

# Analyzing Sales Data

The important features available in the data along with distinct counts(after data cleaning):

Unit Price

Quantity Sold

Product Description (4015)

Transaction Country (38)

Timestamp

Customer Id (4338)

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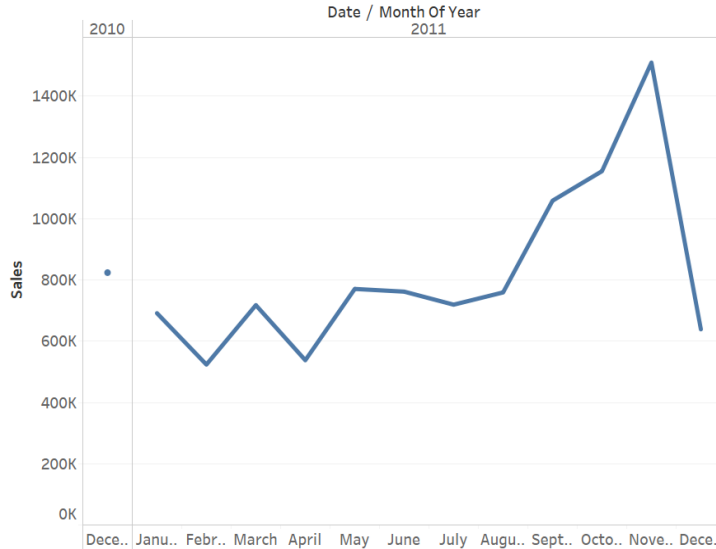
# Data Preprocessing

- Rows with negative *quantity sold* [10624 records] values were removed.
- Rows with negative *unit price* and zero [2517 records] *values* were removed.
- Sales = unit price \* quantity sold.

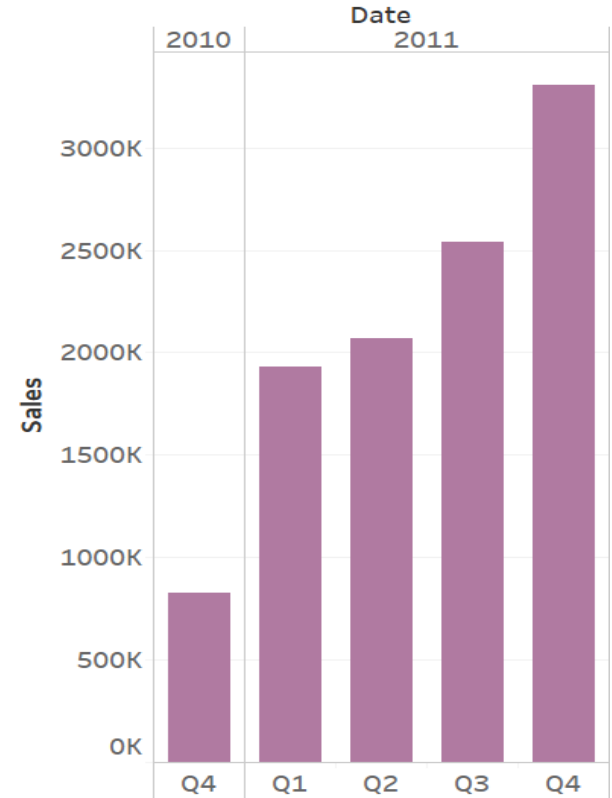
# Analyzing Trends

1) Is the company's performance improving or degrading over time?

- Sales are observed by aggregating on a monthly [Fig 1.a] and quarterly [1.b] basis.
- We observe an increasing trend in both quarterly and monthly sales graphs.



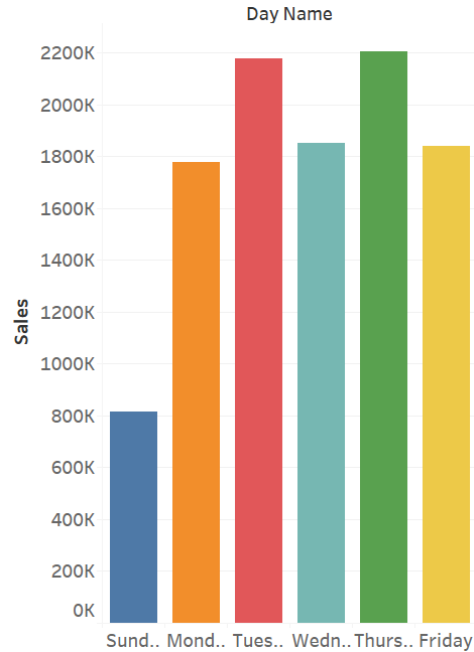
**Fig 1.a: Monthly Sales**



**Fig 1.b: Quarterly Sales**

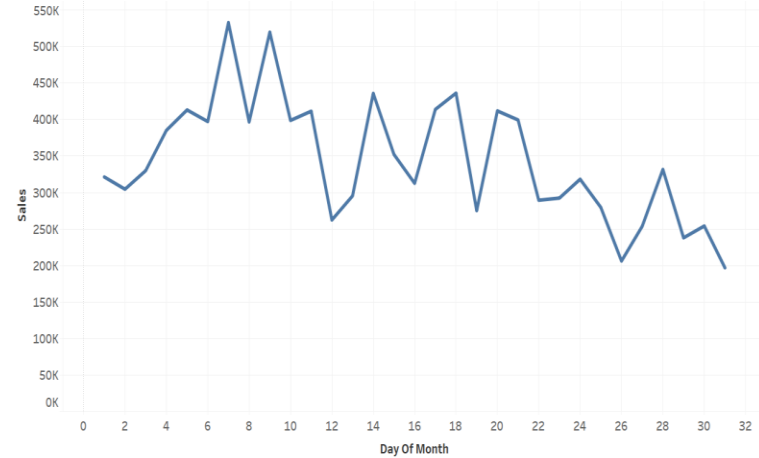
# Important Trends and Highlights

## Sales per Day of Week



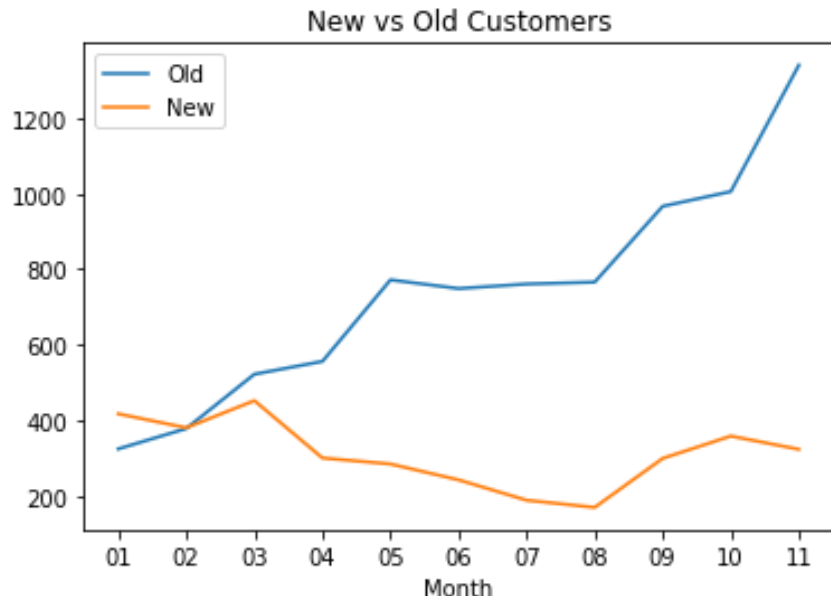
- Most of the revenue is generated on weekdays.

## Sales per Day of Month



- Sales are higher at the beginning of every month and decline as we go through the month.

# Customer Acquisition and Loyalty



2. How can we measure our performance in terms of customer acquisition and building customer loyalty?

Data cleaning/ manipulation:

- Null values in customer id were removed.
- The data was segregated into two parts:
  1. **New:** Where the customers made their first ever transaction.
  2. **Old:** Where the customers had already made a transaction before.

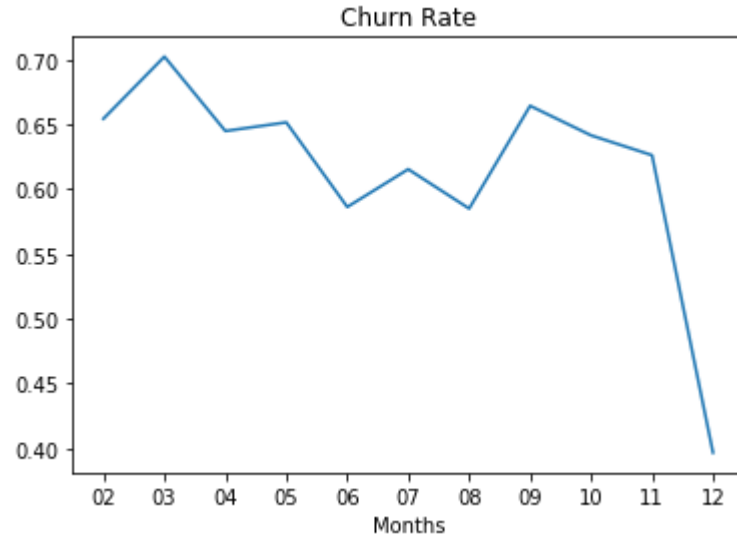
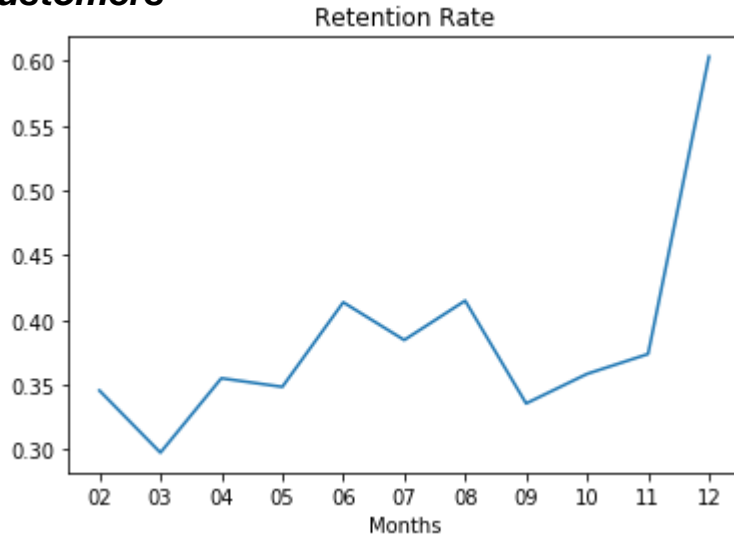
Analysis:

- Although we see addition of new customers every month, the trend is slightly negative.
- The count of old customers is increasing every month which indicates our customers are staying loyal to us.

## *Metrics to get the the performance of customer loyalty*

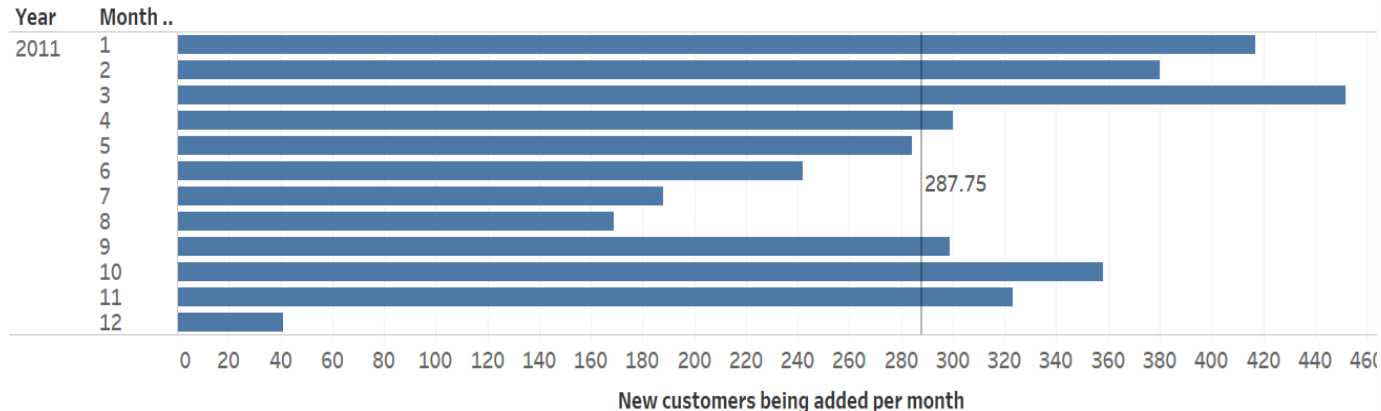
- ❑ **Monthly Retention Rate** = *Retained Customers From Previous Month/Active Customers Total*
  - It signifies how good are we in retaining customers from the last month.
- ❑ **Churn Rate** = *1 - Monthly Retention Rate*
  - It signifies likelihood of a customer to churn.

***Monthly retention rate is increasing (churn rate is decreasing) implying increasing number of loyal customers***



## Relationships and Drivers of Sales

- *Keeping loyal customers intact:* 1091 customers have greater than 100 transactions, major drivers of revenue.
- *Customer acquisition:* The average number of customers acquired per month is nearly 288 which are addition to our sales every month.
- *Huge product range:* Company sells products with unit price ranging from 1 to 13541.33, thus has a good product range to cater to different customers.
- *Largest Market Area:* 85.61% of all the sales are from United Kingdom implying it is the biggest source of revenue. Focussing on UK and similar markets can drive much better sales.



## Kind of Customers

4) What kind of customers do typically buy from us?

Based on data available we can divide customers on the basis of:

☐ Geographical segmentation:

- Based on transaction country
- Based on transaction region (Asia, Australia, Europe, North America, South America, Unspecified)

☐ Customer Value:

- High Value customers = 104 (considering total sales amount > 10000)
- Medium Value Customers = 1564 (considering total sales amount > 1000)
- Low Value Customers = 2670 (considering total sales amount < 1000)

☐ Frequency of Transactions by various customer

- High Frequency Buyers = Customers with more than 102 transactions (top 25% frequent buyers)
- Medium Frequency Buyers = Customers having transactions between 17 to 102
- Low Frequency Buyers = Customers with less than 17 transactions (bottom 25% frequent buyers)



## Initiatives to Increase Sales

### ❑ Based on geographical segmentation:

- Target new customers of any country with the best selling products in that particular country.
- Perform machine learning to recommend similar products to already acquired customers.
- Allocate resources with priorities to those countries which have the highest total sales.

### Top 10 countries by sales

Transaction .. ₣	Sales
United Kingdom	9,025,222
Netherlands	285,446
EIRE	283,454
Germany	228,867
France	209,715
Australia	138,521
Spain	61,577
Switzerland	57,090
Belgium	41,196
Sweden	38,378

### Top 10 products by country

Transaction..	Product Desc.. ₣	Quantity Sold
Australia	MINI PAINT SET ..	2,952
	RABBIT NIGHT LI..	1,884
	RED HARMONIC..	1,704
	RED TOADSTOOL..	1,344
	HOMEMADE JA..	1,080
	DOLLY GIRL LUN..	1,024
	SPACEBOY LUNC..	960
	BLUE HARMONI..	720
	MINI JIGSAW SP..	720
	4 TRADITIONAL ..	700
Austria	SET 12 KIDS COL..	288
	MINI JIGSAW PU..	240
	PACK OF 6 PANN..	144
	PACK OF 6 SWEE..	144
	12 PENCILS SMA..	48
	ANGEL DECORAT..	48
	KIDS RAIN MAC ..	48
	KIDS RAIN MAC ..	48
	PACK OF 60 PINK..	48
	PARTY CONES C..	48

### ❑ Based on customer value:

- High Value: Improve Retention
- Mid Value: Improve Retention + Increase Frequency
- Low Value: Increase Frequency

## Preventing out of stock situations

- ❑ To understand which products are in most demand, we have to consider [**\* Note**]
- 1. Total number of transactions in which a product is purchased.
- 2. Total quantity of the product sold.

To calculate the impact of both simultaneously, I created a metric which is simply the product of *number of transactions* and *total quantity*

- ❑ Analysis:
  - The products are ranked based on the metric calculated above and arranged in the order of their ranks in a table.
  - Thus we can prevent out of stock situations for the products which are in most demand and responsible for most of the sales.

**\* Note:** Metric is designed to give priority to products which are sold frequently.

Product Descript..	Index	Count_tran..	Quantity So..	metric =
JUMBO BAG RED..	1	2,112	48,474	102,377,088
WHITE HANGIN..	2	2,323	37,891	88,020,793
ASSORTED COLO..	3	1,489	36,461	54,290,429
PACK OF 72 RET..	4	1,370	36,419	49,894,030
RABBIT NIGHT LI..	5	1,036	30,788	31,896,368
PARTY BUNTING	6	1,706	18,295	31,211,270
LUNCH BAG RED ..	7	1,594	19,353	30,848,682
POPCORN HOLD..	8	829	36,761	30,474,869
WORLD WAR 2 G..	9	537	55,047	29,560,239
REGENCY CAKES..	10	2,017	13,879	27,993,943
JUMBO BAG PIN..	11	1,238	21,465	26,573,670
VICTORIAN GLAS..	12	1,047	24,304	25,446,288
PAPER CHAIN KI..	13	1,200	19,355	23,226,000
PACK OF 60 PINK..	14	890	24,854	22,120,060
HEART OF WICK..	15	1,226	17,971	22,032,446
MEDIUM CERAM..	16	250	78,033	19,508,250
JAM MAKING SE..	17	1,169	16,412	19,185,628
RED RETROSPOT..	18	1,047	17,765	18,599,955
JUMBO STORAG..	19	1,197	13,654	16,343,838
CHARLOTTE BAG..	20	899	18,152	16,318,648

*THANK YOU*