DEMAND FORECASTING

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THE WAY TO GET STARTED IS TO QUIT TALKING AND BEGIN DOING.

Walt Disney

Agenda

Problem Statement

Data Description

Exploratory Data Analysis

Model Building

Summary

Problem Statement

ABC is a car rental company based out of Bangalore. It rents cars for both in and out stations at affordable prices. The users can rent different types of cars like Sedans, Hatchbacks, SUVs and MUVs, Minivans and so on.

In recent times, the demand for cars is on the rise. As a result, the company would like to tackle the problem of supply and demand. The ultimate goal of the company is to strike the balance between the supply and demand in order to meet the user expectations.

The company has collected the details of each rental. Based on the past data, the company would like to forecast the demand of car rentals on an hourly basis.

The main objective of the problem is to develop the machine learning approach to forecast the demand of car rentals on an hourly basis.

Data Description

Dataset

DATASET DESCRIPTION - OVERVIEW

Number of Variables	3
Number of Observations	18247
Missing Cell	0
Missing Cell (%)	0.0%
Duplicate Rows	0
Duplicate Rows (%)	0.0%
Numeric Variable	2
Categorical Variable	1

Dataset Description- Sample Data

First rows

	date	hour	demand
0	2018-08-18	9	91
1	2018-08-18	10	21
2	2018-08-18	13	23
3	2018-08-18	14	104
4	2018-08-18	15	81
5	2018-08-18	16	37
6	2018-08-18	17	27
7	2018-08-18	18	66
8	2018-08-18	19	80
9	2018-08-18	20	52

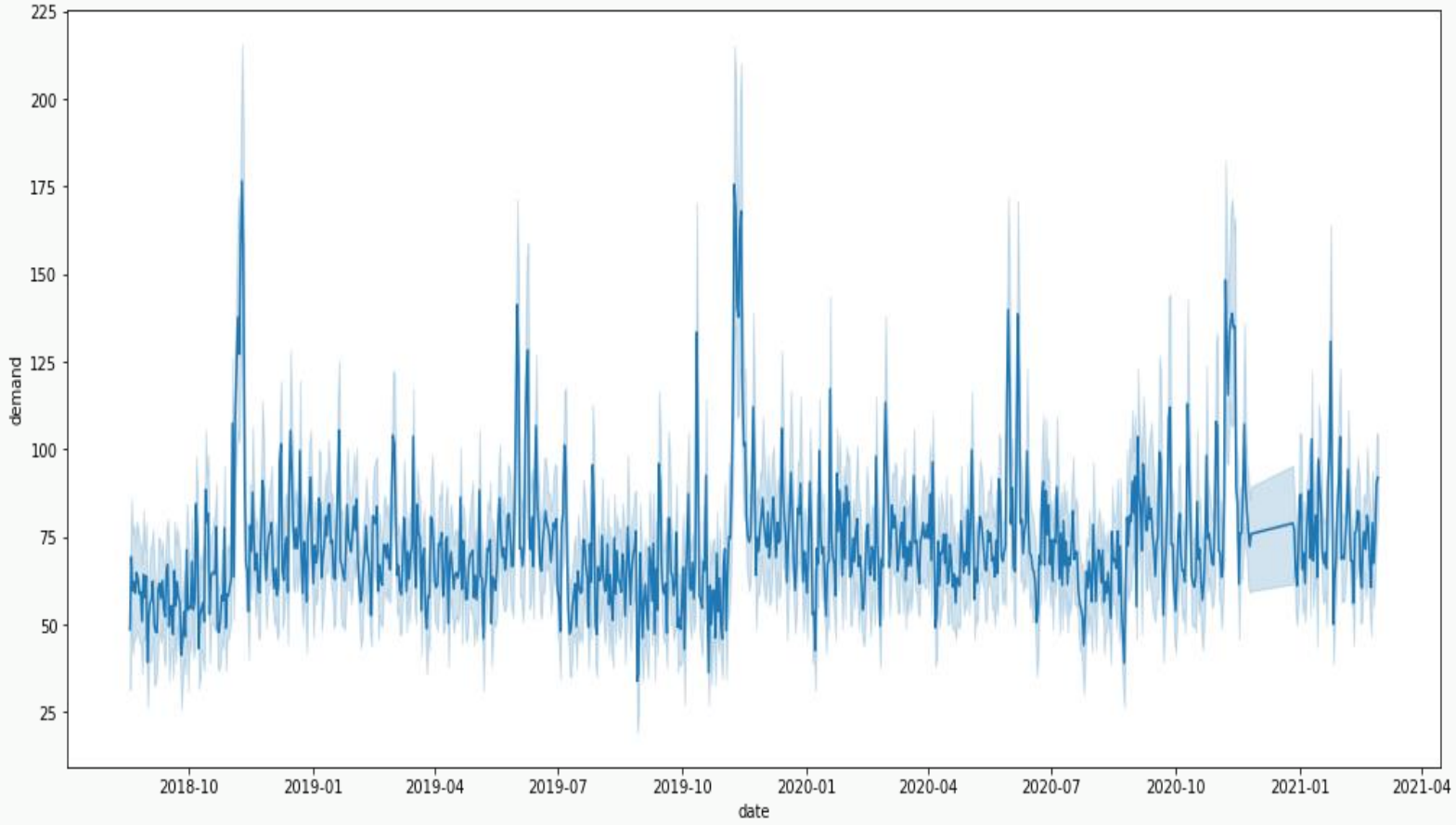
Exploratory Data Analysis

Data Visualization

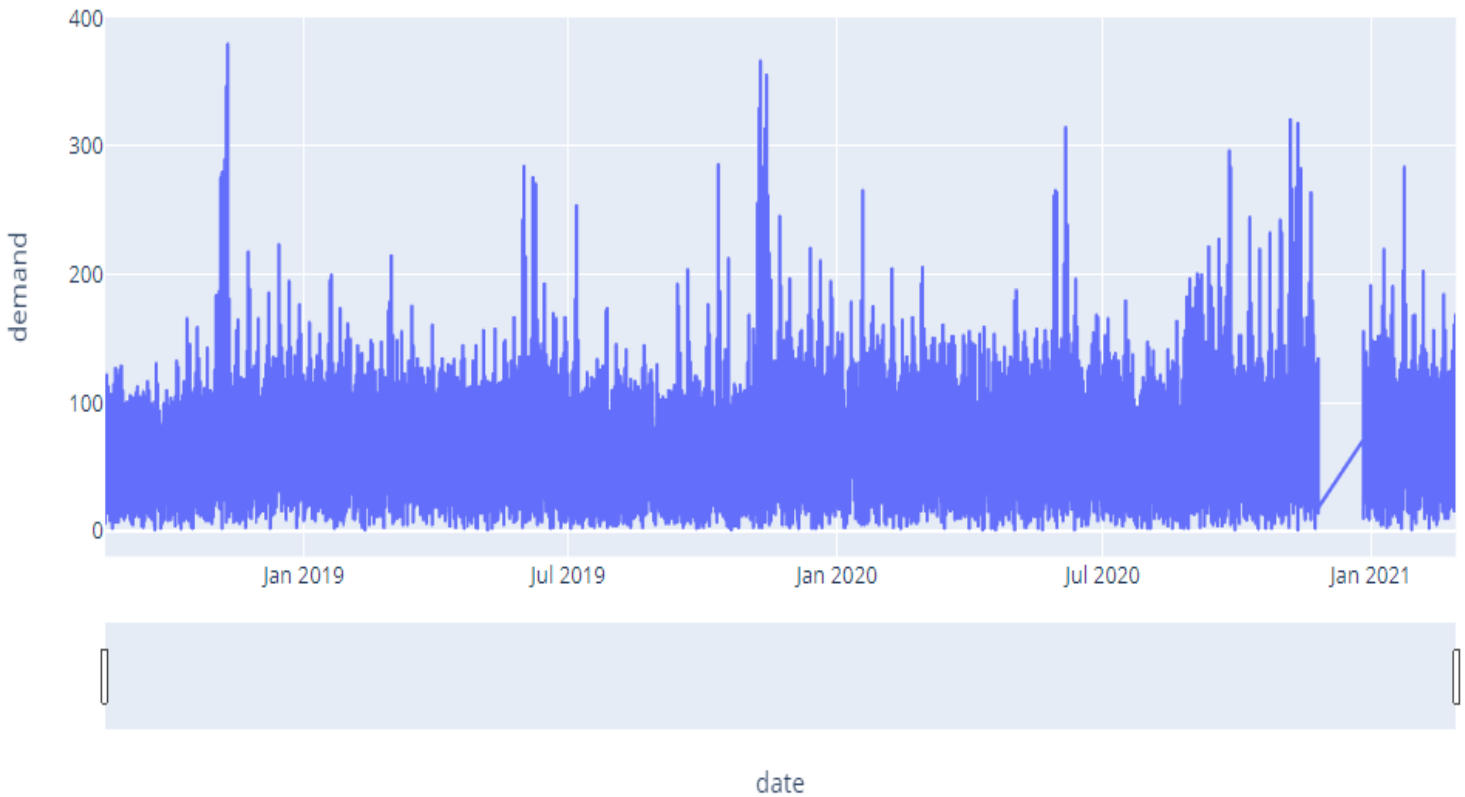
Exploratory Data Analysis

There were no missing values, and data distribution appeared to be normal which allowed to move to EDA without hesitation.

Used Seaborn plot for Trend Analysis. Please refer my Jupyter Notebook as reference.


225
200
175
150
125
100
75
50
25
demand
2018-10
2019-01
2019-04
2019-07
2019-10
2020-01
2020-04
2020-07
2020-10
2021-01
2021-04
date

EDA- TREND1


400
300
200
100
0
demand
Jan 2019
Jul 2019
Jan 2020
Jul 2020
Jan 2021
date

EDA- TREND2

Model Building

Regression- Timeseries

Model Building

This dataset contains date and hour along with demand for number of car rental during a time period and thus falls under timeseries data category.

Used SARIMAX model to arrive at forecast and generate prediction for test dataset.

Summary

Having “hour” feature was tricky and tried different combination before settling down to what works.

December month shows uptick in demand for car rental every year and will continue same trend in future.

There is also sharp rise in demand during summer season though for short duration but seems consistent every year.

THANK YOU

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