ELECKART MARKET MIX MODELING

- • BUSINESS OBJECTIVE AND DATA UNDERSTANDING
- • DATA PREPARATION
- • EDA
- • KPI
- • MODELS CREATED
- • RECOMMENDATION

- •ELECKART IS AN E-COMMERCE FIRM BASED OUT OF ONTARIO, CANADA SPECIALISING IN ELECTRONIC PRODUCTS. OVER THE LAST ONE YEAR, THEY HAD SPENT A SIGNIFICANT AMOUNT OF MONEY ON MARKETING. OCCASIONALLY, THEY HAD ALSO OFFERED BIG-TICKET PROMOTIONS (SIMILAR TO THE BIG BILLION DAY). THEY ARE ABOUT TO CREATE A MARKETING BUDGET FOR THE NEXT YEAR, WHICH INCLUDES SPENDING ON COMMERCIALS, ONLINE CAMPAIGNS, AND PRICING & PROMOTION STRATEGIES. THE CFO FEELS THAT THE MONEY SPENT OVER THE LAST 12 MONTHS ON MARKETING WAS NOT SUFFICIENTLY IMPACTFUL, AND, THAT THEY CAN EITHER CUT ON THE BUDGET OR REALLOCATE IT OPTIMALLY ACROSS MARKETING LEVERS TO IMPROVE THE REVENUE RESPONSE

- • TO CREATE MARKET MIX MODELS FOR THREE PRODUCT SUBCATEGORIES - CAMERA ACCESSORY, HOME AUDIO AND GAMING ACCESSORY.
- • THE MODELS ARE TO BUILT ON WEEKLY BASIS FOR EACH OF THE ABOVE SUBCATEGORIES

- •THE FILES USED FOR THE ANALYSIS ARE:
- • CONSUMER ELECTRONICS –THE BASE DATA SET WHICH CONTAINS THE INFORMATION OF THE ORDERS PLACED.
- • PRODUCT LIST – THE DATASET THAT HAS THE FREQUENCY AND PERCENTAGE CONTRIBUTION OF EACH PRODUCT
- • MEDIA INVESTMENT – THE DATASET THAT GIVES INFORMATION ON THE DISTRIBUTION OF INVESTMENT SPENT FOR THE GIVEN TIME FRAME
- • MONTHLY NPS SCORE – THE DATASET THAT GIVES THE MONTHLY NPS SCORE AND STOCK INDEX FOR THE TIME FRAME.
- • ONTARIO-2015 AND ONTARIO-2016 – THE DATASETS THAT CONTAIN THE THE INFORMATION REGARDING THE CLIMATE FOR THE GIVEN TIME FRAME FOR THEIR RESPECTIVE YEARS

- •BEFORE WE CREATE ANY MODELS ON THE DATA SET (CONSUMER ELECTRONICS IN THIS CASE), WE NEED TO FIRST PREPARE THE DATA BY CLEANING,IMPUTING ,CREATING NEW FEATURES ETC.
- •THE APPROACH FOLLOWED BY US TO ACHIEVE THIS IS : • CHECK THE DATASET FOR ANY TYPE MISMATCH AND CORRECT THE SAME • DROP ANY DUPLICATE RECORD IF PRESENT .
- • REMOVE THE NULL VALUES BY EITHER DROPPING COLUMNS OR BY IMPUTING IT • REMOVING ROWS WITH PRODUCT MRP = 0
- • REMOVE ROWS WITH GMV = 0
- • VALUES ARE NEGATIVE FOR CUSTID,PINCODE,FSNID CORRECT THE VALUES FOR THE SAME.
- • ONLY TAKE RECORDS WHICH BELONG TO THE DESIRED TIME FRAME. (07/2015 TO 06/2016).
- • REMOVE ROWS WHICH HAVE GMV >MRP*UNITS AS IT'S NOT POSSIBLE

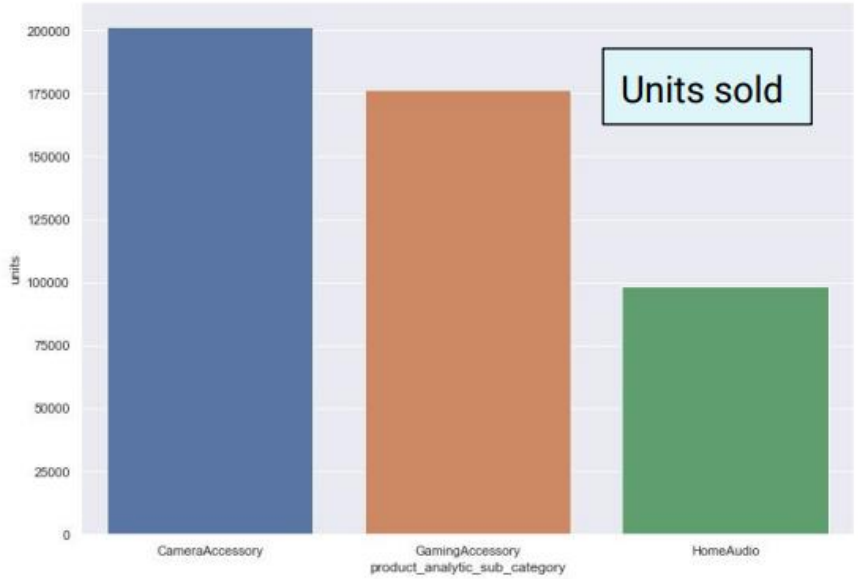
- Local factors impacts: Ontario local holidays are considered along with other holidays for said FY(July-15 to June-16).

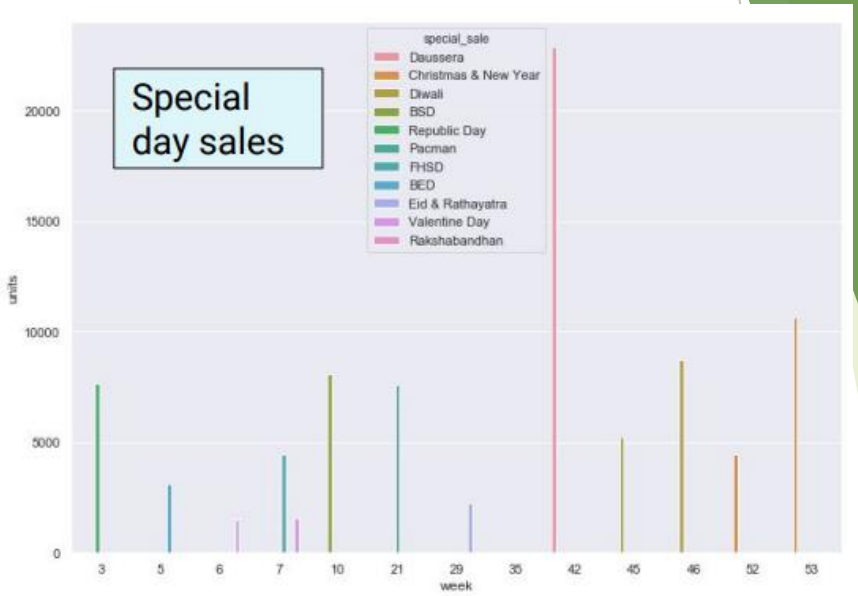
```
##Local holiday list of state Ontario,Canada for 2016
import holidays
from datetime import date

CA_holidays = holidays.Canada(years=2016, state="ON")

for holiday in CA_holidays.items():
    print(holiday)
```

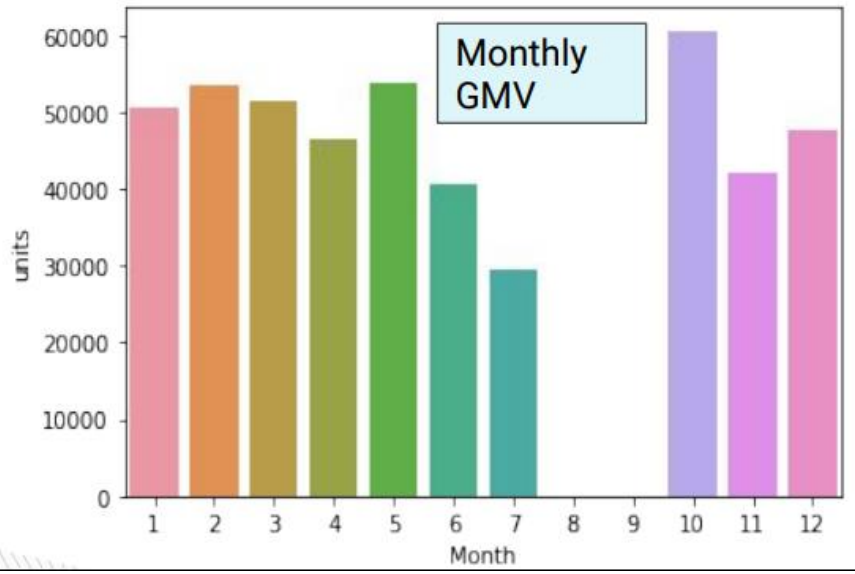
```
(datetime.date(2016, 1, 1), "New Year's Day")
(datetime.date(2016, 2, 15), 'Family Day')
(datetime.date(2016, 3, 25), 'Good Friday')
(datetime.date(2016, 5, 23), 'Victoria Day')
(datetime.date(2016, 7, 1), 'Canada Day')
(datetime.date(2016, 8, 1), 'Civic Holiday')
(datetime.date(2016, 9, 5), 'Labour Day')
(datetime.date(2016, 10, 10), 'Thanksgiving')
(datetime.date(2016, 12, 25), 'Christmas Day')
(datetime.date(2016, 12, 26), 'Christmas Day (Observed)')
(datetime.date(2016, 12, 27), 'Boxing Day (Observed)')
```

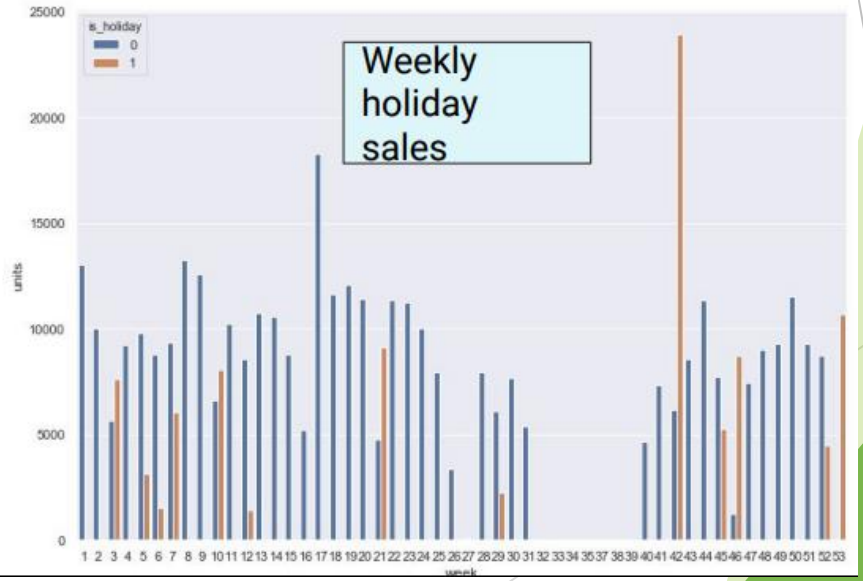
```
#Local holiday list of state Ontario,Canada for 2015
import holidays
from datetime import date

CA_holidays = holidays.Canada(years=2015, state="ON")

for holiday in CA_holidays.items():
    print(holiday)
```

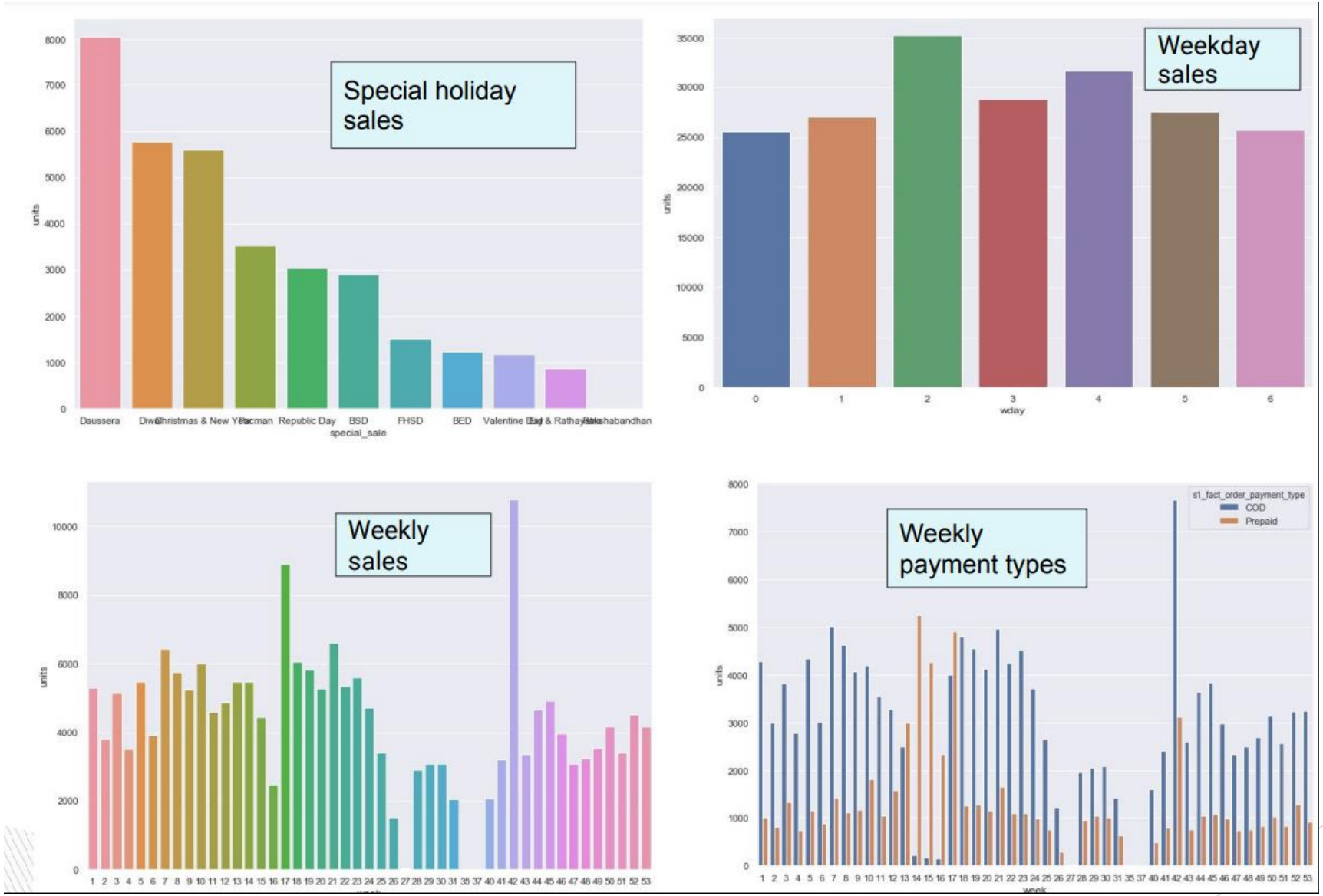
```
(datetime.date(2015, 1, 1), "New Year's Day")
(datetime.date(2015, 2, 16), 'Family Day')
(datetime.date(2015, 4, 3), 'Good Friday')
(datetime.date(2015, 5, 18), 'Victoria Day')
(datetime.date(2015, 7, 1), 'Canada Day')
(datetime.date(2015, 8, 3), 'Civic Holiday')
(datetime.date(2015, 9, 7), 'Labour Day')
(datetime.date(2015, 10, 12), 'Thanksgiving')
(datetime.date(2015, 12, 25), 'Christmas Day')
(datetime.date(2015, 12, 28), 'Boxing Day (Observed)')
```

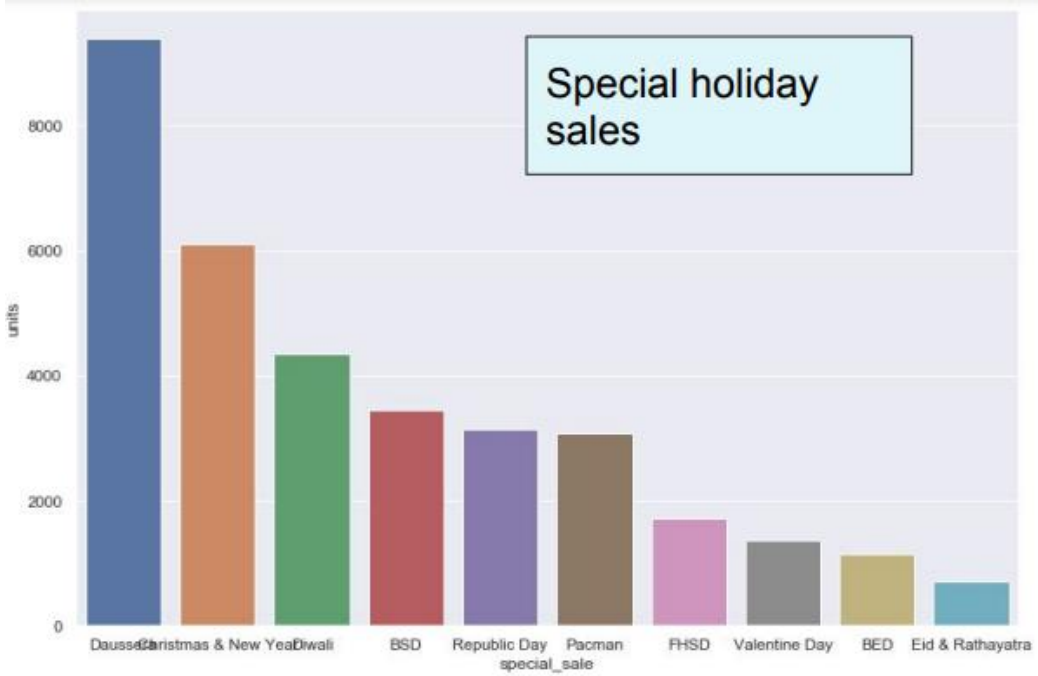

Units sold
units
200000
175000
150000
125000
100000
75000
50000
25000
0
CameraAccessory
GamingAccessory
HomeAudio
product_analytic_sub_category

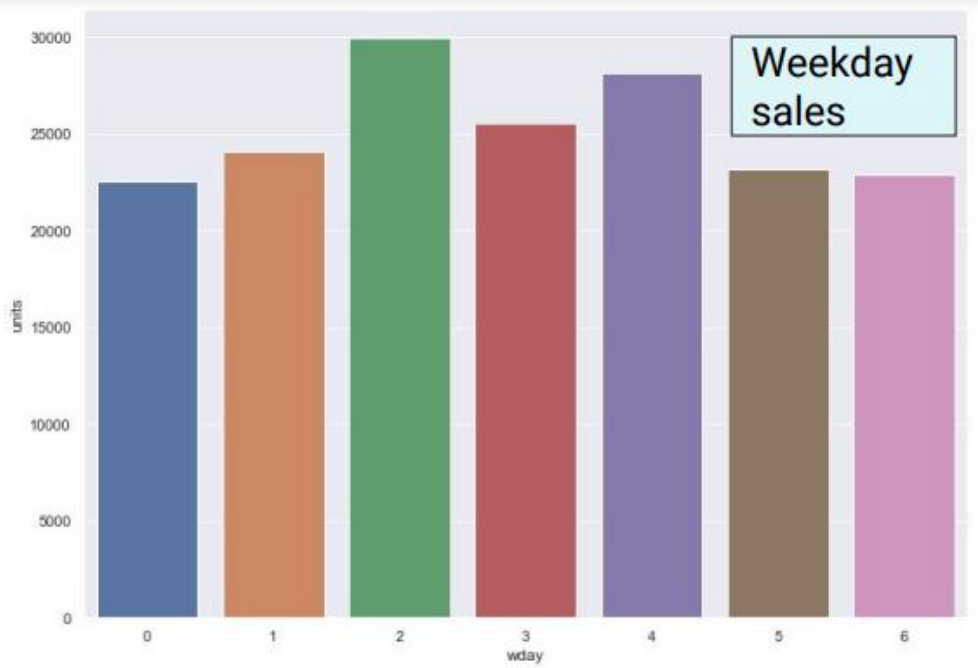

Special day sales
special_sale
Daussera
Christmas & New Year
Diwali
BSD
Republic Day
Pacman
FHSD
BED
Eid & Rathayatra
Valentine Day
Rakshabandhan
units
20000
15000
10000
5000
0
3
5
6
7
10
21
29
35
42
45
46
52
53
week

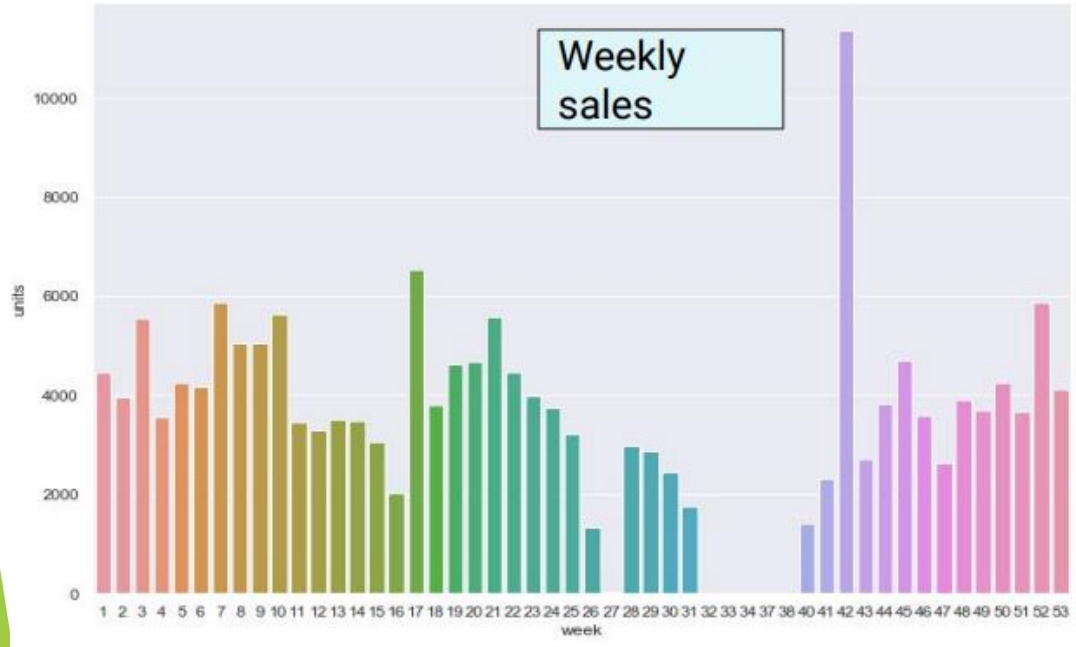

Monthly GMV
units
60000
50000
40000
30000
20000
10000
0
1
2
3
4
5
6
7
8
9
10
11
12
Month

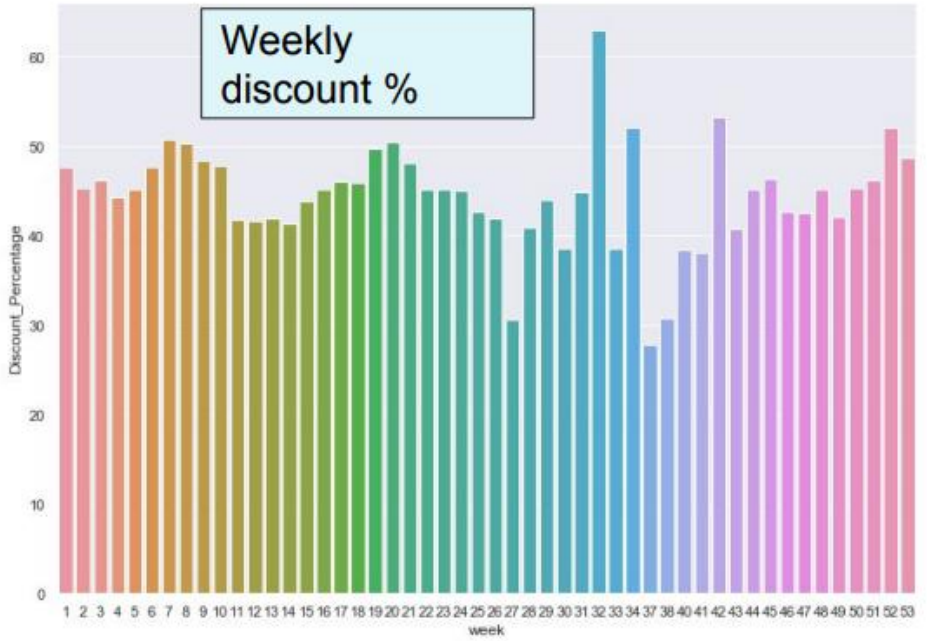

Weekly holiday sales
is_holiday
0
1
units
25000
20000
15000
10000
5000
0
week

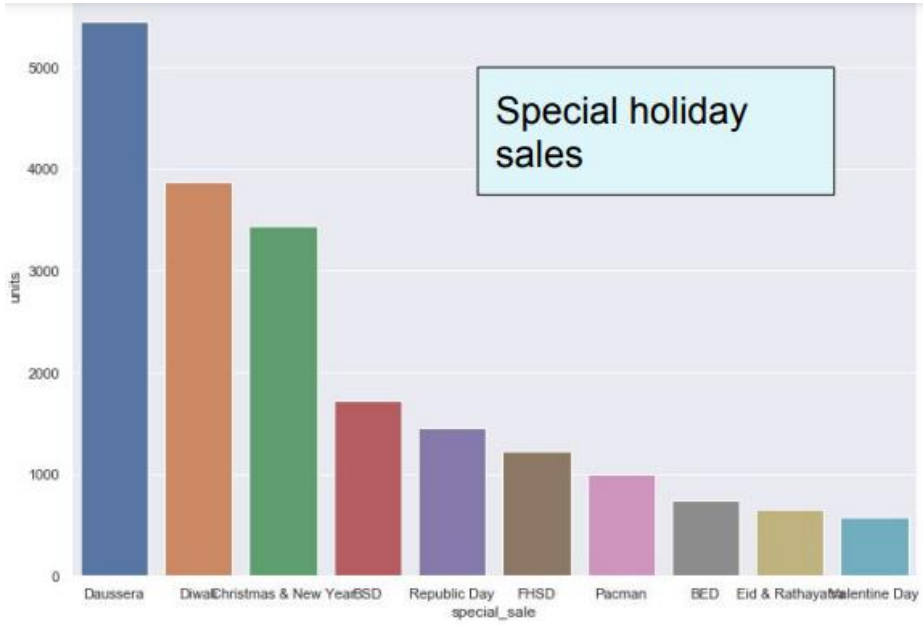

Special holiday sales
units
special_sale
Daussera
Republic Day
BSD
FHSD
BED
Weekday sales
units
wday
Weekly sales
units
Weekly payment types
units
week
s1_fact_order_payment_type
COD
Prepaid

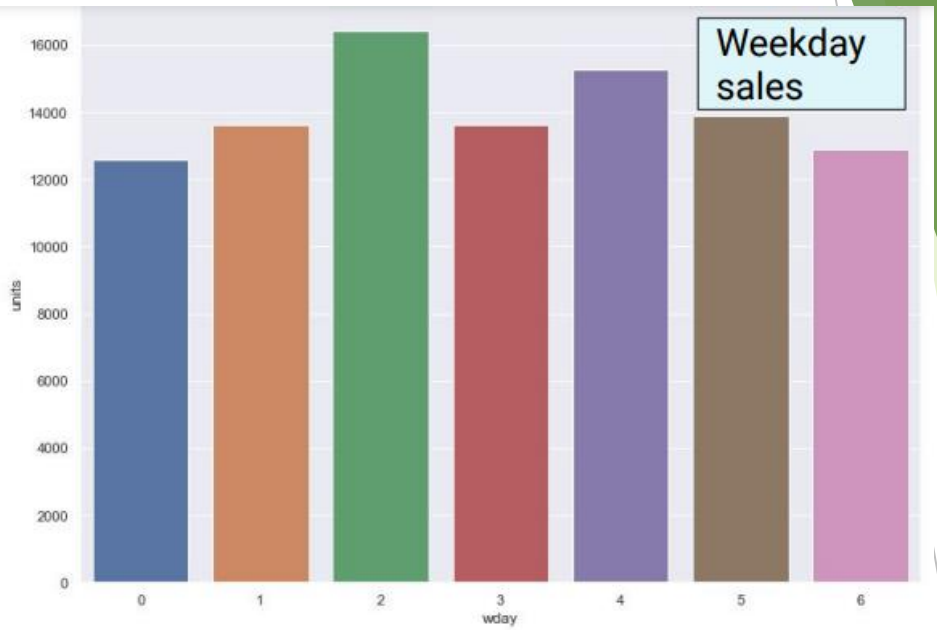

Special holiday sales
units
8000
6000
4000
2000
0
Christmas & New Yea
Diwali
BSD
Republic Day
Pacman
FHSD
Valentine Day
BED
Eid & Rathayatra
special_sale

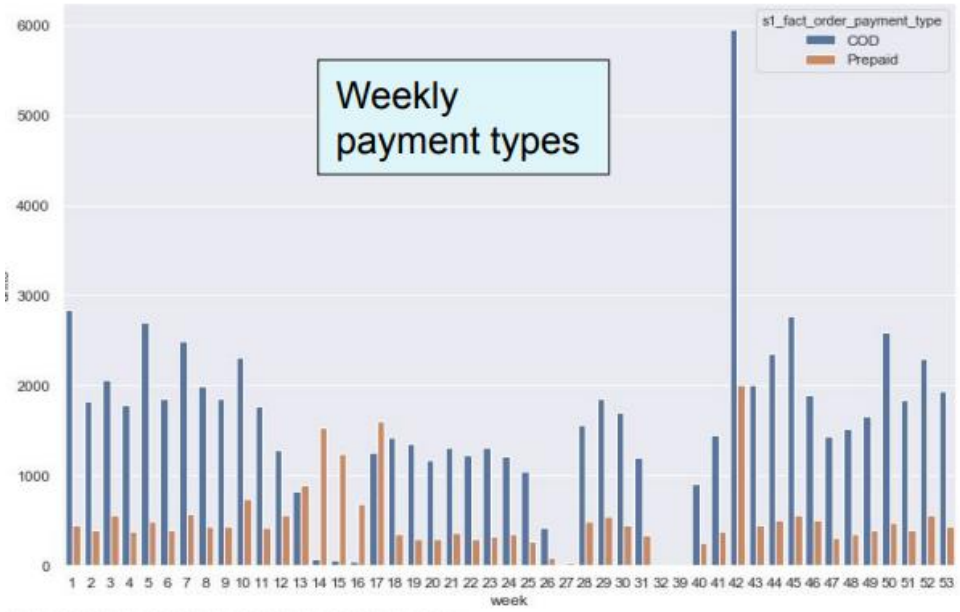

Weekday sales
units
30000
25000
20000
15000
10000
5000
0
0
1
2
3
4
5
6
wday

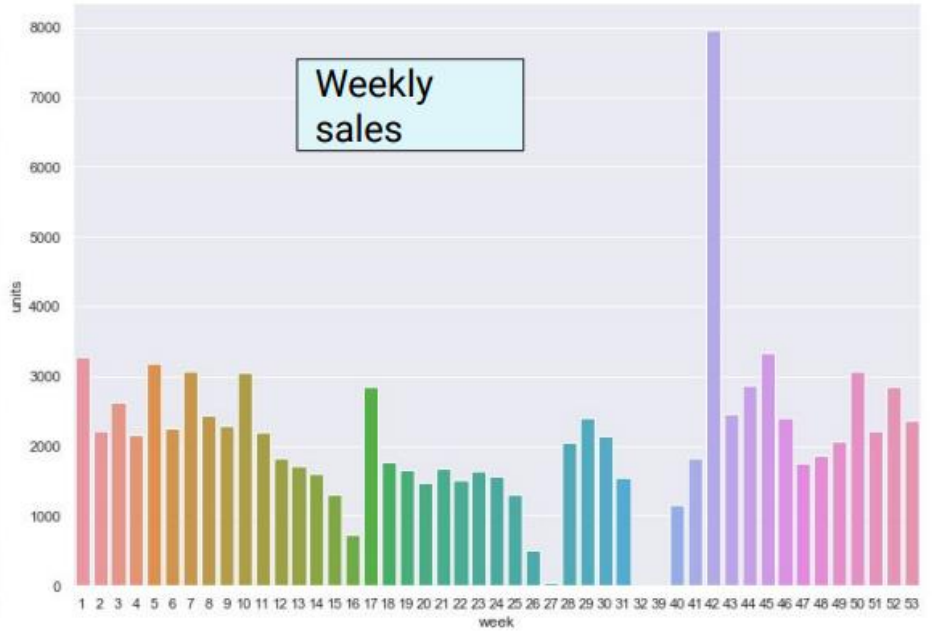

Weekly sales
units
10000
8000
6000
4000
2000
0
week


Weekly discount %
Discount_Percentage
60
50
40
30
20
10
0
week


Special holiday sales
units
special_sale
Daussera
Christmas & New Year
Republic Day
Pacman
Valentine Day


Weekday sales
units
wday


Weekly payment types
s1_fact_order_payment_type
COD
Prepaid
week


Weekly sales
units
week

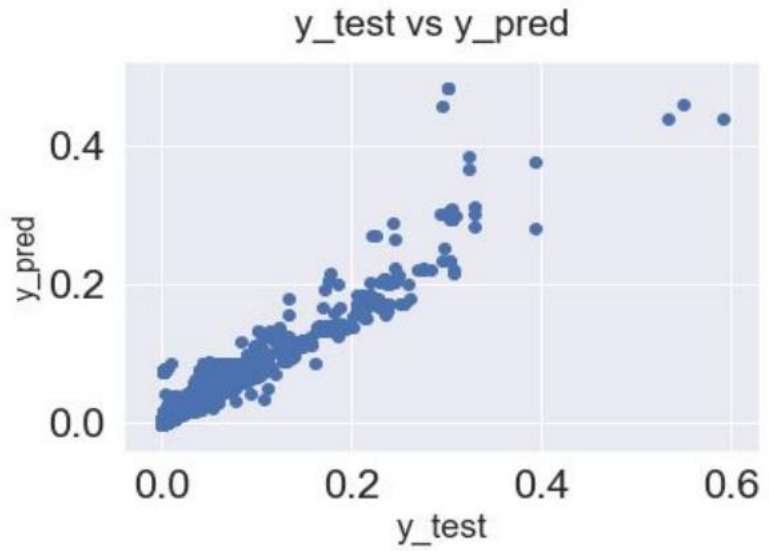

Affiliates
Digital
TV
Online Marketing
Other
Radio
SEM
Sponsorship

Derived KPIs & Modeling
List of derived KPIs and advance KPIs is as follows:

KPIs	Advance KPIs
• Discount Percentage	• Ad-stock of 3 categories
• GMV per unit	• Moving average of last 3 weeks (gmv per unit, DP)
• Total GMV	• Lag variables (gmv per unit, DP) for 3 weeks
• Average GMV	• Promotion Type
• Units	• Holiday Week
• Delivery Status	• Delivery Status
• Item Type	
• Delivery on Time	

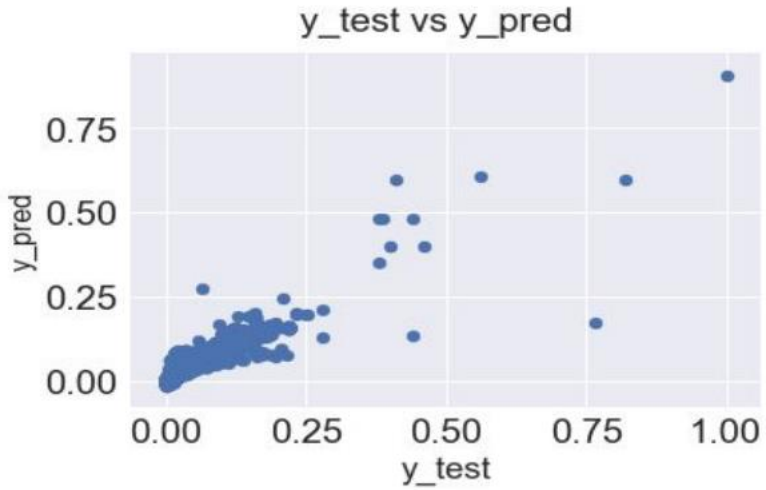
Camera Accessories – Recommendations

- After analyzing 4 different models, its observed that Koyck model is best suited for Camera Accessories. ● Its has least mean square error (0.007) and have high result in Cross -Validation (0.91) as compare to other three models. ● product_mrp is the strongest variable having a good impact on the GMV. ● Other common factor which affect the model is delivery_on_time, Content Marketing etc



Gaming Accessories – Recommendations

- After analyzing 3 different models, its observed that Koyck model is best suited for Gaming Accessories. ● For Gaming Accessories, RMSE is 0.0071 for Koyck which is the least mean square error as compared to others. ● Also product_mrp is the strongest variable having a good impact on the GMV. ● Other common factor which affect the model is delivery_on_time, Content Marketing etc



Home Audio – Recommendations

- After building and analyzing 3 different models, it is observed that Multiplicative model is best suited for the category of Home Audio. ● R2 scores of Koyck and Distributed lag models are almost the same but better results are achieved after performing cross validation. ● product_mrp is the strongest variable having a good impact on the GMV. ● gmv_lag_1_per and gmv_lag_2_per are also proving to be good for GMV. ● GMV increases with a little bit of tweaking in the product_mrp.