

✦ Sales Conversion Optimisation

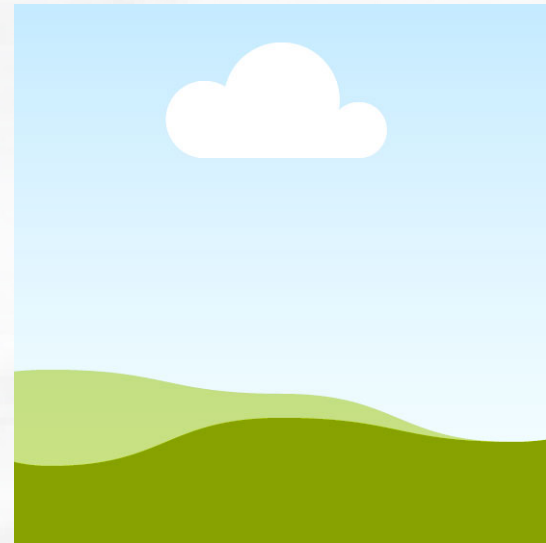
MGMT 52500-001 - Group 8



Team



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Table of Contents



- Data Description
- Problem Statement
- Exploratory Data Analysis
- Marketing KPI Analysis
- Hypothesis Testing
- Modelling Techniques
- Conclusion

...

Data Description

An anonymous Organization's
social media ad campaign Data

1143 observations

11 variables



Variable Description

...

1

Unique ID for
each ad

2

Ad Campaign ID
(3 Campaigns)

3

ID for Facebook
tracker

4

Age Group

5

Gender

6

Category of
person's
interest

7

Impressions: the
number of times
the ad was shown

8

Clicks: number
of clicks on for
that ad

9

Spent: Amount
spent by campaign
to show the ad

10

Total conversion:
Total No. of people
who enquired after
seeing the ad

11

Approved
conversion: Total
No. of people who
purchased after
seeing the ad

Objective : Explore features to determine optimal customer segments and next steps for ad targeting

Problem Statement

...

- Optimize the social ad campaigns for the highest conversion rate possible
- Finding the perfect target demographics utilizing appropriate marketing KPIs

1

Phase 01

Exploratory Data
Analysis and Marketing
KPI Analysis

2

Phase 02

Hypothesis testing to
validate analysis
findings

3

Phase 03

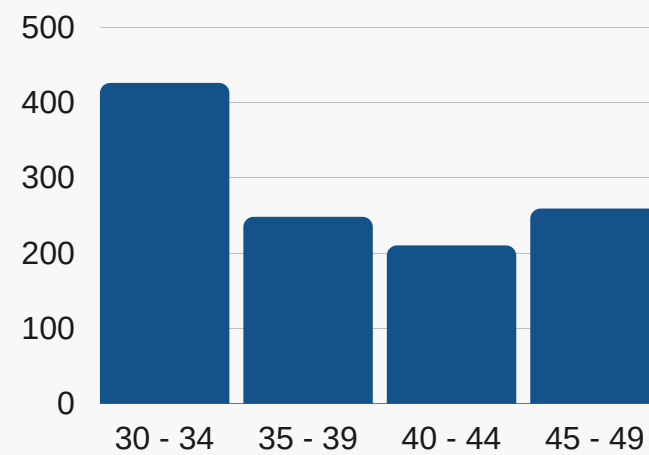
Modelling

Basic EDA

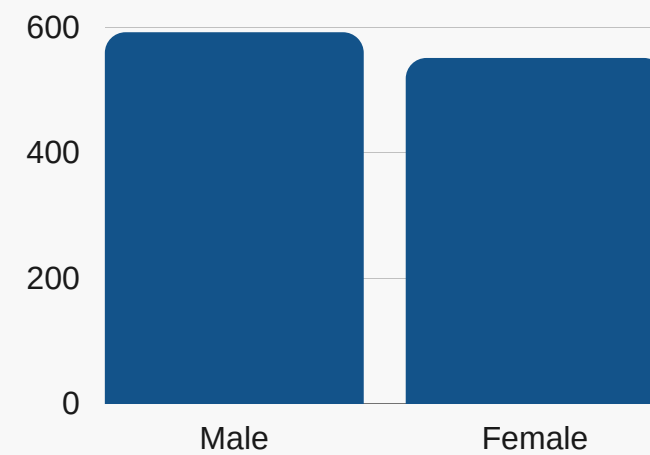
...

Age group 45-49 has higher Click to Impression ratio

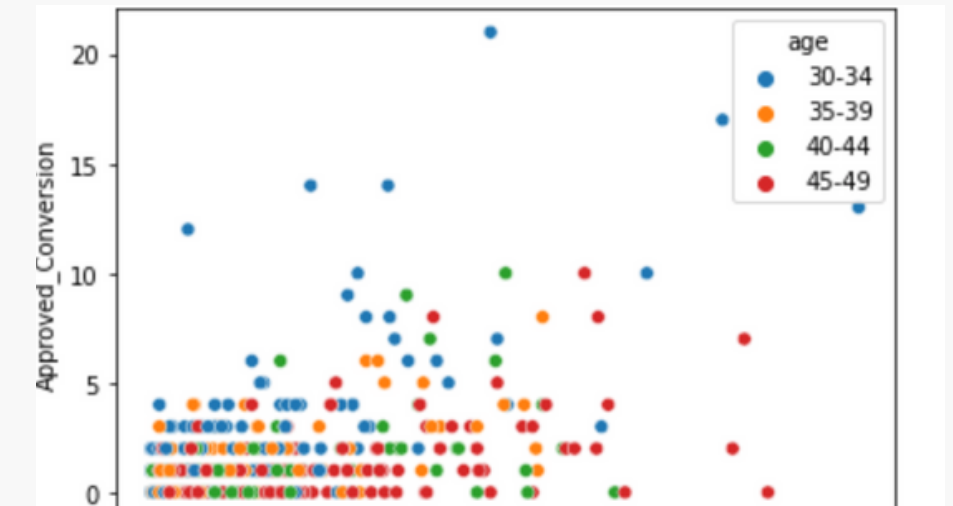
Age group distribution



Gender distribution

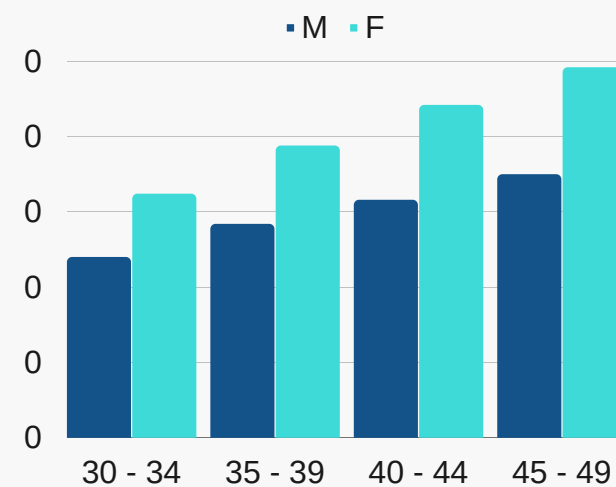


Approved Conversions vs Clicks for each age group

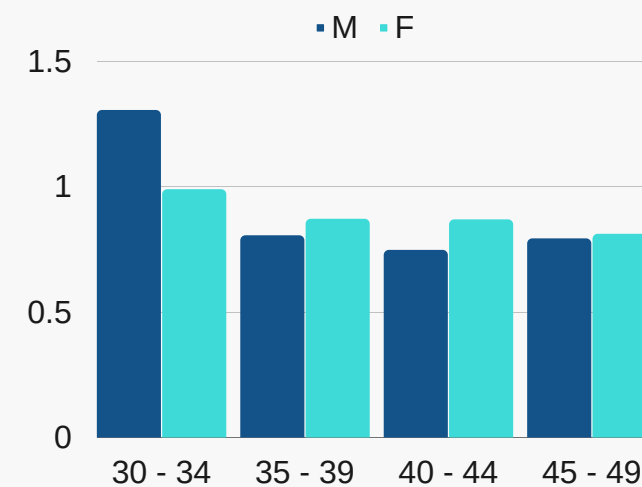


Age group 30-34 has higher approved conversion rate than any other group

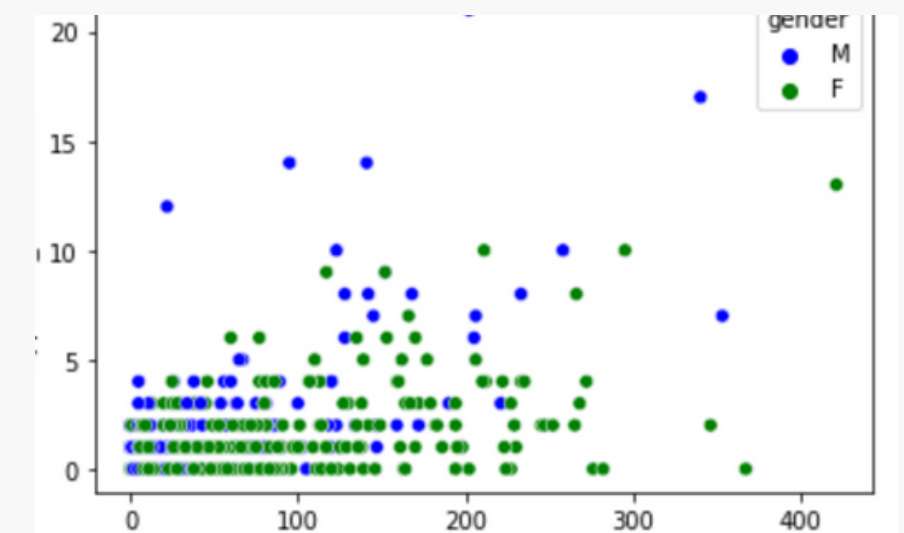
Click-to-impression by age



Approved conversion rate by age



Total Conversions vs Clicks for each gender

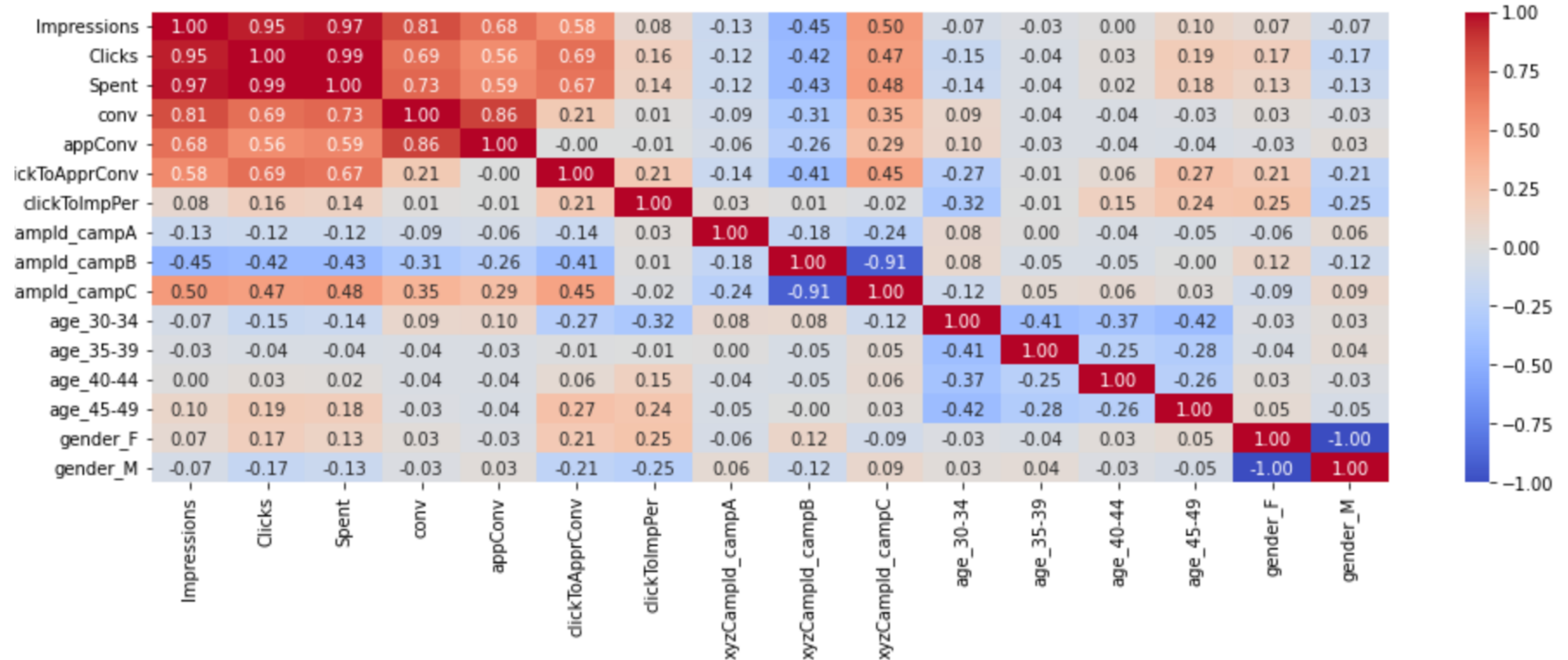


On Average,
Males - Significant conversions for age 30-34
Females - CTR is high across ages

Correlation Matrix

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- Very strong correlation between spend and impressions and spend and clicks
- Moderate to strong correlation between conversions to spend



Campaign Level Analysis

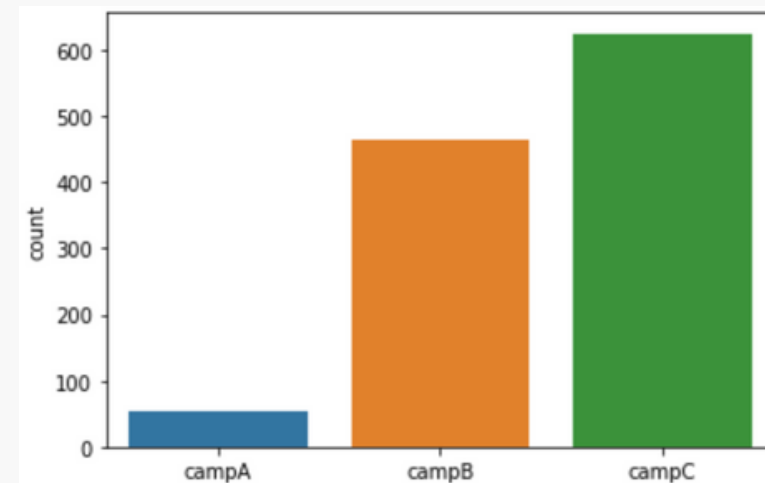
...

Unequal distribution of both individual ads and the impressions

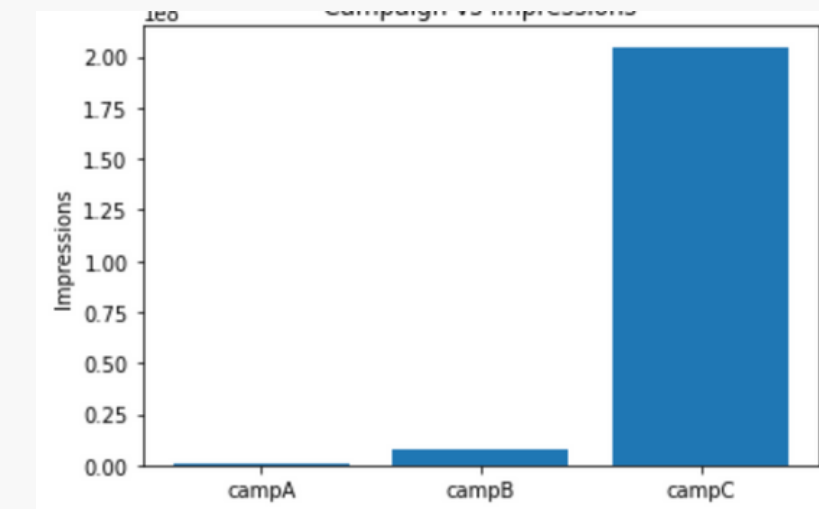
Campaign C has the highest ad spend and highest conversions

Need to define more attributes to gauge performance

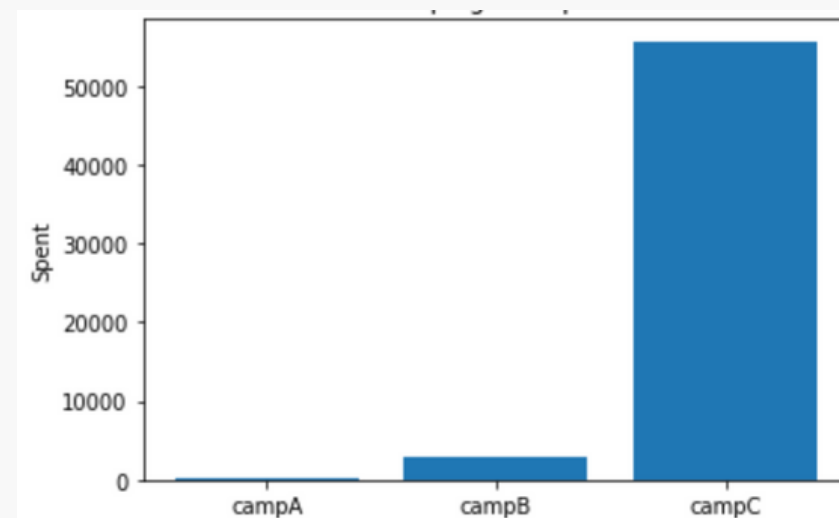
Count of Individual Ads



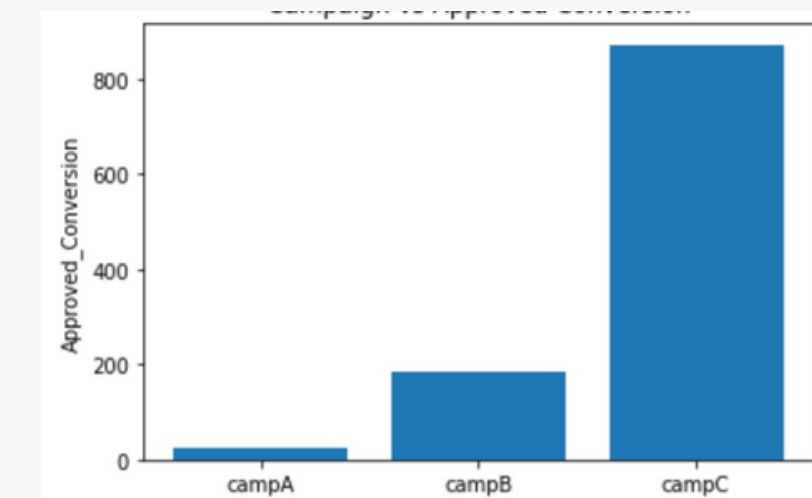
Campaign vs Impressions



Campaign vs. Spent



Campaign vs Approved Conversion



Marketing KPIs

Need for additional features to properly measure campaign efficacy

CTR

Click Through
Rate

$$\frac{[\text{Clicks}]}{[\text{Impressions}]}$$

CPC

Cost Per Click

$$\frac{[\text{Spent}]}{[\text{Clicks}]}$$

Conversion Rate

$$\frac{[\text{Approved
Conversions}]}{[\text{Clicks}]}$$

CAC

Customer
Acquisition Cost

$$\frac{[\text{Spent}]}{[\text{Approved
Conversions}]}$$

Gender-wise Analysis

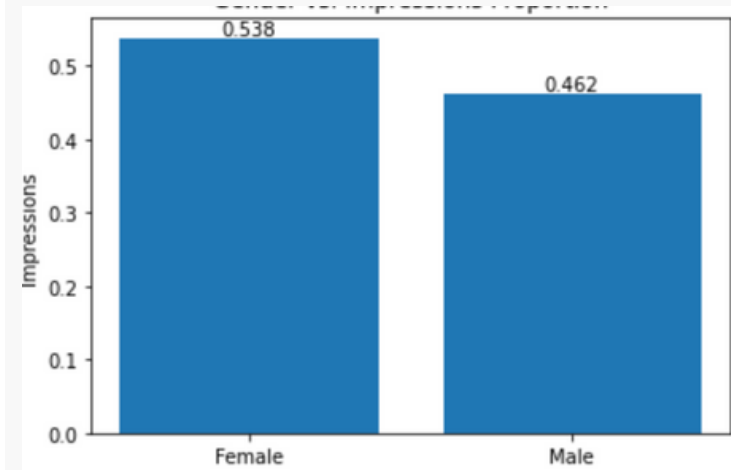
...

Although females have a higher CTR Males are almost twice as likely to actually complete a purchase once on the site

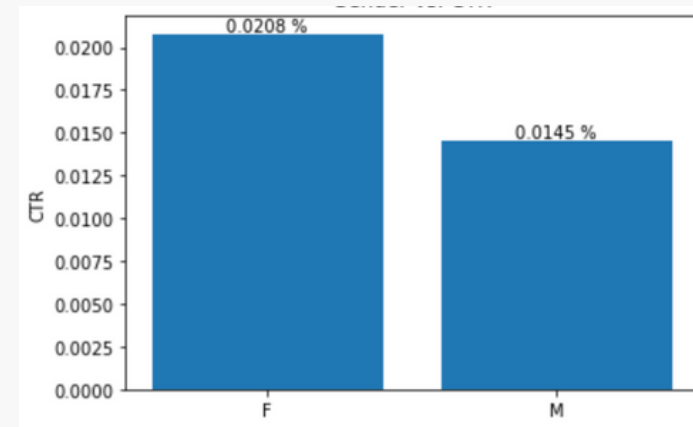
Across all campaigns females are more exposed to the advertisements

Females have a higher CTR & CAC on all campaigns with a lower conversion

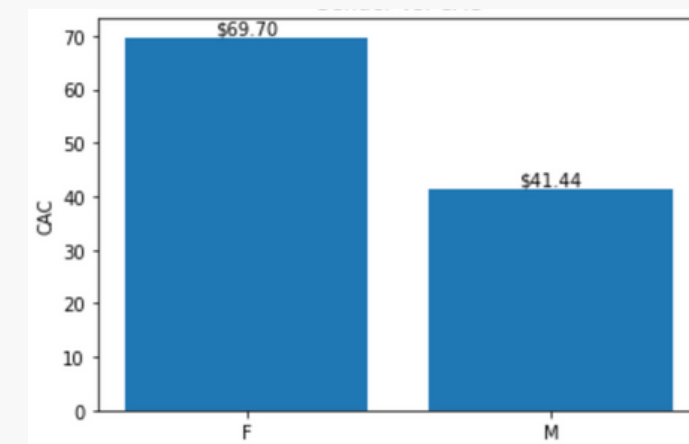
Impressions proportion



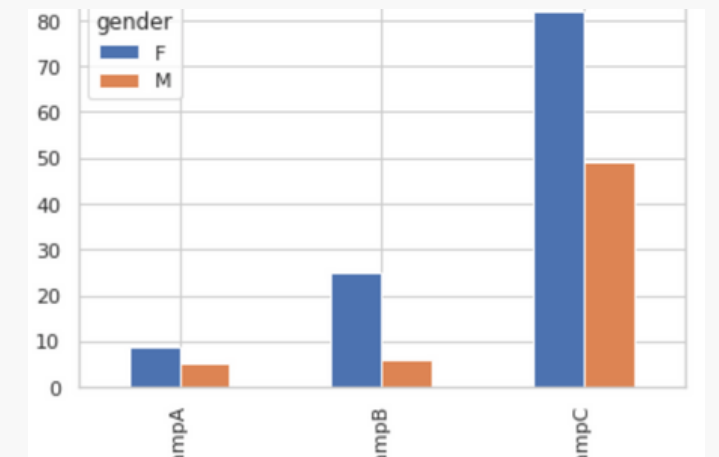
CTR



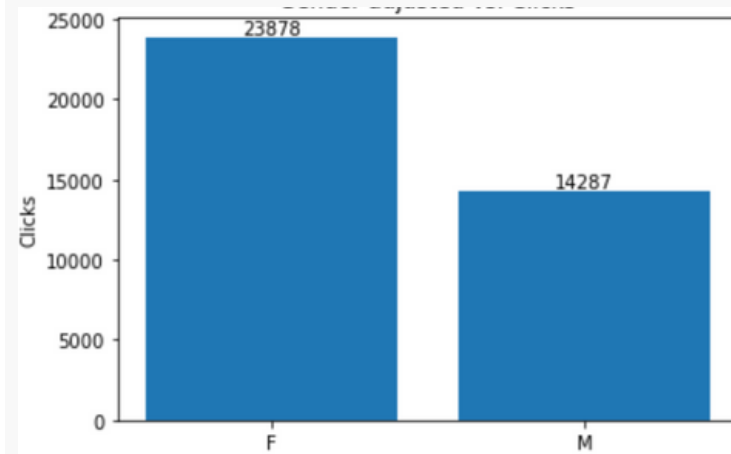
CAC



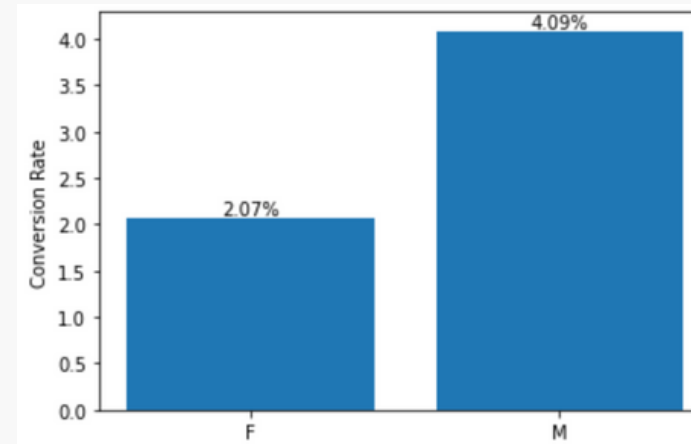
Campaign-wise CAC



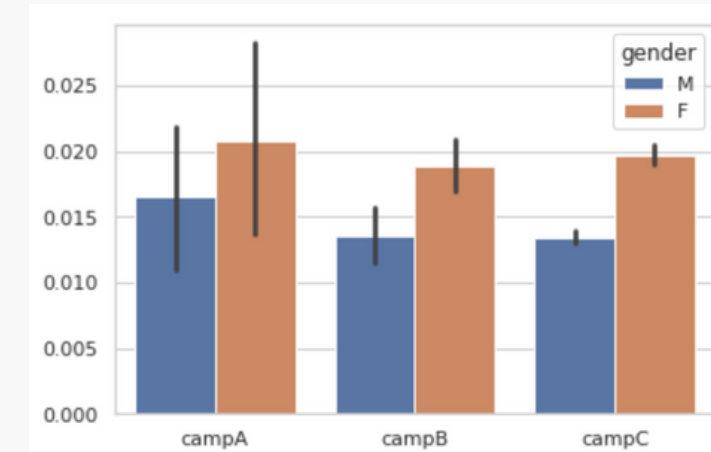
Clicks



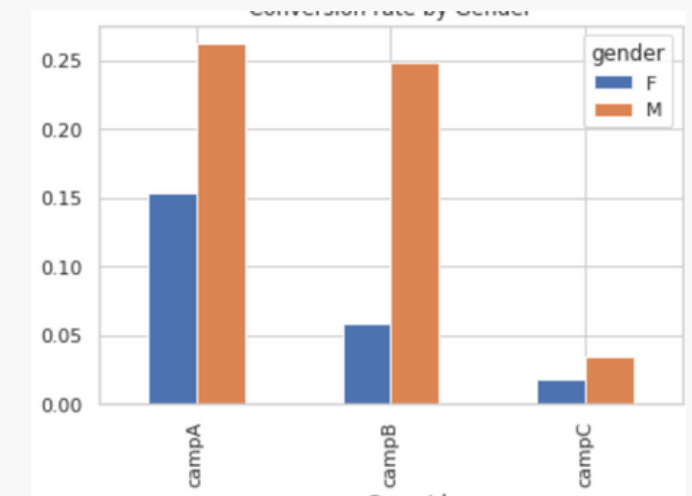
Conversion Rate



Campaign-wise CTR



Campaign-wise Conversion Rate



Age-wise Analysis

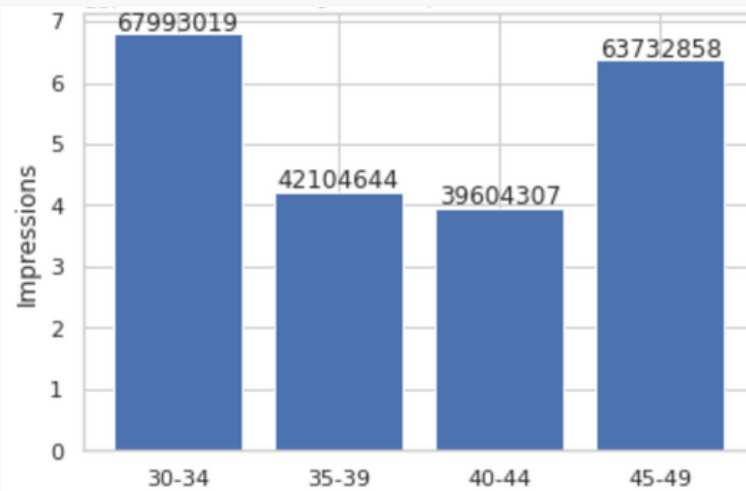
...

45-49 has the highest CTR with age 30-34 being the lowest
30-34 has max conversion rate

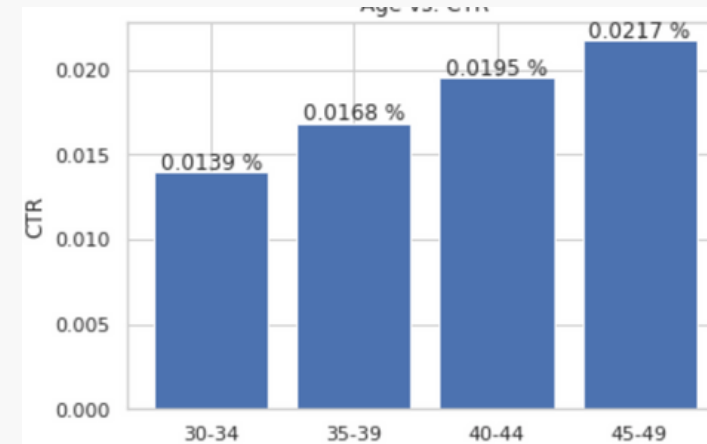
45-49 have the highest customer acquisition cost while 30-34 are the lowest

Campaign A has the highest conversion rate for all age groups except 30-34 while campaign C is the lowest

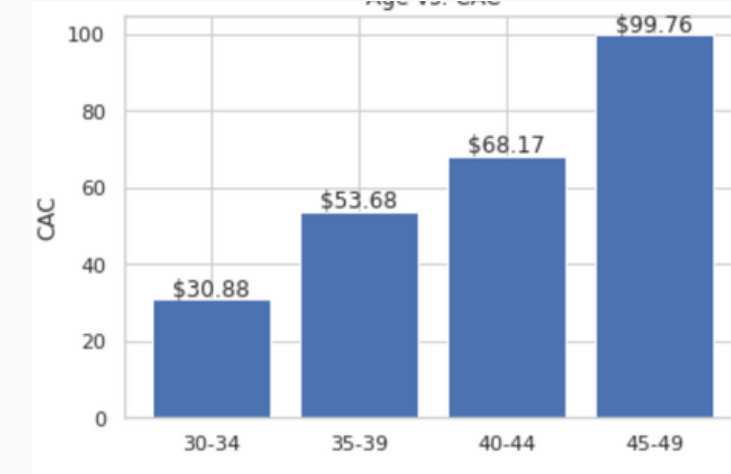
Impressions proportion



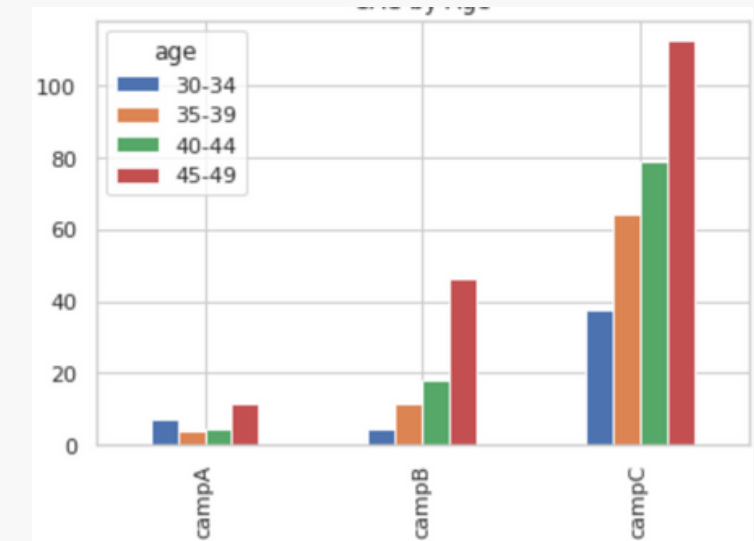
CTR



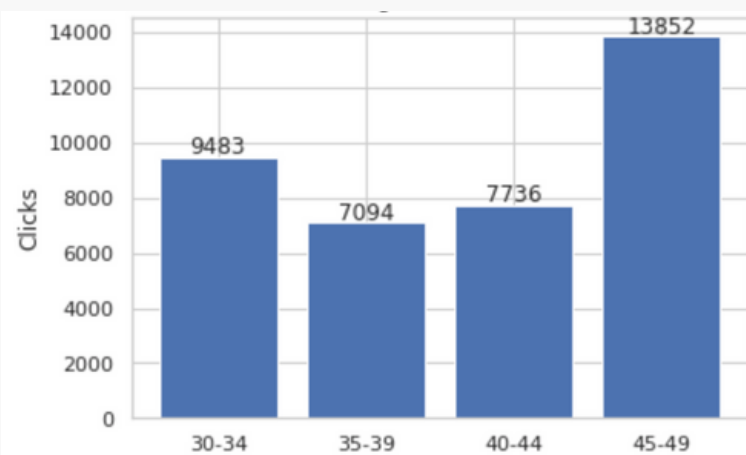
CAC



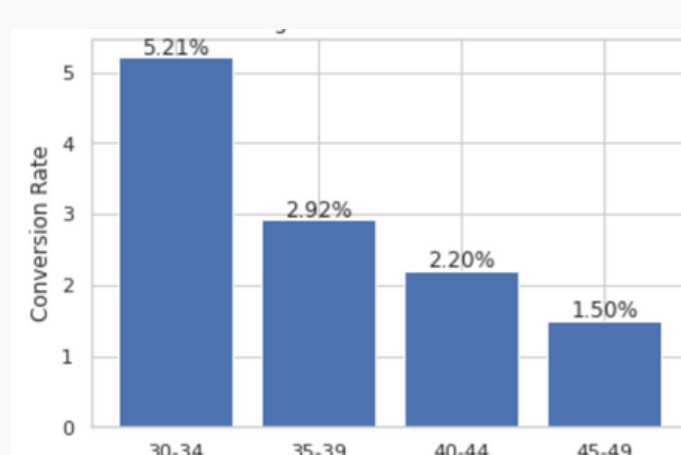
Campaign-wise CAC



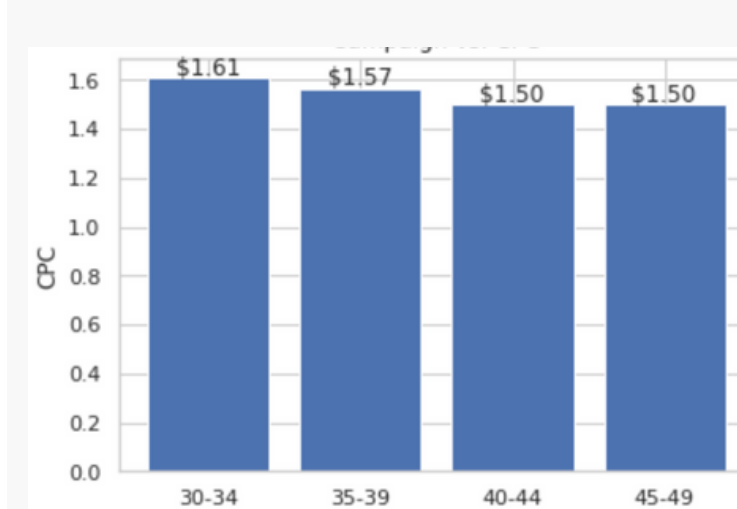
Clicks



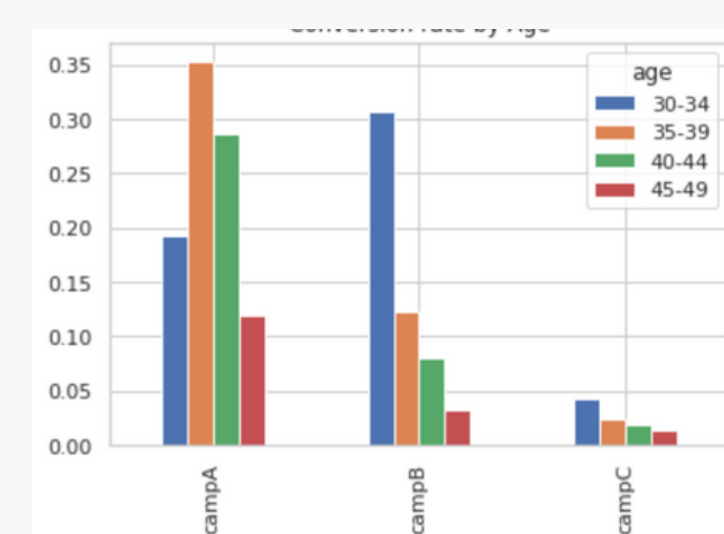
Conversion Rate



CPC



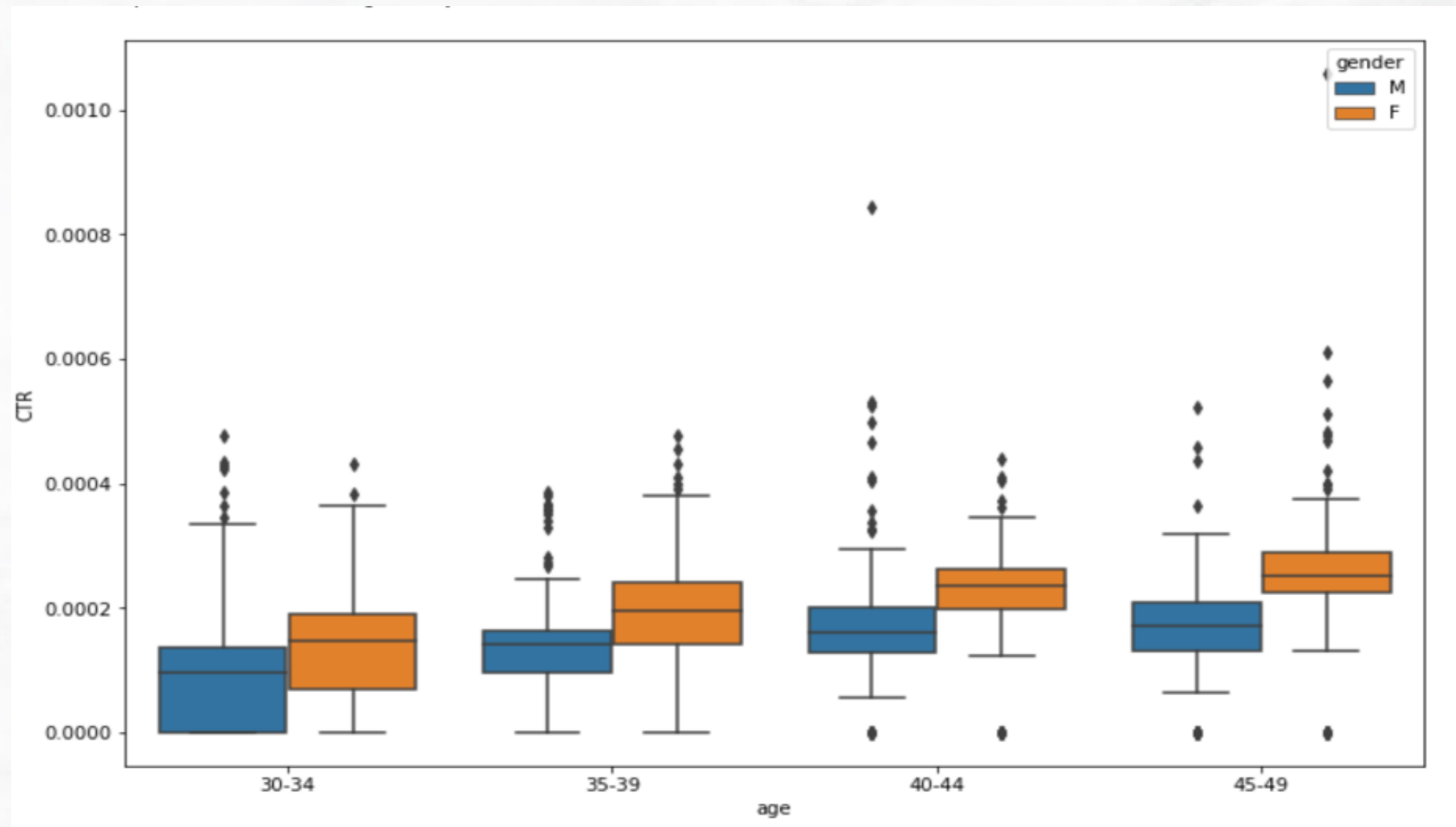
Campaign-wise Conversion Rate



Campaign Objective 1

...

Age vs CTR



Objective: Product Awareness

- Females tend to have higher CTR
- CTR increasing with age -
Indicating younger age groups
have shorter attention span

Result Validation through Hypothesis Testing

...

Gender

1

- H0: Mean click-through rates aren't effected by gender
- Ha: Mean click-through rates are effected by gender



p-value=1.708968397498632e-17)
Females have higher CTR

Age

2

- H0: All age groups have same mean click-through rates
- Ha: All age groups have different mean click-through rates

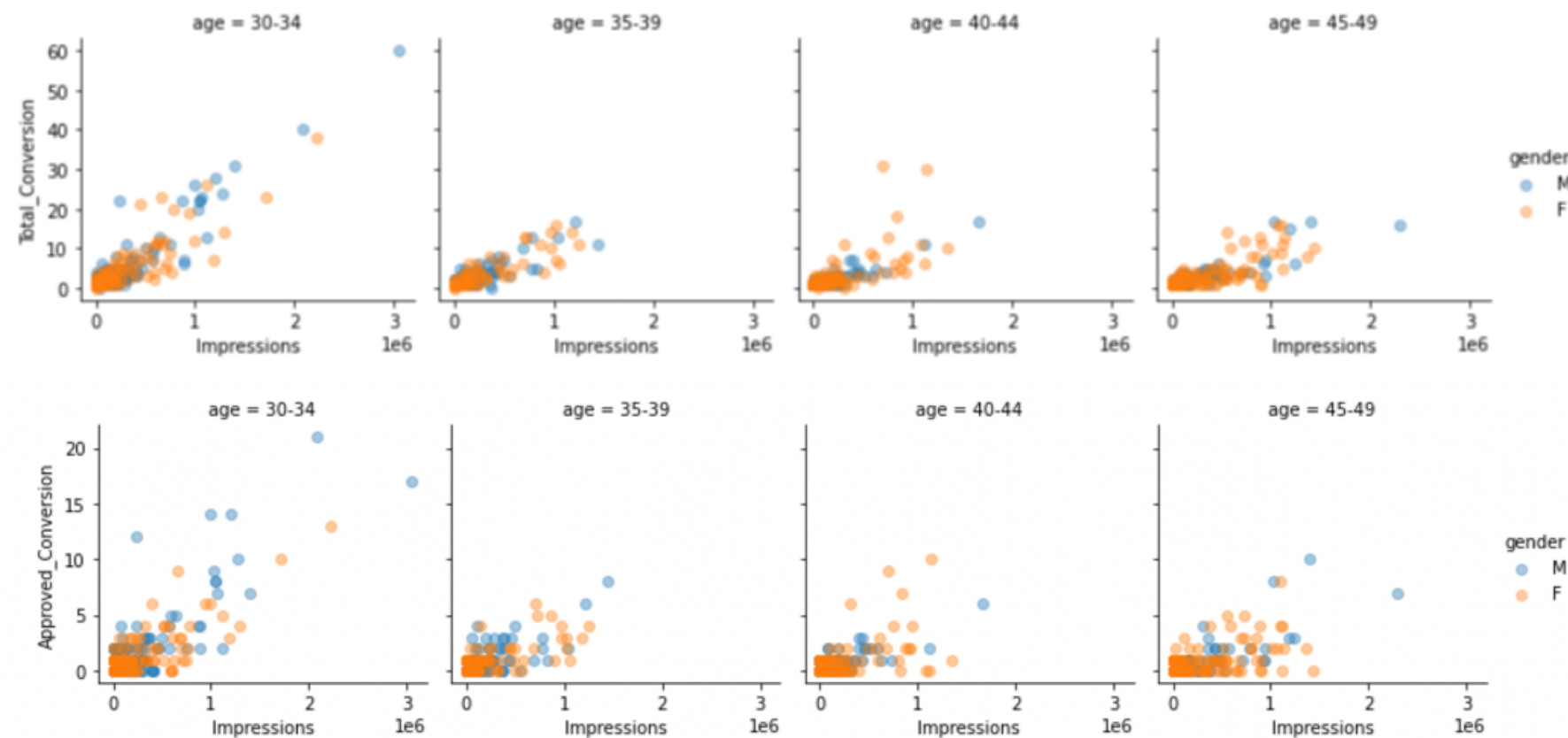


p-value=1.6245998315114536e-07)
45-49 aged have higher CTR

Campaign Objective 2

...

Impressions vs Conversions



Objective: Customer Acquisition

- Gender: No major differences in conversions between Males & Females across ages
- Age: 30-34 Age group has higher conversions

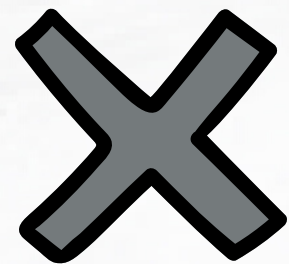
Result Validation through Hypothesis Testing

...

Gender

1

- H0: Males and females have same mean conversions
- Ha: Males and females have different mean conversions



p-value=0.3502

Fail to prove different conversions

Age

2

- H0: '30-34' & '45-49' aged group have same mean conversions
- Ha: '30-34' & '45-49' aged group have different mean conversions



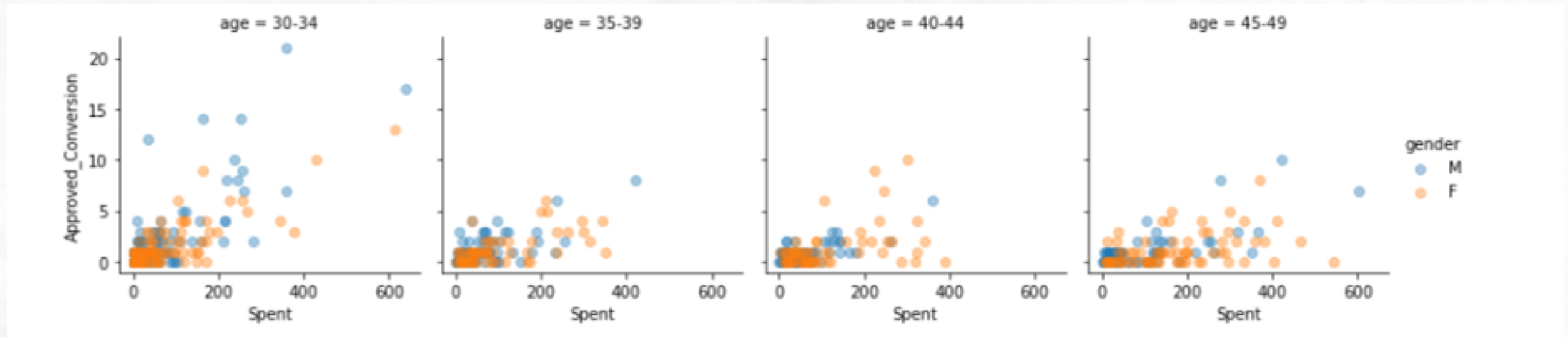
p-value=0.0396

30-34 aged have more conversions

Campaign-C

...

Approved Conversions



**Improve
performance**



- Highest spending currently on both 30-34, 45-49 age groups
- Males higher conversions relatively predominantly in 30-34 age group



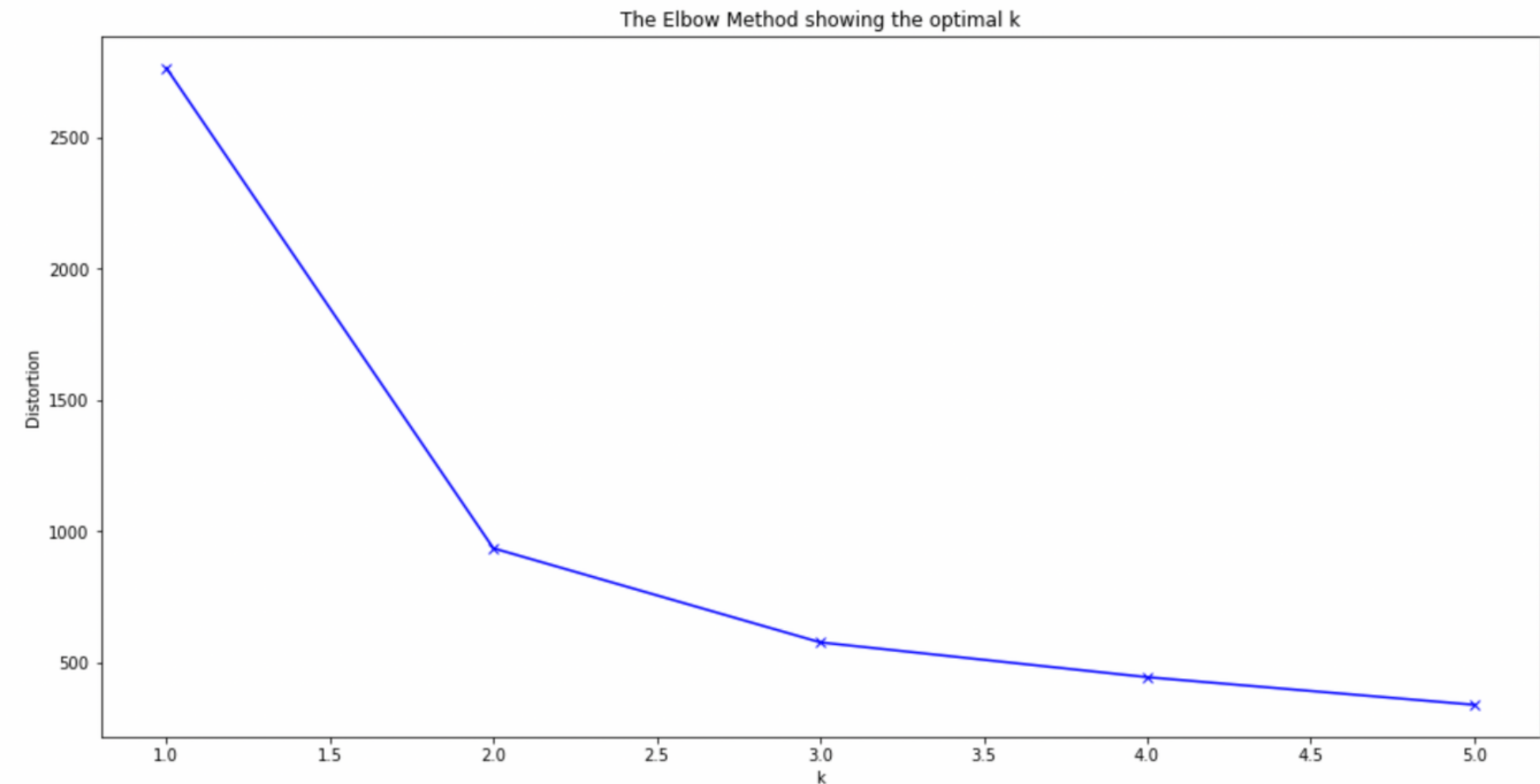
Which Campaigns to
target in future?



691
FB campaigns IDs

K-Means- Clustering

- Cluster 691 FB Campaigns IDs
- On basis on Spend amount, Clicks, Impressions, Conversions to detect unoptimized campaigns
- Using K-Means Clustering
- Heuristic Approach to identify number of clusters - 2 Optimal



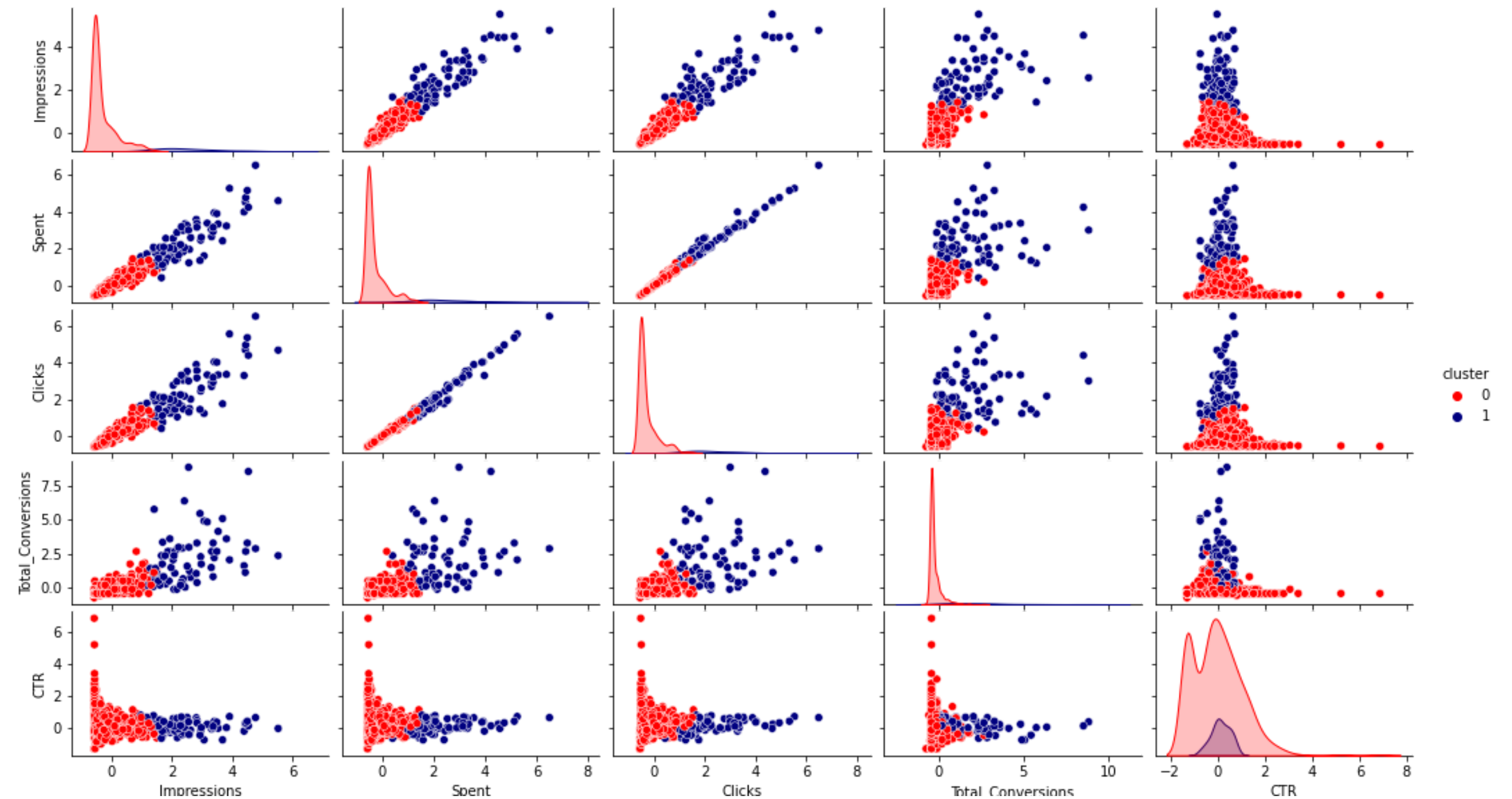
Elbow Method

Campaigns: FB Level

...

K-Means- Clustering

- Clear distinguishing of clusters
- Campaigns in Red cluster:
 - Low Spend -> High CTR
 - Efficient Performance
- Campaigns in blue cluster:
 - High Spend
 - Low CTR -> Ineffective Campaigns
 - Optimization opportunity



Conclusions & Recommendations ...

Conclusions



Age

Users in the age group 30 - 34 are most likely to make a purchase once they click on the ad



Gender

- In terms of product awareness, company is doing better job targeting females
- In terms of customer acquisition, performance is the same for both males and females



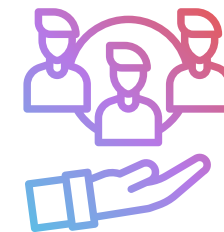
Campaign

Spend allocation across age groups is not appropriate for campaign C



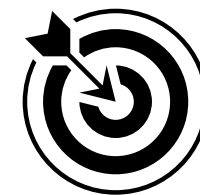
Awareness

- Increase ad exposure for age group 30-34 by throwing more impressions
- Target more male users for product awareness by showing them more impressions



Acquisition

- Target age-groups 35 to 49 for acquisition. Make changes in ad designs to increase their clicks.
- Gender specific targeting not required



Future Campaigns

For future campaigns, demographics studies and analyses to understand their interests should be undertaken before allocating ad spend across different segments



Thank You!