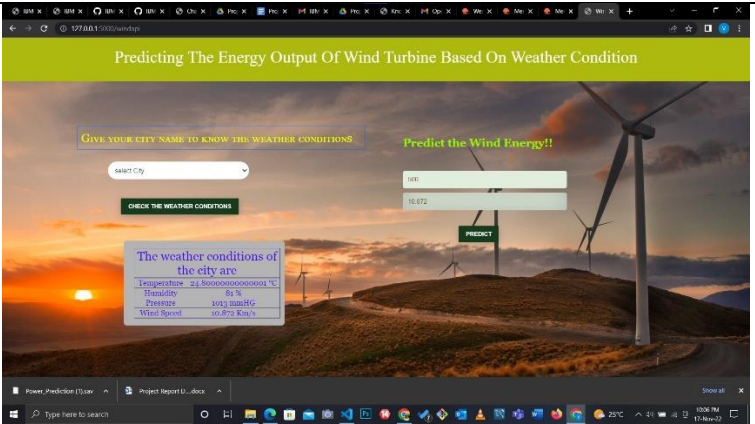


## Project Development Phase Model Performance Test

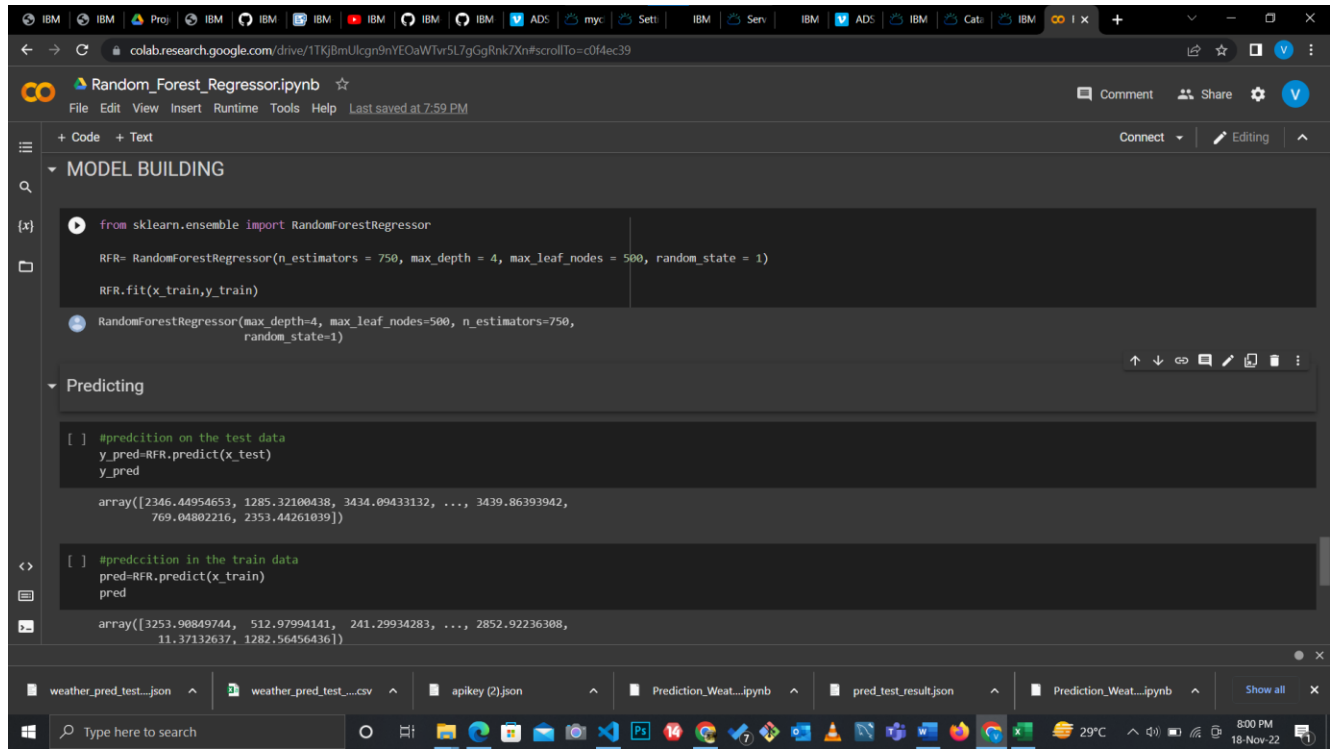
Date	17 November 2022
Team ID	PNT2022TMID21439
Project Name	Predicting the energy output of wind turbine based on weather condition
Maximum Marks	10 Marks

### Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Values	Screenshot
1.	Metrics	<p><b>Regression Model:</b> MAE – 0.6, MSE – 0.3, RMSE – 0.4, R2 score – 0.7</p> <p><b>Classification Model:</b> Confusion Matrix - 4, Accuracy Score- 85 &amp; Classification Report -</p>	
2.	Tune the Model	<p>Hyperparameter Tuning – 0.6 Validation Method – 0.8</p>	

## Performance Testing: Regression Model:



The screenshot shows a Google Colab notebook titled "Random\_Forest\_Regressor.ipynb". The notebook is divided into two sections: "MODEL BUILDING" and "Predicting".

**MODEL BUILDING**

```
from sklearn.ensemble import RandomForestRegressor

RFR= RandomForestRegressor(n_estimators = 750, max_depth = 4, max_leaf_nodes = 500, random_state = 1)

RFR.fit(x_train,y_train)
```

**Predicting**

```
[ ] #prediction on the test data
y_pred=RFR.predict(x_test)
y_pred

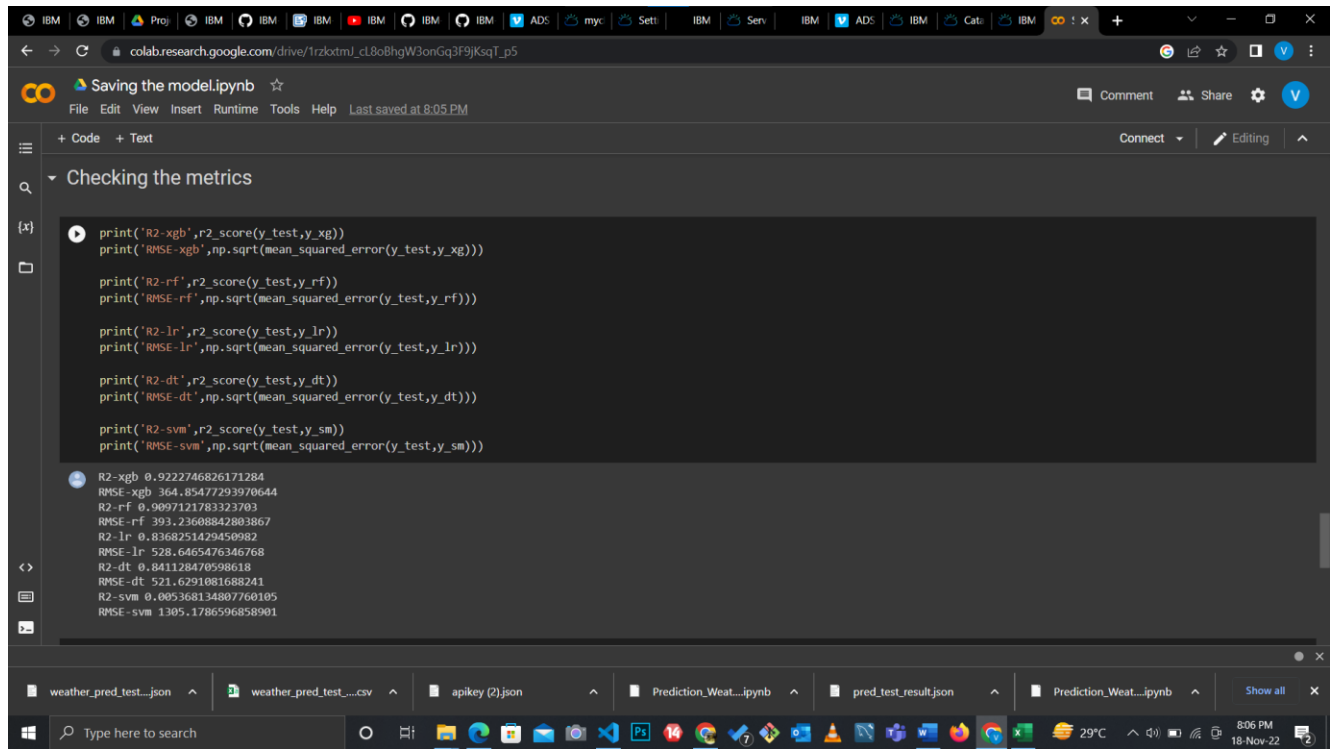
array([2346.44954653, 1285.32100438, 3434.09433132, ..., 3439.86393942,
       769.04802216, 2353.44261039])

[ ] #predccition in the train data
pred=RFR.predict(x_train)
pred

array([3253.90849744,  512.97994141,  241.29934283, ..., 2852.92236388,
       11.37132637, 1282.56456436])
```

The bottom of the notebook shows a file explorer with several files: weather\_pred\_test\_...json, weather\_pred\_test\_...csv, apikey (2).json, Prediction\_West\_...ipynb, pred\_test\_result.json, and Prediction\_West\_...ipynb.

## Evaluation Metrics: MAE - , MSE - , RMSE - , R2 score , Accuracy Score



The screenshot shows a Google Colab notebook titled "Saving the model.ipynb". The notebook is divided into a section titled "Checking the metrics".

**Checking the metrics**

```
print('R2-xgb',r2_score(y_test,y_xg))
print('RMSE-xgb',np.sqrt(mean_squared_error(y_test,y_xg)))

print('R2-rf',r2_score(y_test,y_rf))
print('RMSE-rf',np.sqrt(mean_squared_error(y_test,y_rf)))

print('R2-lr',r2_score(y_test,y_lr))
print('RMSE-lr',np.sqrt(mean_squared_error(y_test,y_lr)))

print('R2-dt',r2_score(y_test,y_dt))
print('RMSE-dt',np.sqrt(mean_squared_error(y_test,y_dt)))

print('R2-svm',r2_score(y_test,y_sm))
print('RMSE-svm',np.sqrt(mean_squared_error(y_test,y_sm)))
```

The output of the code shows the R2 score and RMSE for five different models: xgb, rf, lr, dt, and svm.

Model	R2 Score	RMSE
xgb	0.9222746826171284	364.85477293970644
rf	0.9097121783323703	393.23608842803867
lr	0.8368251429450982	528.6465476346768
dt	0.841128470598618	521.6291081688241
svm	0.005368134807760105	1305.1786596858901

The bottom of the notebook shows a file explorer with several files: weather\_pred\_test\_...json, weather\_pred\_test\_...csv, apikey (2).json, Prediction\_West\_...ipynb, pred\_test\_result.json, and Prediction\_West\_...ipynb.

colab.research.google.com/drive/1rzlotmJ\_cL8oBhgW3onGq3F9jKsqT\_p5

Saving the model.ipynb

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+ Code + Text

```
print('RMSE-uc',np.sqrt(mean_squared_error(y_test,y_uc)))

[ ]

print('R2-svm',r2_score(y_test,y_sm))
print('RMSE-svm',np.sqrt(mean_squared_error(y_test,y_sm)))

R2-xgb 0.9222746826171284
RMSE-xgb 364.85477293970644
R2-rf 0.9097121783323703
RMSE-rf 393.23608842803867
R2-lr 0.8368251429450982
RMSE-lr 528.6465476346768
R2-dt 0.841128470598618
RMSE-dt 521.6291081688241
R2-svm 0.805368134887760105
RMSE-svm 1305.1786596858901

# import pickle
# file_name = "xgb_reg.pkl"

## save
# pickle.dump(xgb_model, open(file_name, "wb"))

[ ]

model_xg.save_model('test_model.bin')

[ ]

data=[[5.311336,259.994904]]
df = pd.DataFrame(data, columns=[ 'WindSpeed(m/s)', 'WindDirection'])
xgr.predict(df)

array([348.26437], dtype=float32)
```

weather\_pred\_test.json weather\_pred\_test.csv apikey (2).json Prediction\_Weat...ipynb pred\_test\_result.json Prediction\_Weat...ipynb Show all

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