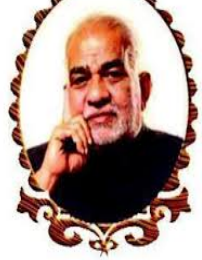
BVRIT HYDERABAD

College of Engineering for Women



PUBLIC BICYCLE RENTAL SYSTEM

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AGENDA

- Problem statement
- Python Packages used
- Algorithms used
- output
- Comparison table
- Execute the code

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Problem Statement

- You are provided hourly rental data spanning two years. The training set is comprised of the first 19 days of each month, while the test set is the 20th to the end of the month. You have to predict the total count of bikes rented during each hour covered by the test set, using only information available prior to the rental period.

  File descriptions:

  Train.csv- the training set

  Test.csv- the test set

  sample submission.csv - a sample submission file in the correct format

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Data fields

datetime - hourly date + timestamp
season - 1 = spring, 2 = summer, 3 = fall, 4 = winter
holiday - whether the day is considered a holiday
workingday - whether the day is neither a weekend nor holiday
weather - 1: Clear, Few clouds, Partly cloudy
2: Mist + Cloudy, Mist + Broken clouds, Mist + Few clouds, Mist
3: Light Snow, Rain + Thunderstorm , Rain + Scattered clouds
4: Heavy Rain + Ice Pallets + Thunderstorm + Mist, Snow + Fog
temp - temperature in Celsius
atemp - "feels like" temperature in Celsius
humidity - relative humidity
windspeed - wind speed
casual - number of non-registered user rentals initiated
registered - number of registered user rentals initiated
count - number of total rentals.

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Python Packages used

- numpy
- pandas
- seaborn
- sklearn
- matplotlib.pyplot
- traintestsplit
- metrics
- accuracy score

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Algorithm

- Linear Regression
- Random Forest Regression
- Light Gradient Boost Machine Regressor (LGBMR)
- Extreme Gradient Boost Regressor (XGBR)

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Linear Regression

Linear regression is one of the easiest and most popular Machine Learning algorithms. It is a statistical method that is used for predictive analysis. Linear regression makes predictions for continuous/real or numeric variables such as sales, salary, age, product price, etc. Linear regression algorithm shows a linear relationship between a dependent (y) and one or more independent (y) variables, hence called as linear regression. Since linear regression shows the linear relationship, which means it finds how the value of the dependent variable is changing according to the value of the independent variable.

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Random Forest Regression

Random Forest is a popular machine learning algorithm that belongs to the supervised learning technique. It can be used for both Classification and Regression problems in ML. It is based on the concept of ensemble learning, which is a process of combining multiple classifiers to solve a complex problem and to improve the performance of the model. Instead of relying on one decision tree, the random forest takes the prediction from each tree and based on the majority votes of predictions, and it predicts the final output. The greater number of trees in the forest leads to higher accuracy and prevents the problem of overfitting.

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Light Gradient Boost Machine Regressor

LightGBM is a gradient boosting framework used to process data faster and provides best accuracy. It can handle large datasets with less memory usage.It is used for regression,classification and other ML tasks. LGBM automatically takes care of the missing values. The feature that made choose the LGBM is EFB(Exclusive Feature Bundling) Technique. It puts two features together and bundles them into one single feature.

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Extreme Gradient Boost Regressor

Extreme Gradient Boost Regressor is a gradient boosting framework used to handle large datasets with less memory usage.Regression predictive modeling problems involve predicting a numerical value such as a dollar amount or a height. XGBoost can be used directly for regression predictive modeling. It is used for regression and classification. XGBM automatically takes care of the missing values . XGBM also used to removes the outliers.

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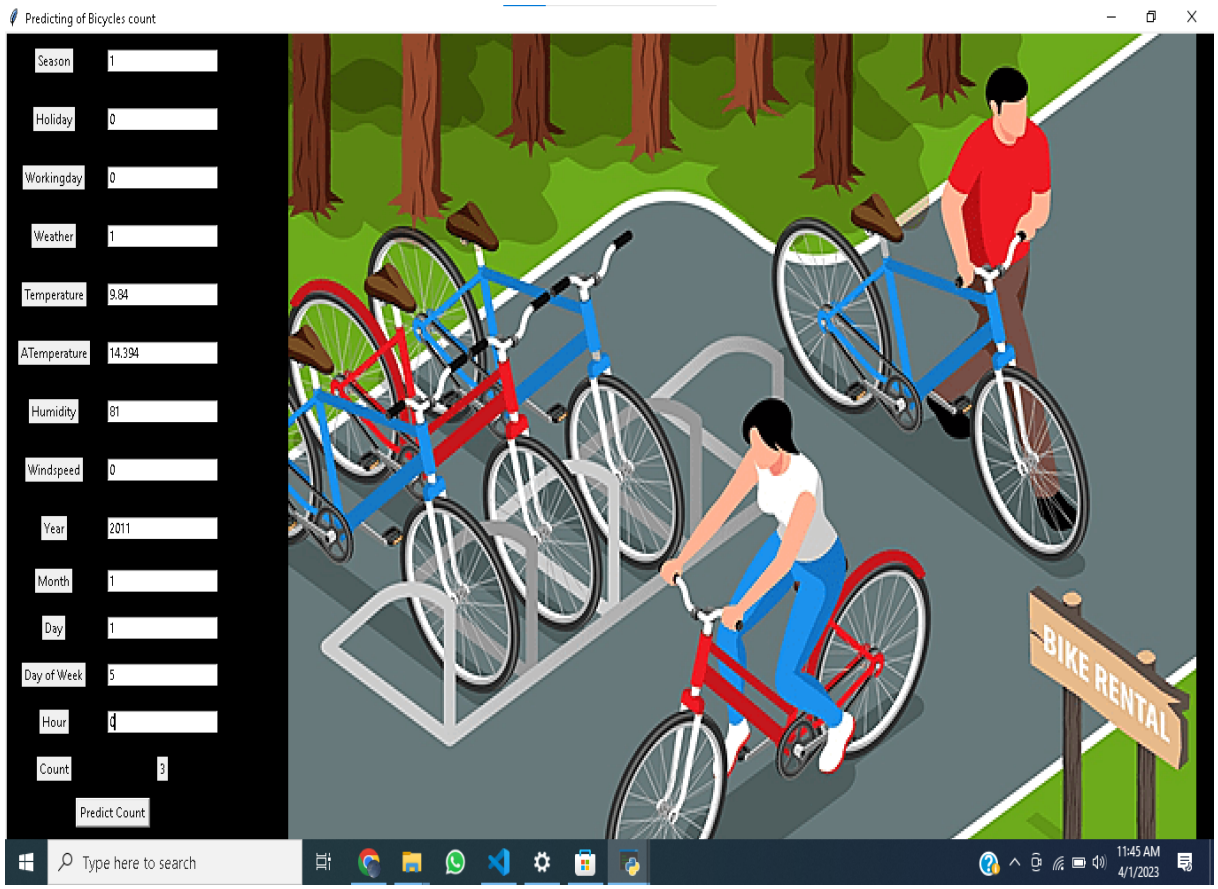
Output

index	datetime	count
0	2011-01-20 00:00:00	9.934380807573095
1	2011-01-20 01:00:00	5.0142538769864275
2	2011-01-20 02:00:00	3.869226312332251
3	2011-01-20 03:00:00	2.3134750442184684
4	2011-01-20 04:00:00	1.559393414202521
5	2011-01-20 05:00:00	4.845940192847102
6	2011-01-20 06:00:00	25.994110179152198
7	2011-01-20 07:00:00	70.43922680575201
8	2011-01-20 08:00:00	181.823473942108
9	2011-01-20 09:00:00	101.13073136982808
10	2011-01-20 10:00:00	56.21005310113282
11	2011-01-20 11:00:00	53.069655045278424
12	2011-01-20 12:00:00	71.73117344311058
13	2011-01-20 13:00:00	68.59554580884267
14	2011-01-20 14:00:00	64.46492836743994
15	2011-01-20 15:00:00	72.47037972564442
16	2011-01-20 16:00:00	101.62802793887464
17	2011-01-20 17:00:00	208.8212278882694
18	2011-01-20 18:00:00	176.14061352985988
19	2011-01-20 19:00:00	110.00733034751094
20	2011-01-20 20:00:00	88.7283703134452
21	2011-01-20 21:00:00	53.492952907694146
22	2011-01-20 22:00:00	37.145658396208574
23	2011-01-20 23:00:00	27.55217586083922
24	2011-01-21 00:00:00	11.990420608406541

Output


Predicting of Bicycles count
Season 1
Holiday 0
Workingday 0
Weather 1
Temperature 9.84
ATemperature 14.394
Humidity 81
Windspeed 0
Year 2011
Month 1
Day 1
Day of Week 5
Hour 0
Count 3
Predict Count
BIKE RENTAL
Type here to search
11:45 AM
4/1/2023

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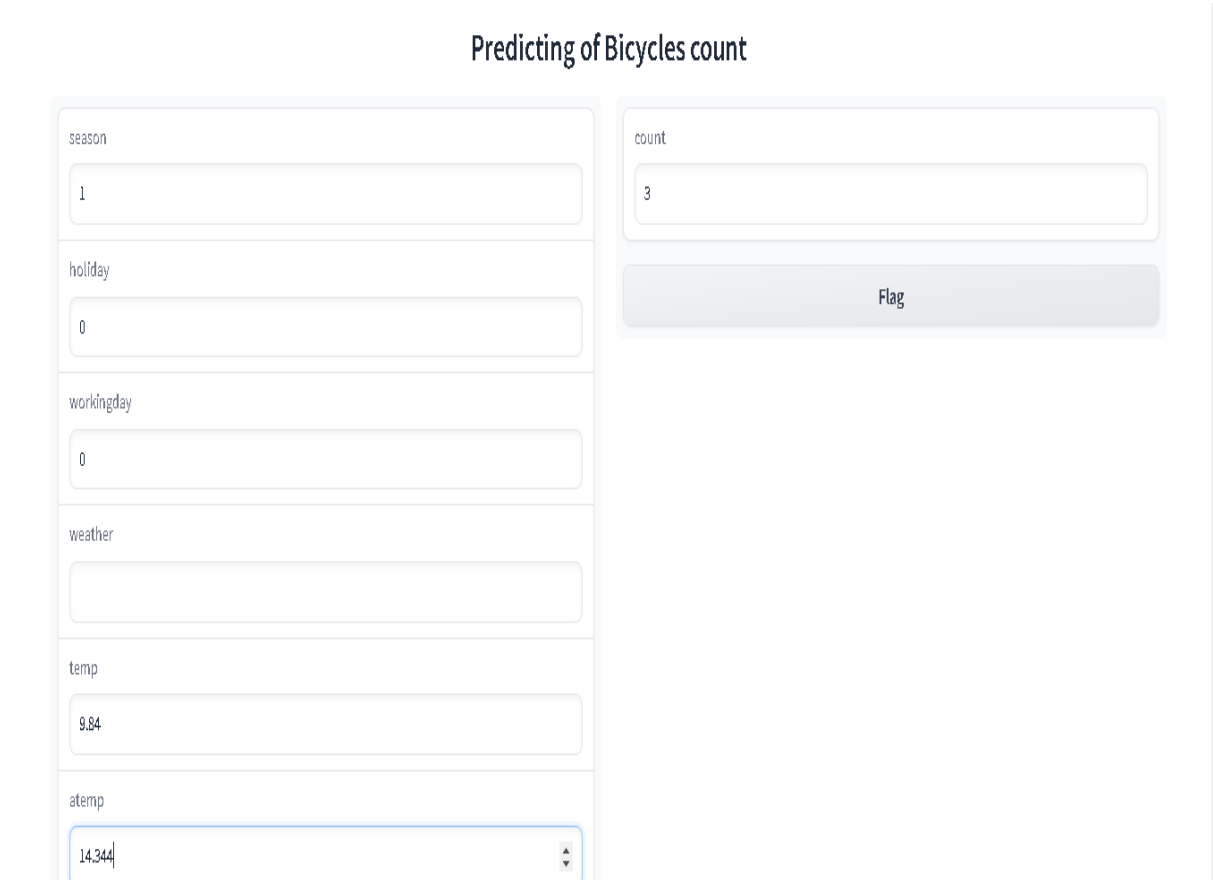
Comparison Table

	Model	Score	Grid Score
3	LGBMRegressor	0.953719	0.283811
2	XGBRegressor	0.953095	0.300864
1	RandomForest Regressor	0.947184	0.312967
0	Linear Regression	-0.096556	1.031411

EXECUTE CODE



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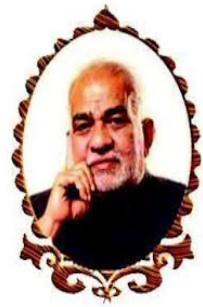

THANK YOU