# Hotel Booking Demand with Economic Indicators

#### About Dataset

- This dataset contains 119390 observations for a City Hotel and a Resort Hotel. Each observation represents a hotel booking between the 1st of July 2015 and 31st of August 2017. I have coupled each month of booking with leading economic indicators for the United States for that timeframe using the FRED.
- While this dataset does not specify the location of the hotels, I have gone with the assumption of both being located in the United States for ease of applying economic data for learning purposes

# Acknowledgments

- The data is originally from the article Hotel Booking Demand Datasets, written by Nuno Antonio, Ana Almeida, and Luis Nunes for Data in Brief, Volume 22, February 2019. The original cleaned version was uploaded to Kaggle by by Thomas Mock and Antoine Bichat. I used that dataset to couple with various indicators:
- GDP
- CPI
- · CPI for Hotels
- Fuel Prices
- · Disposable income per capita
- Inflation

df.show()

· Consumer Sentiment

```
· GINI Indicator
!pip install pyspark
#installing the pyspark
     Collecting pyspark
       Downloading pyspark-3.4.1.tar.gz (310.8 MB)
                                                 - 310.8/310.8 MB 2.1 MB/s eta 0:00:00
       Preparing metadata (setup.py) ... done
     Requirement already satisfied: py4j==0.10.9.7 in /usr/local/lib/python3.10/dist-packages (from pyspark) (0.10.9.7)
     Building wheels for collected packages: pyspark
       Building wheel for pyspark (setup.py) ... done
       Created wheel for pyspark: filename=pyspark-3.4.1-py2.py3-none-any.whl size=311285387 sha256=de30b62e3fa35b42f4ff330c0af120f0f700
       Stored in directory: /root/.cache/pip/wheels/0d/77/a3/ff2f74cc9ab41f8f594dabf0579c2a7c6de920d584206e0834
     Successfully built pyspark
     Installing collected packages: pyspark
     Successfully installed pyspark-3.4.1
# Importing libraries
import pyspark
from pyspark.sql import SparkSession
from pyspark.sql import functions as f
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
spark = SparkSession.builder.appName("Hotel Booking").getOrCreate()
file = "/content/drive/MyDrive/Data Analysis Files/hotel_bookings_raw.csv"
original_datasets = spark.read.csv(
    file.
    header=True,
    inferSchema=True
df = original_datasets.alias("copy")
```

+	+	+		+	<del> </del>		·+
	hotel	is_canceled	lead_time	arrival_date_year	arrival_date_month	arrival_date_week_number	arrival_date_day_of_month stays_
Resort	Hotel	0	342	2015	July	27	   1
Resort	Hotel	0	737	2015	July	27	1
Resort	Hotel	0	7	2015	July	27	1
Resort	Hotel	0	13	2015	July	27	1
Resort	Hotel	0	14	2015	July	27	1
Resort	Hotel	0	14	2015	July	27	1
Resort	Hotel	0	0	2015	July	27	1
Resort	Hotel	0	9	2015	July	27	1
Resort	Hotel	1	85	2015	July	27	1
Resort	Hotel	1	75	2015	July	27	1
Resort	Hotel	1	23	2015	July	27	1
Resort	Hotel	0	35	2015	July	27	1
Resort	Hotel	0	68	2015	July	27	1
Resort	Hotel	0	18	2015	July	27	1
Resort	Hotel	0	37	2015	July	27	1
Resort	Hotel	0	68	2015	July	27	1
Resort	Hotel	0	37	2015	July	27	1
Resort	Hotel	0	12	2015	July	27	1
Resort	Hotel	0	0	2015	July	27	1
Resort	Hotel	0	7	2015	July	27	1

```
only showing top 20 rows
df.count()
      119390
df.columns
      ['hotel',
        'is_canceled',
       'lead_time',
       'arrival_date_year',
'arrival_date_month',
'arrival_date_week_number',
'arrival_date_day_of_month',
       'stays_in_weekend_nights',
       'stays_in_week_nights',
       'adults',
'children',
       'babies',
       'meal',
       'country',
       'market_segment',
        'distribution_channel',
       'is_repeated_guest',
       \verb|'previous_cancellations'|,
        \verb|'previous_bookings_not_canceled'|,
       'reserved_room_type',
        'assigned_room_type',
       'booking_changes',
        'deposit_type',
        'agent',
        'days_in_waiting_list',
       'customer_type',
        'adr',
       'required_car_parking_spaces',
       'total_of_special_requests',
       'reservation_status',
       'reservation_status_date',
       'MO_YR',
       'CPI_AVG'
       'INFLATION'
       'INFLATION_CHG',
       'CSMR_SENT',
       'UNRATE',
       'INTRSRT',
       'GDP',
'FUEL_PRCS',
'CPI_HOTELS',
       'US_GINI',
       'DIS_INC']
```

len(df.columns)

13

 $print(f"The \ Datasets \ is \ having \ \{df.count()\} \ rows \ and \ \{len(df.columns)\} \ columns.")$ 

The Datasets is having 119390 rows and 43 columns.

```
df.select([f.sum(f.col(i).isNull().cast('int')).alias(i) for i in df.columns]).show()
   |hotel|is_canceled|lead_time|arrival_date_year|arrival_date_month|arrival_date_week_number|arrival_date_day_of_month|stays_in_weeke
   df.printSchema()
   root
    |-- hotel: string (nullable = true)
    |-- is_canceled: integer (nullable = true)
    |-- lead_time: integer (nullable = true)
    -- arrival_date_year: integer (nullable = true)
    |-- arrival_date_month: string (nullable = true)
    |-- arrival_date_week_number: integer (nullable = true)
    |-- arrival_date_day_of_month: integer (nullable = true)
     -- stays_in_weekend_nights: integer (nullable = true)
    -- stays_in_week_nights: integer (nullable = true)
    |-- adults: integer (nullable = true)
    |-- children: string (nullable = true)
     -- babies: integer (nullable = true)
    |-- meal: string (nullable = true)
    -- country: string (nullable = true)
    |-- market_segment: string (nullable = true)
    -- distribution_channel: string (nullable = true)
```

#### |-- previous\_cancellations: integer (nullable = true) |-- previous\_bookings\_not\_canceled: integer (nullable = true) |-- reserved\_room\_type: string (nullable = true) -- assigned\_room\_type: string (nullable = true) -- booking\_changes: integer (nullable = true) -- deposit\_type: string (nullable = true) -- agent: string (nullable = true) |-- days\_in\_waiting\_list: integer (nullable = true) -- customer\_type: string (nullable = true) -- adr: double (nullable = true) -- required\_car\_parking\_spaces: integer (nullable = true) -- total\_of\_special\_requests: integer (nullable = true) -- reservation\_status: string (nullable = true) -- reservation\_status\_date: string (nullable = true) -- MO\_YR: string (nullable = true) -- CPI\_AVG: string (nullable = true) |-- INFLATION: string (nullable = true) -- INFLATION\_CHG: string (nullable = true) -- CSMR\_SENT: string (nullable = true) -- UNRATE: string (nullable = true) |-- INTRSRT: string (nullable = true) |-- GDP: string (nullable = true) |-- FUEL\_PRCS: string (nullable = true) |-- CPI\_HOTELS: string (nullable = true) |-- US\_GINI: string (nullable = true) |-- DIS\_INC: string (nullable = true)

-- is\_repeated\_guest: integer (nullable = true)

['hotel', 'arrival\_date\_month', 'children', 'meal', 'country', 'market\_segment', 'distribution\_channel', 'reserved\_room\_type', 'assigned\_room\_type', 'deposit\_type', 'agent', 'customer\_type', 'reservation\_status' 'reservation\_status\_date', 'MO\_YR', 'CPI\_AVG' 'INFLATION' 'INFLATION\_CHG', 'CSMR\_SENT', 'UNRATE', 'INTRSRT' 'GDP', 'FUEL\_PRCS' 'CPI HOTELS', 'US GINI'. 'DIS\_INC']

[i for i,v in df.dtypes if v in ['string']]

+	hotellarrival	date month	t  children	1 maal	Lountry	t  market segment	+   distribution_channel	reserved room typels	essigned room typelde
+	·+		+		country 				+
Resort	Hotel	July	. 0	ВВ	PRT	Direct	Direct	ci	c
Resort	Hotel	July	0	BB	PRT	Direct	Direct	c	c
Resort	Hotel	July	0	BB	GBR	Direct	Direct	A	c
Resort	Hotel	July	0	BB	GBR	Corporate	Corporate	A	Α
Resort	Hotel	July	0	BB	GBR	Online TA	TA/TO	A	Α
Resort	Hotel	July	0	BB	GBR	Online TA	TA/TO	A	Α
Resort	Hotel	July	0	BB	PRT	Direct	Direct	C	C
Resort	Hotel	July	0	FB	PRT	Direct	Direct	C	C
Resort	Hotel	July	0	BB	PRT	Online TA	TA/TO	A	Α
Resort	Hotel	July	0	HB	PRT	Offline TA/TO	TA/TO	D	D
Resort	Hotel	July	0	BB	PRT	Online TA	TA/TO	E	E
Resort	Hotel	July	0	HB	PRT	Online TA	TA/TO	D	D
Resort	Hotel	July	0	BB	USA	Online TA	TA/TO	D	E
Resort	Hotel	July	1	HB	ESP	Online TA	TA/TO	G	G
Resort	Hotel	July	0	BB	PRT	Online TA	TA/TO	E	E
Resort	Hotel	July	0	BB	IRL	Online TA	TA/TO	D	E
Resort	Hotel	July	0	BB	PRT	Offline TA/TO	TA/TO	E	E
Resort	Hotel	July	0	BB	IRL	Online TA	TA/TO	A	E
Resort	Hotel	July	0	BB	FRA	Corporate	Corporate	A	G
Resort	Hotel	July	0	BB	GBR	Direct	Direct	G	G
+	+		+		·	·	·	+-	+

only showing top 20 rows

'reservation\_status',

```
df.groupBy(f.col('CPI_AVG')).count().show()
```

```
|CPI_AVG|count|
      |243.892| 4826|
      |244.193| 4634|
      244.243 4038
      238.034 3615
      237.733 5742
      |237.652| 4482|
      |237.001| 275|
       |244.006| 4858|
      |238.017| 3077
      |237.761| 3062|
      245.183 3417
      |236.222| 151|
      1235.3421
                    44
      240.222 4552
      244.004 5006
      242.026 5021
      |244.163| 4060|
      |241.176| 4993|
      |242.637| 4338|
      246.435 393
      only showing top 20 rows
df = df.withColumn("CPI_AVG", f.col("CPI_AVG").cast("double"))
df = df.withColumn("INFLATION_CHG", f.col("INFLATION_CHG").cast("double"))
df = df.withColumn("CSMR_SENT", f.col("CSMR_SENT").cast("double"))
df = df.withColumn("UNRATE", f.col("UNRATE").cast("double"))
df = df.withColumn("INTRSRT", f.col("INTRSRT").cast("double"))
df = df.withColumn("GDP", f.col("GDP").cast("double"))
df = df.withColumn("FUEL_PRCS", f.col("FUEL_PRCS").cast("double"))
df = df.withColumn("CPI_HOTELS", f.col("CPI_HOTELS").cast("double"))
df = df.withColumn("US_GINI", f.col("US_GINI").cast("double"))
df = df.withColumn("DIS_INC", f.col("DIS_INC").cast("double"))
df = df.withColumn("INFLATION", f.col("INFLATION").cast("double"))
df = df.withColumn("children", f.col("children").cast("double"))
 \texttt{df} = \texttt{df.withColumn("agent", (f.when(f.col("agent") == "NULL", "0").otherwise(f.col("agent"))).cast('double'))} 
[i for i,v in df.dtypes if v in ['string']]
      ['hotel'
        'arrival_date_month',
       'meal',
        'country',
        'market_segment',
        'distribution_channel',
       'reserved_room_type',
        'assigned_room_type',
       'deposit_type',
        'customer_type',
```

```
df.select([i for i,v in df.dtypes if v in ['string']]).show()
        +------
                hotel | arrival\_date\_month | meal| country | market\_segment| distribution\_channel | reserved\_room\_type| assigned\_room\_type| deposit\_type| de
                                                                     |Resort Hotel|
                                                 July
                                                           BBI
                                                                      PRT
                                                                                        Direct
                                                                                                                       Direct
                                                                                       Direct
        |Resort Hotel|
                                                July
                                                            RRI
                                                                      PRT
                                                                                                                       Direct
                                                                                                                                                           CI
                                                                                                                                                                                        СI
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                July
                                                           BB
                                                                      GBR
                                                                                       Direct
                                                                                                                       Direct
                                                                                                                                                           Αl
                                                                                                                                                                                        C
                                                                                                                                                                                             No Deposit
        Resort Hotel
                                                July
                                                                      GBR
                                                                                   Corporate
                                                                                                                  Corporate
                                                                                                                                                                                             No Deposit
                                                            BB
                                                                                                                                                           Αl
        |Resort Hotel|
                                                 July|
                                                            BB
                                                                      GBR
                                                                                   Online TA
                                                                                                                        TA/TO
                                                                                                                                                           Αl
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                           BB
                                                                      GBR
                                                                                   Online TA
                                                                                                                         TA/T0
                                                                                                                                                           Αl
                                                                                                                                                                                             No Deposit
                                                 July
                                                                                                                                                                                        Αl
        Resort Hotel
                                                            ВВ
                                                                      PRT
                                                                                       Direct
                                                                                                                                                           cİ
                                                                                                                                                                                        C
                                                                                                                                                                                             No Deposit
                                                 Julvl
                                                                                                                       Direct
                                                                                                                                                           ci
        Resort Hotel
                                                 July
                                                           FBİ
                                                                                        Direct
                                                                                                                       Direct
                                                                                                                                                                                        Сİ
                                                                                                                                                                                             No Deposit
                                                 Julvl
                                                            ввІ
                                                                                   Online TA
                                                                                                                         TA/TO
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                                      PRT
                                                                                                                                                           Αl
                                                                                                                                                                                        Αl
                                                                      PRT | Offline TA/TO
                                                                                                                         TA/TO
                                                                                                                                                           DΙ
        Resort Hotel
                                                 July
                                                           HB
                                                                                                                                                                                        DΙ
                                                                                                                                                                                             No Deposit
        Resort Hotel
                                                 July
                                                           BB
                                                                      PRT
                                                                                   Online TA
                                                                                                                         TA/TO
                                                                                                                                                           Εİ
                                                                                                                                                                                        FΙ
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                 July|
                                                           HB
                                                                      PRT
                                                                                   Online TAI
                                                                                                                         TA/TO
                                                                                                                                                           DΙ
                                                                                                                                                                                       DΙ
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                 July|
                                                           BB
                                                                      USA
                                                                                   Online TA
                                                                                                                         TA/TO
                                                                                                                                                           D
                                                                                                                                                                                        Εİ
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                 July|
                                                          HB
                                                                      ESP
                                                                                   Online TA
                                                                                                                         TA/TO
                                                                                                                                                           G|
                                                                                                                                                                                        G|
                                                                                                                                                                                             No Deposit
                                                                                                                                                                                             No Deposit
                                                                                   Online TA
                                                                                                                         TA/TO
        |Resort Hotel|
                                                 July|
                                                           BB
                                                                      PRT
                                                                                                                                                           Εİ
                                                                                                                                                           Dİ
        |Resort Hotel|
                                                 July|
                                                            BBI
                                                                      IRL
                                                                                   Online TA
                                                                                                                         TA/TO
                                                                                                                                                                                        Εİ
                                                                                                                                                                                             No Deposit
                                                           вв
                                                                                                                         TA/TO
        |Resort Hotel|
                                                 Julvl
                                                                      PRT | Offline TA/TO
                                                                                                                                                           Εİ
                                                                                                                                                                                       Εİ
                                                                                                                                                                                             No Deposit
                                                            вві
                                                                      IRL
                                                                                   Online TA
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                 July
                                                                                                                         TA/TO
                                                                                                                                                           Αl
                                                                                                                                                                                        Εl
                                                          BB
                                                                      FRA
                                                                                                                                                           Αl
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                 July
                                                                                   Corporate
                                                                                                                   Corporate
                                                                                                                                                                                        G
        |Resort Hotel|
                                                 July| BB|
                                                                      GBR
                                                                                       Direct
                                                                                                                       Direct
                                                                                                                                                           Gl
                                                                                                                                                                                        Gl
                                                                                                                                                                                             No Deposit
       only showing top 20 rows
from pyspark.sql import types as t
[i for i,v in df.dtypes if v in ['string']]
        ['hotel',
          'arrival_date_month',
         'meal'.
         'country',
         'market segment',
          'distribution_channel',
          'reserved_room_type',
         'assigned_room_type',
          'deposit_type',
         'customer_type',
         'reservation_status'
         'reservation_status_date',
         'MO YR']
df.select([i for i,v in df.dtypes if v in ['string']]).show()
                  hotel|arrival_date_month|meal|country|market_segment|distribution_channel|reserved_room_type|assigned_room_type|deposit_typ
                 Direct
        |Resort Hotel|
                                                July| BB|
                                                                      PRT
                                                                                                                       Direct
                                                                                                                                                           Сl
                                                                                                                                                                                        cl
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                July|
                                                          BB
                                                                      PRT
                                                                                       Direct
                                                                                                                       Direct
                                                                                                                                                           C
                                                                                                                                                                                        C \mid
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                July
                                                                      GBR
                                                                                      Direct
                                                                                                                       Direct
                                                                                                                                                                                             No Deposit
                                                           BB
                                                                                                                                                           Αl
                                                                                                                                                                                        C \mid
        Resort Hotel
                                                 July
                                                            BBİ
                                                                      GBR I
                                                                                  Corporate
                                                                                                                   Corporate
                                                                                                                                                           Αİ
                                                                                                                                                                                             No Deposit
        Resort Hotel
                                                July
                                                           ВВ
                                                                      GBR
                                                                                   Online TA
                                                                                                                                                           Αİ
                                                                                                                                                                                             No Deposit
                                                                                                                         TA/TO
        |Resort Hotel|
                                                 July|
                                                            ввІ
                                                                      GBR
                                                                                   Online TA
                                                                                                                         TA/TO
                                                                                                                                                           Α|
                                                                                                                                                                                        Αl
                                                                                                                                                                                             No Deposit
                                                                      PRT
                                                                                     Direct
                                                                                                                       Direct|
                                                                                                                                                           C|
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                 July
                                                           BB
                                                                                                                                                                                        Cl
                                                                                                                                                           ci
        Resort Hotel
                                                            FBİ
                                                                      PRT
                                                                                        Direct|
                                                                                                                       Direct
                                                                                                                                                                                        C
                                                                                                                                                                                             No Deposit
                                                 July
        |Resort Hotel|
                                                 Julvl
                                                            BBI
                                                                      PRT
                                                                                   Online TAL
                                                                                                                         TA/TO
                                                                                                                                                           Αl
                                                                                                                                                                                        Αl
                                                                                                                                                                                             No Deposit
                                                                      PRT Offline TA/TO
                                                                                                                                                                                             No Deposit
                                                 Julvl
                                                           HB
                                                                                                                         TA/TO
                                                                                                                                                           DΙ
                                                                                                                                                                                        DΙ
        Resort Hotel
                                                                                                                         TA/TO
        |Resort Hotel|
                                                 July
                                                           BBI
                                                                      PRT
                                                                                  Online TAL
                                                                                                                                                           Εİ
                                                                                                                                                                                        Εİ
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                 July
                                                           HB
                                                                      PRT
                                                                                   Online TA
                                                                                                                         TA/TO
                                                                                                                                                           D
                                                                                                                                                                                        D
                                                                                                                                                                                             No Deposit
        Resort Hotel
                                                 July|
                                                           BB
                                                                      IISΔ
                                                                                   Online TAL
                                                                                                                         TA/TO
                                                                                                                                                           D
                                                                                                                                                                                        Εİ
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                 July|
                                                           HB
                                                                      ESP
                                                                                   Online TAI
                                                                                                                         TA/TO
                                                                                                                                                           Gl
                                                                                                                                                                                        G١
                                                                                                                                                                                             No Deposit
                                                 July|
                                                           BB|
                                                                      PRT|
                                                                                   Online TA
                                                                                                                         TA/T0
                                                                                                                                                           Εļ
                                                                                                                                                                                        Εļ
                                                                                                                                                                                             No Deposit
        Resort Hotel
        |Resort Hotel|
                                                 July|
                                                           BB
                                                                                   Online TA
                                                                                                                         TA/TO
                                                                                                                                                           D
                                                                                                                                                                                             No Deposit
        |Resort Hotel|
                                                            BB
                                                                      PRT | Offline TA/TO
                                                                                                                         TA/TO
                                                                                                                                                           Εİ
                                                                                                                                                                                        Εİ
                                                                                                                                                                                             No Deposit
                                                 July
        Resort Hotel
                                                            BBİ
                                                                                   Online TA
                                                                                                                         TA/TO
                                                                                                                                                           Αİ
                                                                                                                                                                                        Εİ
                                                                                                                                                                                             No Deposit
                                                 July
                                                                      IRL
        |Resort Hotel|
                                                 Julvl
                                                           вві
                                                                      FRAİ
                                                                                   Corporate
                                                                                                                   Corporate
                                                                                                                                                           Αİ
                                                                                                                                                                                        Gl
                                                                                                                                                                                             No Deposit
                                                          ввІ
                                                                      GBR
                                                                                                                                                           Gl
                                                                                                                                                                                        Gl No Deposit
        |Resort Hotel|
                                                 July
                                                                                       Direct
                                                                                                                       Direct
       only showing top 20 rows
df.select("reservation status date").show()
        +----+
        |reservation_status_date|
```

'reservation\_status\_date',

'MO YR']

```
7/1/2015
                    7/1/2015
                    7/2/2015
                    7/2/2015
                    7/3/2015
                    7/3/2015
                    7/3/2015
                    7/3/2015
                    5/6/2015
                   4/22/2015
                   6/23/2015
                    7/5/2015
                    7/5/2015
                    7/5/2015
                    7/5/2015
                    7/5/2015
                    7/5/2015
                    7/2/2015
                    7/2/2015
                    7/5/2015
    only showing top 20 rows
df.groupBy(f.col("reservation_status_date")).count().show()
     |reservation_status_date|count|
                 11/14/2015 | 80
                   6/29/2016 | 113 | 7/31/2016 | 125 |
                   8/21/2016 | 139 |
12/8/2016 | 153 |
                   3/20/2017 194
                   2/27/2015
                                1
                   8/31/2015 | 116
                  8/9/2016 | 121 |
11/24/2016 | 172 |
                    5/7/2017 | 146
                  11/26/2015 | 135 |
                   8/28/2016 | 134 |
2/14/2017 | 121 |
                   4/10/2017 | 164
                   6/11/2016
                               89
                   8/31/2016 | 155
                  11/30/2016 | 137 |
7/20/2017 | 104 |
                   6/15/2015 | 53
    only showing top 20 rows
df.select("reservation_status_date").show()
    |reservation_status_date|
                 2015-07-01
                  2015-07-01
                  2015-07-02
                  2015-07-02
                  2015-07-03
                  2015-07-03
                  2015-07-03
                  2015-07-03
                  2015-05-06
                  2015-04-22
                  2015-06-23
                  2015-07-05
                  2015-07-05
                  2015-07-05
                  2015-07-05
                  2015-07-05
                  2015-07-05
                  2015-07-02
                  2015-07-02
                  2015-07-05
    only showing top 20 rows
```

```
'arrival date month',
      'meal',
     'country',
      'market_segment',
     'distribution_channel',
     'reserved_room_type',
     'assigned_room_type',
     'deposit_type',
     'customer_type',
      'reservation_status',
     'MO_YR']
df.select([i for i,v in df.dtypes if v in ['string']]).show()
     hotel|arrival_date_month|meal|country|market_segment|distribution_channel|reserved_room_type|assigned_room_type|deposit_typ
                             July| BB|
                                          PRT
                                                    Direct|
     Resort Hotel
                             July| BB|
                                          PRT
                                                    Direct
                                                                       Direct
                                                                                             C|
                                                                                                                  No Deposit
                                                                                                               C
     |Resort Hotel|
                             July| BB|
                                          GBR
                                                    Direct
                                                                       Direct
                                                                                             Αl
                                                                                                              C|
                                                                                                                  No Deposit
                             July| BB|
                                                                    Corporate
     Resort Hotel
                                          GBR
                                                Corporate
                                                                                             Αl
                                                                                                              A| No Deposit
                             July BB July BB
                                          GBR
                                                                                                              A No Deposit
     |Resort Hotel|
                                                 Online TA
                                                                        TA/TO
                                                                                             Αl
                                                 Online TA
                                          GBRİ
                                                                        TA/TO
     |Resort Hotel|
                                                                                             Αl
                                                    Direct|
     |Resort Hotel|
                             July| BB|
                                          PRT
                                                                                             C|
                                                                                                              C|
                                                                                                                  No Deposit
                                                                       Direct
     |Resort Hotel|
                             July| FB|
                                          PRT
                                                    Direct
                                                                       Direct
                                                                                             C|
                                                                                                              Сl
                                                                                                                  No Deposit
                                                  Online TA
     |Resort Hotel|
                             July|
                                    BB
                                          PRT
                                                                        TA/TO
                                                                                             Α|
                                                                                                              Αl
                                                                                                                  No Deposit
     |Resort Hotel|
                             July| HB|
                                          PRT | Offline TA/TO |
                                                                        TA/T0
                                                                                             D
                                                                                                              D
                                                                                                                  No Deposit
     Resort Hotel
                             July
                                   вв ј
                                          PRT |
                                               Online TA
                                                                        TA/TO
                                                                                             Εİ
                                                                                                                  No Deposit
                                                                                                              Εİ
     |Resort Hotel|
                             July|
                                    HB|
                                          PRT|
                                                  Online TA
                                                                        TA/TO
                                                                                             D
                                                                                                              D
                                                                                                                  No Deposit
                                                 Online TA
     |Resort Hotel|
                             July
                                          USAL
                                                                        TA/TO
                                                                                             D
                                                                                                              E| No Deposit
     Resort Hotel
                             July
                                   нв і
                                          ESP
                                                  Online TA
                                                                        TA/TO
                                                                                             G
                                                                                                                  No Deposit
                                                                                                              G١
                                                 Online TA
                                                                                                              E| No Deposit
     Resort Hotel
                             July| BB|
                                          PRTİ
                                                                        TA/TO
                                                                                             Εİ
     |Resort Hotel|
                             July| BB|
                                          IRL
                                                 Online TA
                                                                        TA/TO
                                                                                             DΙ
                                                                                                              Εļ
                                                                                                                  No Deposit
     |Resort Hotel|
                             July| BB|
                                          PRT | Offline TA/TO
                                                                                                              Εİ
                                                                                                                  No Deposit
                                                                        TA/TO
                                                                                             Εĺ
                             July| BB|
     |Resort Hotel|
                                          IRL
                                                  Online TA
                                                                        TA/TO
                                                                                             Αl
                                                                                                              E| No Deposit
     |Resort Hotel|
                             July|
                                   BB
                                          FRA
                                                  Corporate|
                                                                     Corporate
                                                                                             Αl
                                                                                                              Gl No Deposit
     |Resort Hotel|
                             July| BB|
                                          GBR
                                                   Direct
                                                                       Direct
                                                                                             G|
                                                                                                              G| No Deposit
    only showing top 20 rows
[i for i,v in df.dtypes if v in ['int', 'double']]
    ['is_canceled',
      'lead_time',
      'arrival_date_year',
      'arrival_date_week_number'
     'arrival_date_day_of_month',
      'stays_in_weekend_nights',
     'stays_in_week_nights',
      'adults',
     'children',
     'babies',
     'is_repeated_guest',
      'previous_cancellations',
      'previous_bookings_not_canceled',
      'booking_changes',
     'agent',
      'days_in_waiting_list',
      'adr'.
     'required_car_parking_spaces',
     'total_of_special_requests',
     'CPI_AVG',
     'INFLATION'
     'INFLATION_CHG',
     'CSMR_SENT',
     'UNRATE',
     'INTRSRT',
     'GDP',
'FUEL_PRCS'
     'CPI_HOTELS',
     'US_GINI',
     'DIS_INC']
df.select([i for i,v in df.dtypes if v in ['int', 'double']]).show()
    is canceled lead time arrival date year arrival date week number arrival date day of month stays in weekend nights stays in week n
      342
                                    2015
              91
                                                             271
                                                                                     11
                     737
                                                             27
              01
                                    2015
                                                                                     1
                                                                                                           01
                      7 İ
              0
                                    2015
                                                             27
                                                                                     1
                                                                                                           0
              0
                      13
                                    2015
                                                             27
                                                                                     1|
                                                                                                           0
              0
                      14
                                    2015
                                                             27
                                                                                                           0
                                                                                     1
              0
                      14
                                     2015
                                                             27
                                                                                                           0
```

['hotel',

0   0   1   1   1   1   0   0   0   0	0  9  85  75  23  35  68  18  37  68  37  12  0	2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015   2015	27  27  27  27  27  27  27  27  27  27	1  1  1  1  1  1  1  1  1  1	0  0  0  0  0  0  0  0  0	
1 1	•	·		1  1  1	• !	

only showing top 20 rows

```
[i for i,v in df.dtypes if v in ['date']]
    ['reservation_status_date']
df.select([i for i,v in df.dtypes if v in ['date']]).show()
     +----+
     |reservation_status_date|
                 2015-07-01
                  2015-07-01
                  2015-07-02
                  2015-07-02
                  2015-07-03
                  2015-07-03
                  2015-07-03
                  2015-07-03
                  2015-05-06
                  2015-04-22
                  2015-06-23
                  2015-07-05
                  2015-07-05
                  2015-07-05
                  2015-07-05
```

only showing top 20 rows

2015-07-05 | 2015-07-05 | 2015-07-02 | 2015-07-02 | 2015-07-05 |

### df.printSchema()

```
root
 |-- hotel: string (nullable = true)
 |-- is_canceled: integer (nullable = true)
 -- lead_time: integer (nullable = true)
 |-- arrival_date_year: integer (nullable = true)
 |-- arrival_date_month: string (nullable = true)
|-- arrival_date_week_number: integer (nullable = true)
 -- arrival_date_day_of_month: integer (nullable = true)
 -- stays_in_weekend_nights: integer (nullable = true)
 -- stays_in_week_nights: integer (nullable = true)
 -- adults: integer (nullable = true)
 -- children: double (nullable = true)
 -- babies: integer (nullable = true)
 -- meal: string (nullable = true)
 -- country: string (nullable = true)
 |-- market_segment: string (nullable = true)
 -- distribution_channel: string (nullable = true)
 -- is_repeated_guest: integer (nullable = true)
 |-- previous_cancellations: integer (nullable = true)
 |-- previous_bookings_not_canceled: integer (nullable = true)
 -- reserved_room_type: string (nullable = true)
 -- assigned_room_type: string (nullable = true)
 |-- booking_changes: integer (nullable = true)
 |-- deposit_type: string (nullable = true)
 |-- agent: double (nullable = true)
 -- days_in_waiting_list: integer (nullable = true)
 -- customer_type: string (nullable = true)
 -- adr: double (nullable = true)
 -- required_car_parking_spaces: integer (nullable = true)
 |-- total_of_special_requests: integer (nullable = true)
 |-- reservation_status: string (nullable = true)
|-- reservation_status_date: date (nullable = true)
 -- MO_YR: string (nullable = true)
```

```
|-- CPI_AVG: double (nullable = true)
|-- INFLATION: double (nullable = true)
|-- INFLATION_CHG: double (nullable = true)
|-- CSMR_SENT: double (nullable = true)
|-- UNRATE: double (nullable = true)
|-- INTRSRT: double (nullable = true)
|-- GDP: double (nullable = true)
|-- FUEL_PRCS: double (nullable = true)
|-- CPI_HOTELS: double (nullable = true)
|-- US_GINI: double (nullable = true)
|-- DIS_INC: double (nullable = true)
```

## df.show()

	hotel	is_canceled	lead_time	arrival_date_year	arrival_date_month	arrival_date_week_number	arrival_date_day_of_month	stays_:
Resort	Hotel	0	342	2015	July	27	1	
Resort	Hotel	0	737	2015	July	27	1	
Resort	Hotel	0	7	2015	July	27	1	
Resort	Hotel	0	13	2015	] July	27	1	
Resort	Hotel	0	14	2015	July	27	1	
	Hotel	0	14	2015	] July	27	1	
	Hotel	0	0				1	
	Hotel	0	9	•	] July	27	1	
	Hotel	1	85		,		1	
	Hotel	1	75				1	
	Hotel	1	23			27	1	
Resort	Hotel	0	35		,	27	1	
	Hotel	0		•			1	
	Hotel	0	18	•			1	
	Hotel	0	37	•			1	
	Hotel	0	68				1	
	Hotel	0	37		,		1	
	Hotel	0	12			27	1	
	Hotel	0	0	•		27	1	
Resort	Hotel	0	7	2015	July	27	1	
	+		+	+	+		<del></del>	

only showing top 20 rows