Online shoppers' purchasing intention

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Introduction

The goal of this project is to use data about online sessions on the shop website to inspect whether we can extract distinct groups of customers based on their behaviour and shopping intentions, which could be useful in further development of the website and the whole brand.

Data source:

https://archive.ics.uci.edu/ml/datasets/Online+Shoppers+Purchasing+Intention+Dataset#

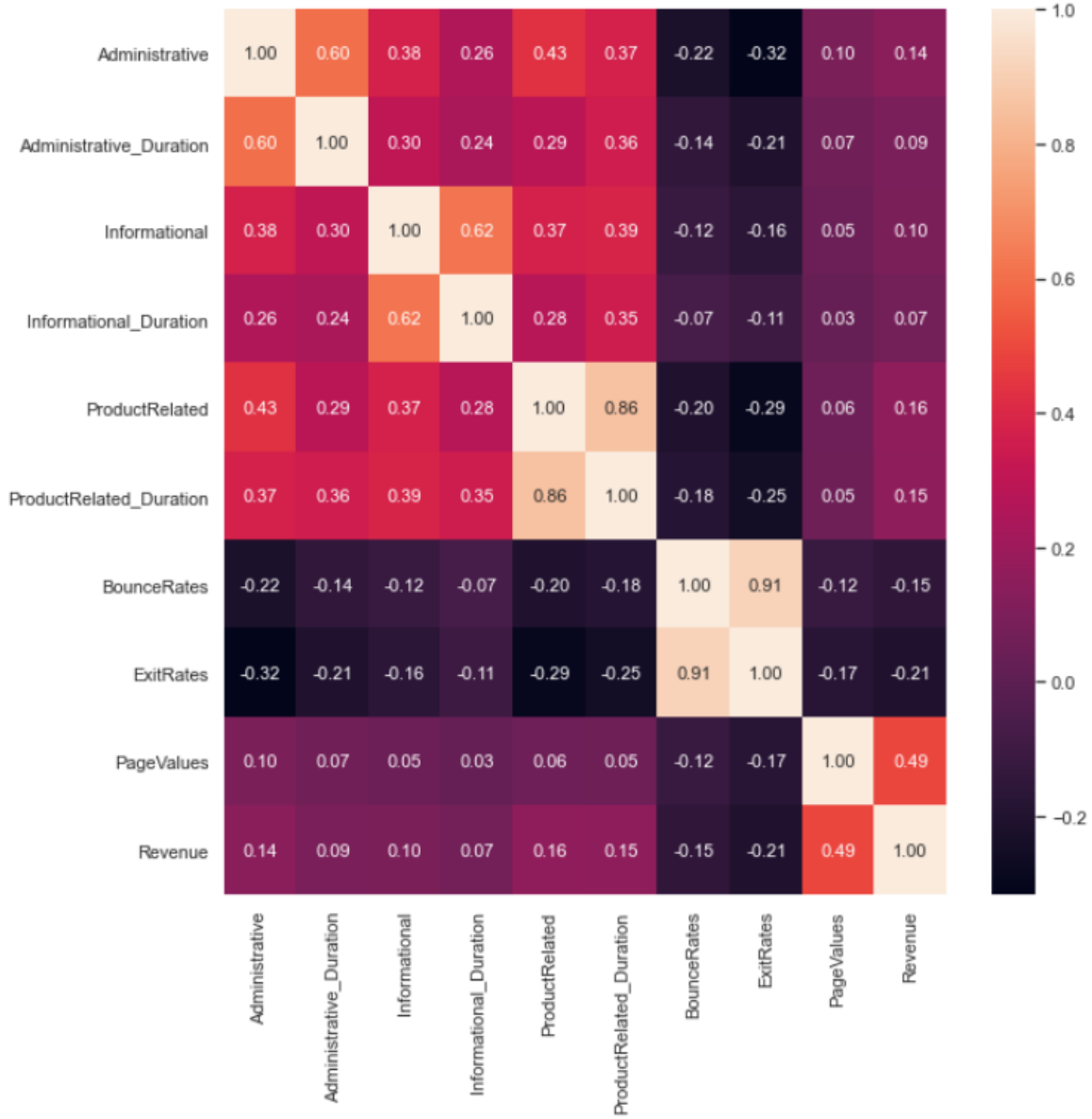
Dataset has 125 (1.0%) duplicate rows	Duplica
`BounceRates` is highly correlated with `ExitRates`	High co
`ExitRates` is highly correlated with `BounceRates`	High co
`Administrative` has 5768 (46.8%) zeros	Zeros
`Administrative_Duration` has 5903 (47.9%) zeros	Zeros
`Informational` has 9699 (78.7%) zeros	Zeros
`Informational_Duration` has 9925 (80.5%) zeros	Zeros
`ProductRelated_Duration` has 755 (6.1%) zeros	Zeros
`BounceRates` has 5518 (44.8%) zeros	Zeros
`PageValues` has 9600 (77.9%) zeros	Zeros
`SpecialDay` has 11079 (89.9%) zeros	Zeros

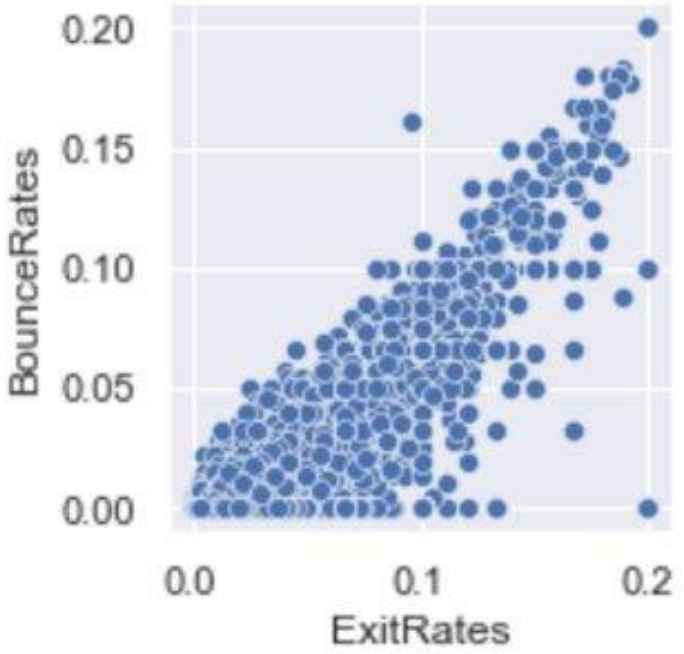
```
Data columns (total 18 columns):
 #   Column                   Non-Null Count  Dtype
---  ------                   --------------  -----
 0   Administrative           12330 non-null  int64
 1   Administrative_Duration  12330 non-null  float64
 2   Informational            12330 non-null  int64
 3   Informational_Duration   12330 non-null  float64
 4   ProductRelated           12330 non-null  int64
 5   ProductRelated_Duration  12330 non-null  float64
 6   BounceRates              12330 non-null  float64
 7   ExitRates                12330 non-null  float64
 8   PageValues               12330 non-null  float64
 9   SpecialDay               12330 non-null  float64
 10  Month                    12330 non-null  object
 11  OperatingSystems         12330 non-null  int64
 12  Browser                  12330 non-null  int64
 13  Region                   12330 non-null  int64
 14  TrafficType              12330 non-null  int64
```

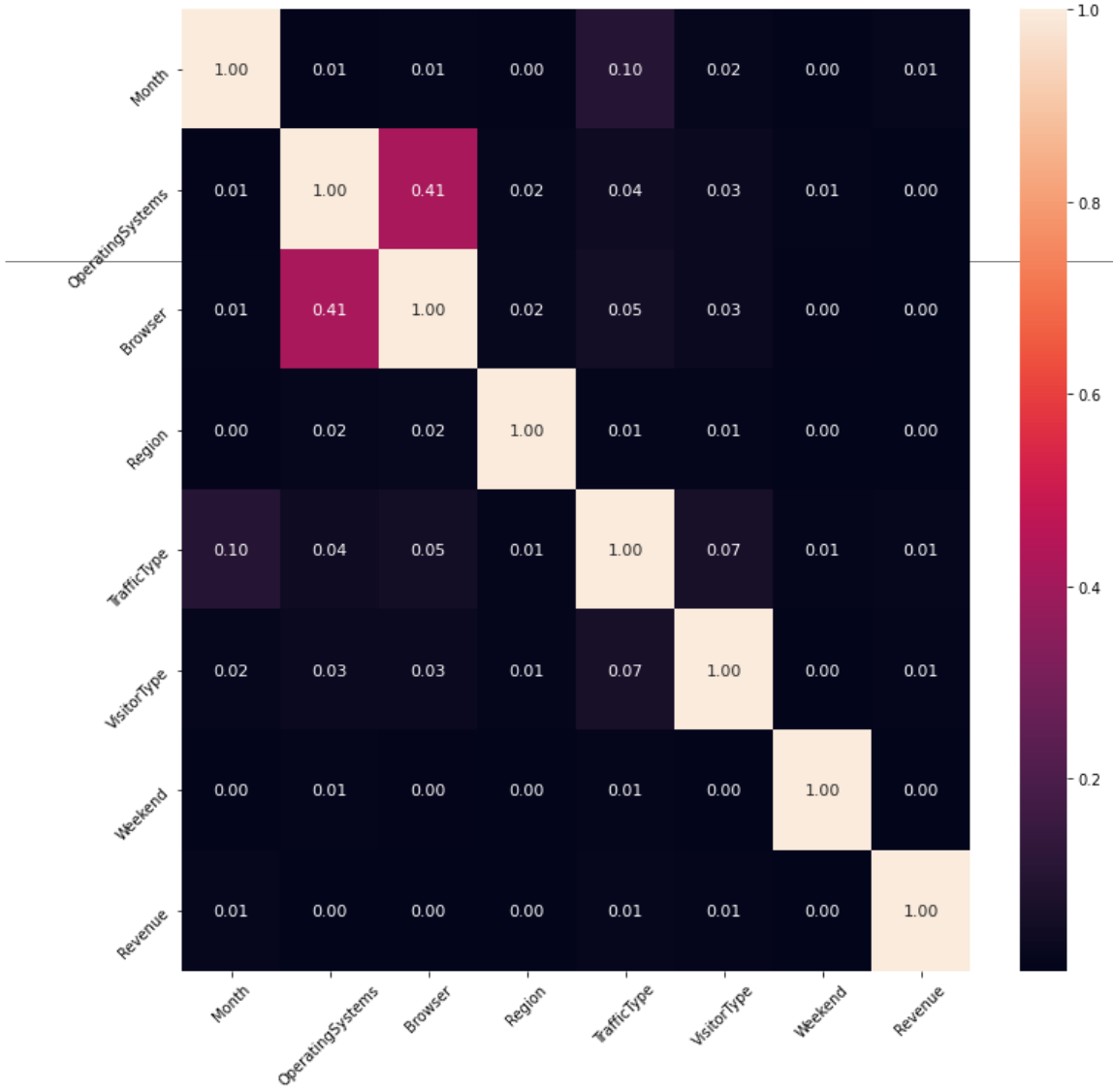
Data info

- both discrete and continuous variables
- highly correlated variables
- Many mostly zero variables

Correlation matrix



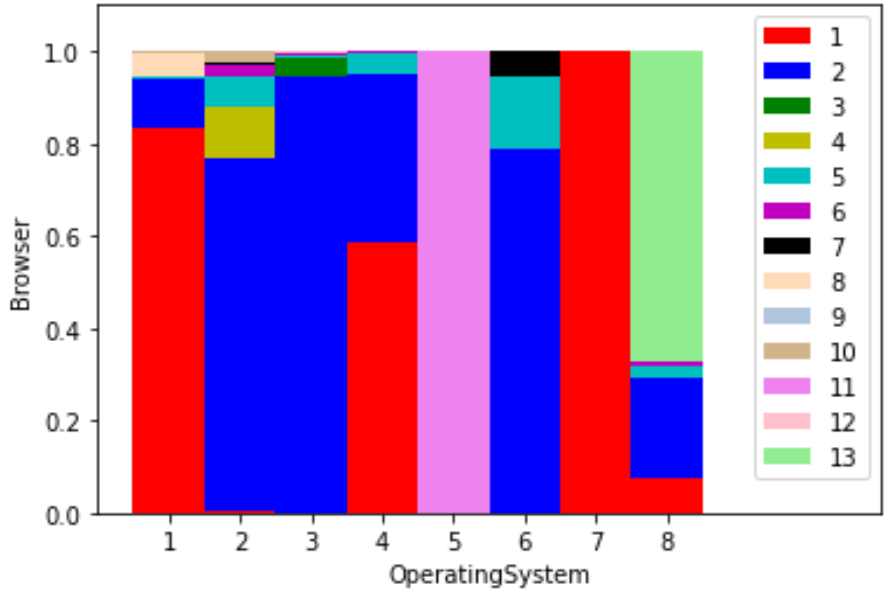




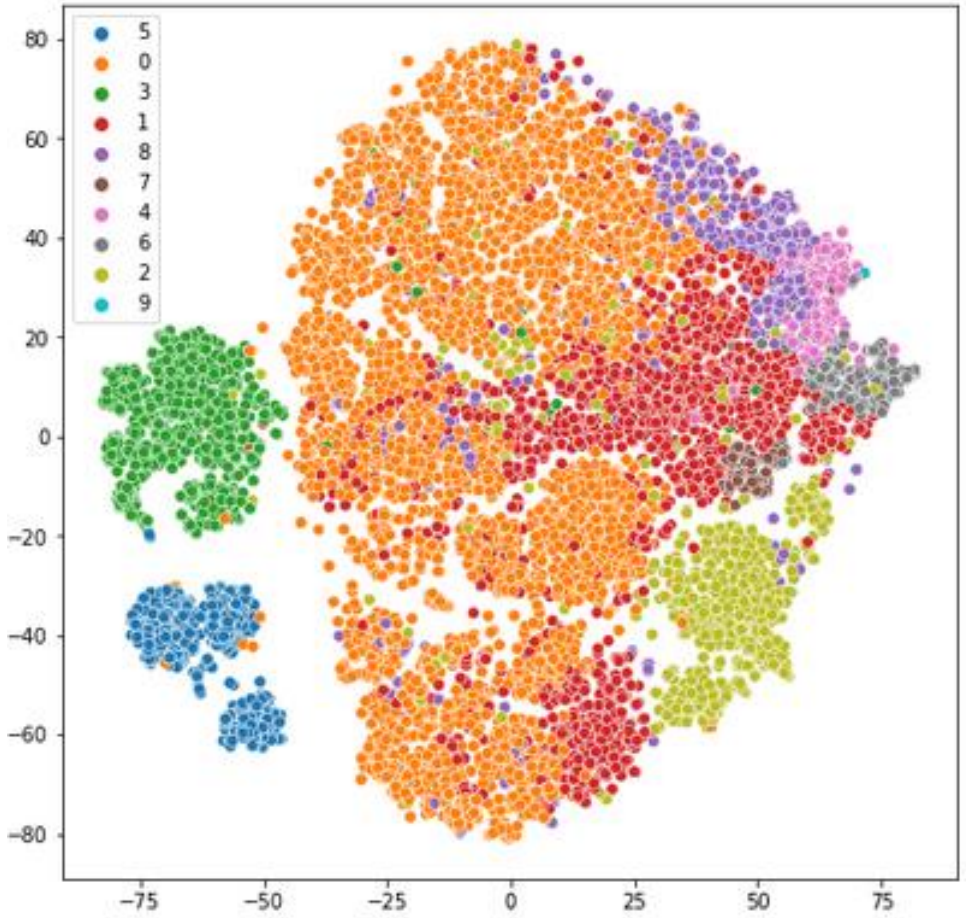
Mutual information

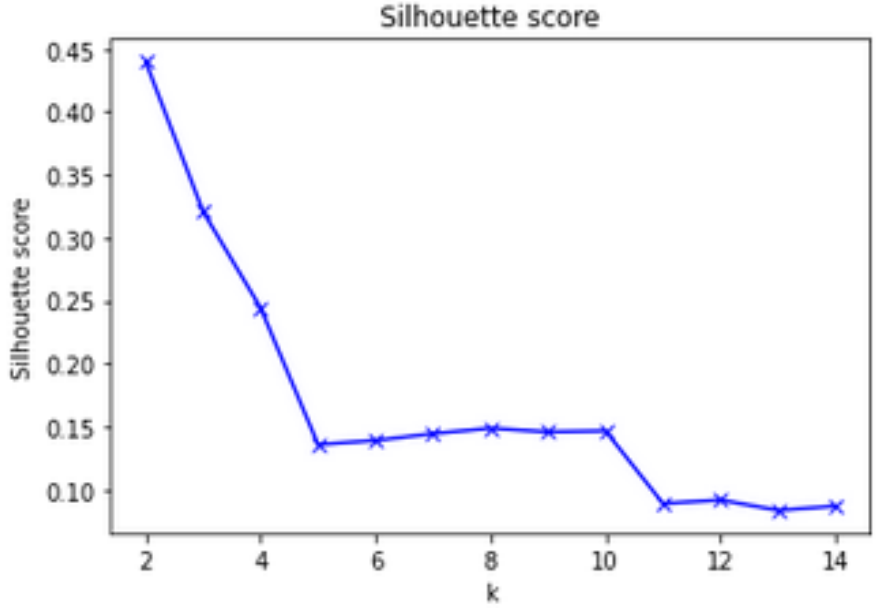
Better than correlation for discrete variables

Strong connection between browser type and operating system type

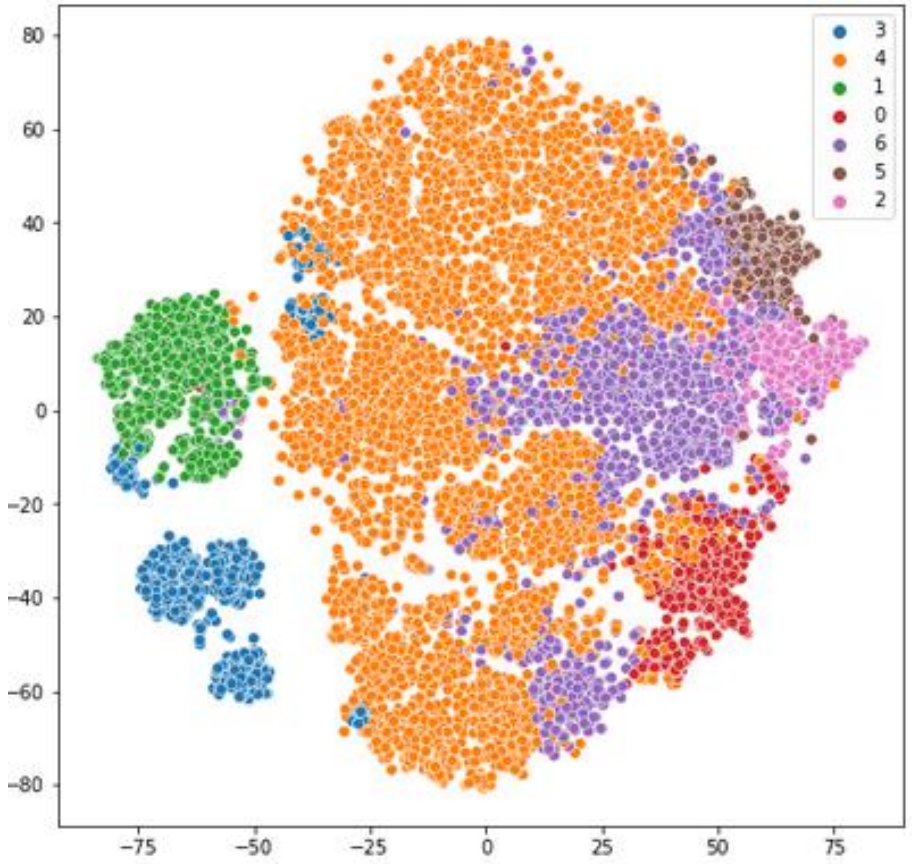


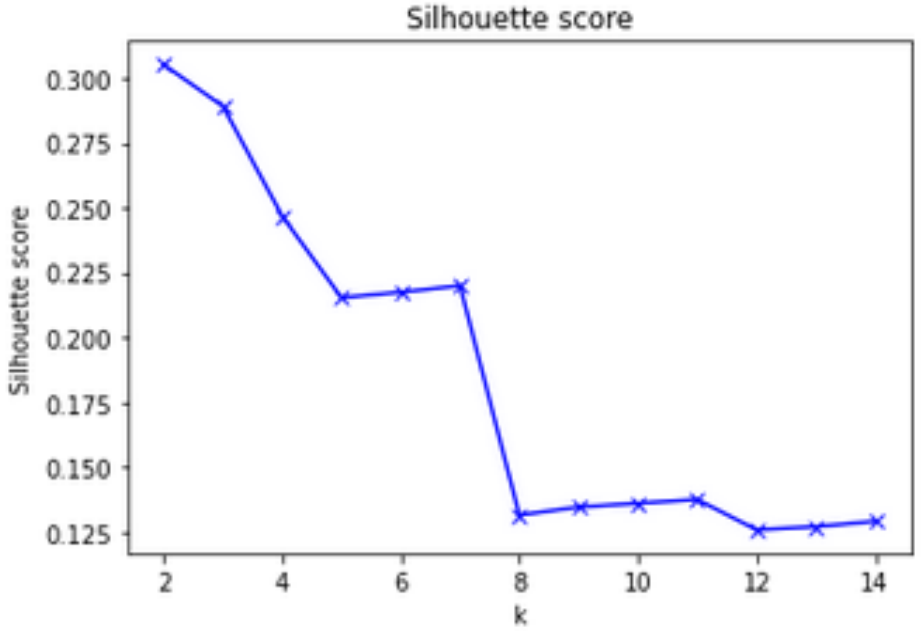
Hierarchical clustering





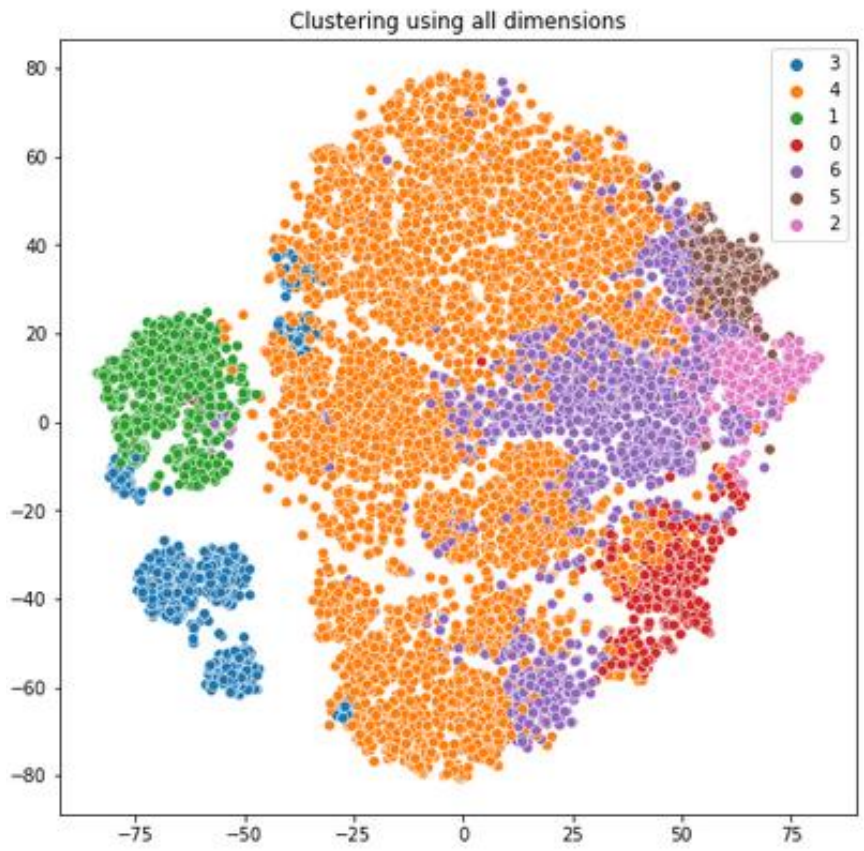
Clustering using K-means

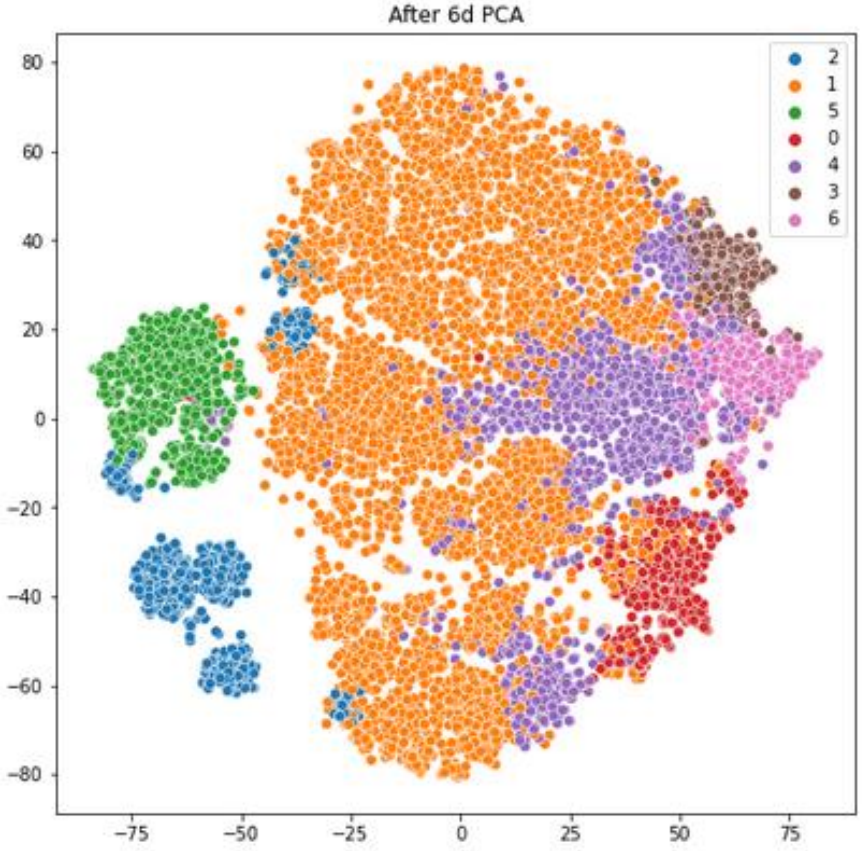


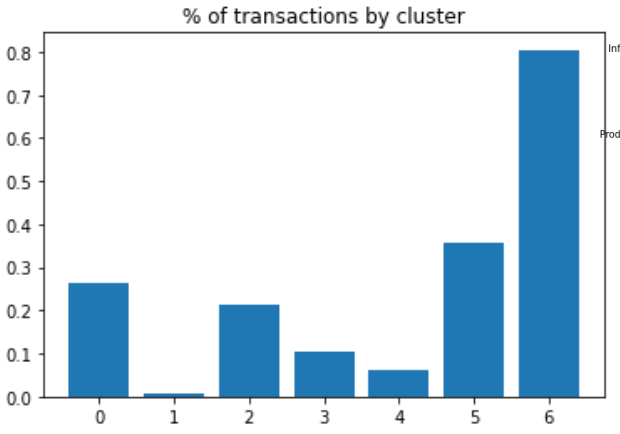


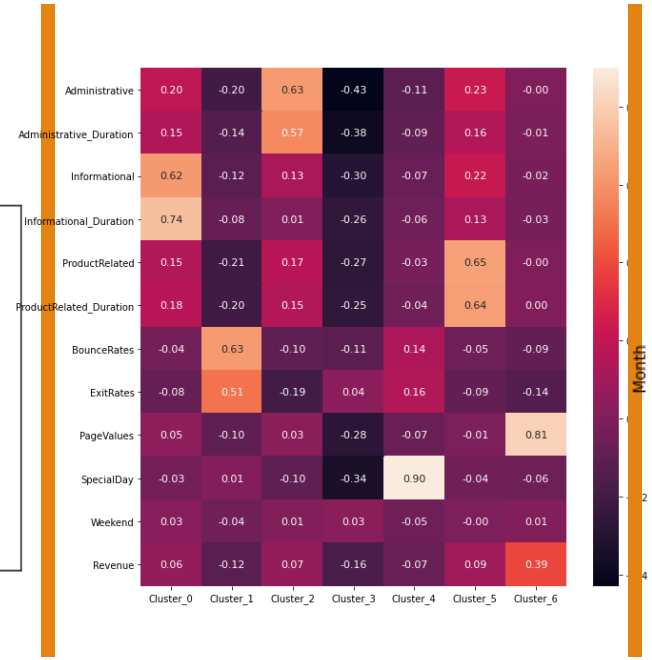
After analysis, decided to stick with K-means clustering using 7 distinct clusters.

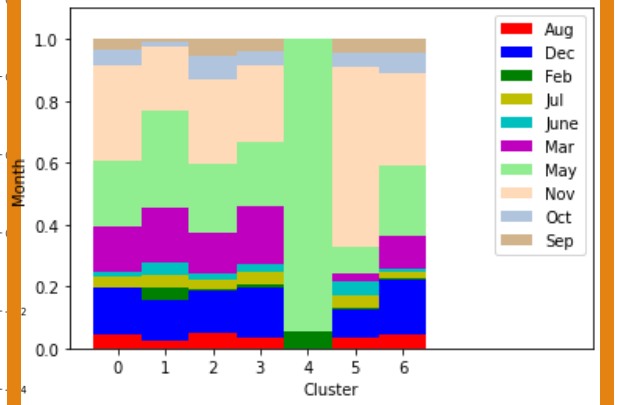
Using PCA to reduce dimensionality

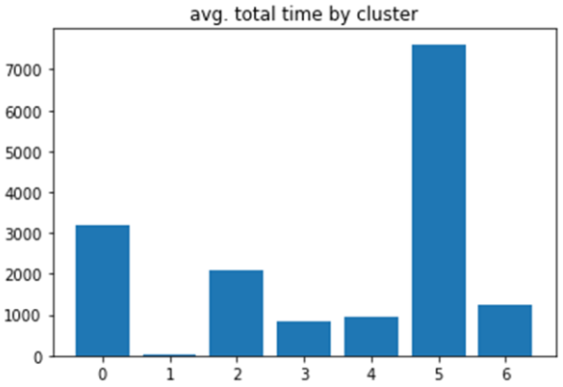




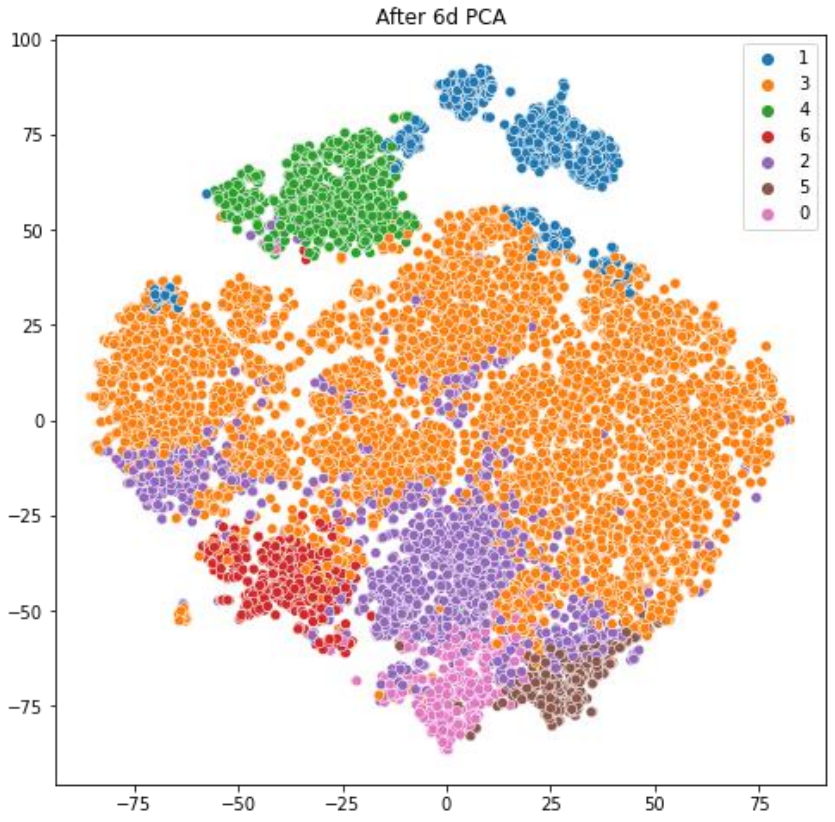








Some cluster analysis



Describing types of customers based on performed clustering

Cluster 0 – long time spent on information pages, not many trainsactions – maybe someone looking on FAQs?

Cluster 1 – immediate „bounce” – leaves website immediately

Cluster 2 – long time spent on administrative pages, not many transactions – someone signing up for the first time? Admins?

Cluster 3 – average customer, short time spent and not too many transactions

Cluster 4 – customers visiting before Special Days (example Valentines etc)

Cluster 5 – a long time spent on product-related pages, many transtactions!

Cluster 6 – customer ending up buying the product, lots of transactions and above average time spent