E-commerce Marketing Analytics

Author: Nina Zou

Outline

- *Intro & data summary*
- Database Development
- Marketing Evaluation
- Marketing Proposals
- Summary

Intro & Data Summary

Background Recap

The datasets come from E-commerce Databank, which including 6 csv files. The time range is from 2013 to 2017, each dataset including the information for attribution, user, device, sales and product.

Research Purpose

Evaluate the marketing efficiency from the angle of Campaign Funnels, User Acquisition and Sales Behaviors. Make actionable proposals and insights to drive growth and revenue

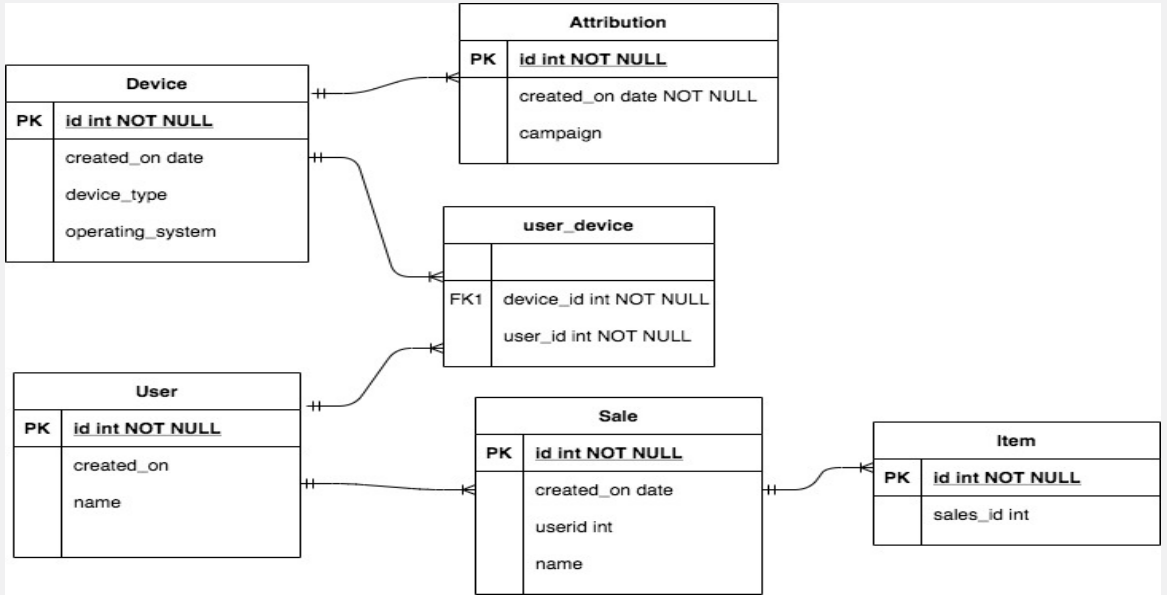
Database Development

*In the databank, we have **6** csv files. We need to build a database and write SQL to get useful views*

- *Tool: SQLite*
- *View 1: A table to understand how long did it take from receiving a campaign to become a new user*
- *View 2: A table to summarize every day's sales amount*
- *View 3: A table of total amount of sales and campaigns each day*
- *View 4: A table to understand how long did it take from register as a new user to make the first purchase*
- *View 5: A summary for all the campaign's performance, whether it acquire a new user in 7 days*

***details in Appendix**

Name	Type	Schema
Tables (6)		
attribution		CREATE TABLE "attribution" ("created_on
device		CREATE TABLE "device" ("created_on" TE
item		CREATE TABLE "item" ("item_id" INTEGEF
sale		CREATE TABLE "sale" ("amount" REAL, "c
user		CREATE TABLE "user" ("created_on" TEX
user_device		CREATE TABLE "user_device" ("device_id



Marketing Evaluation -- Campaigns

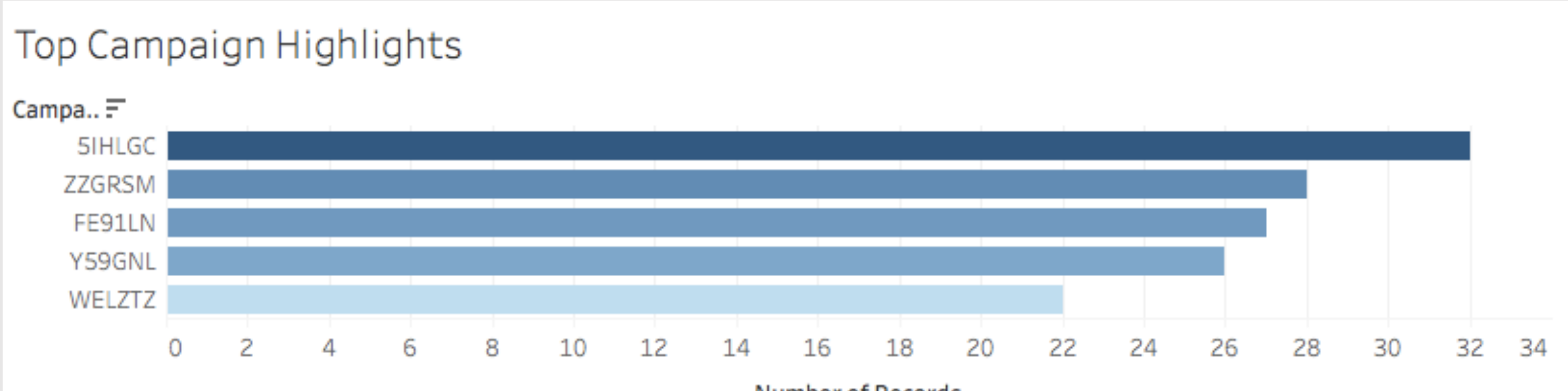
What Campaign is responsible for users to find our app?

*From View 1, we got the time length between each campaign feed and the new user's first register; Ideally, a successful feed is when people got the ads to feed and then use the link to register immediately, but considering our average campaign length is 3 years and the seasonality, I choose **7 day**s as my criterion.*

If the user received the feed and register in 7 days, then we assume that this campaign is responsible for acquisition.

***Pros**: Quick achieve, Action in Time, Avoid network effect*

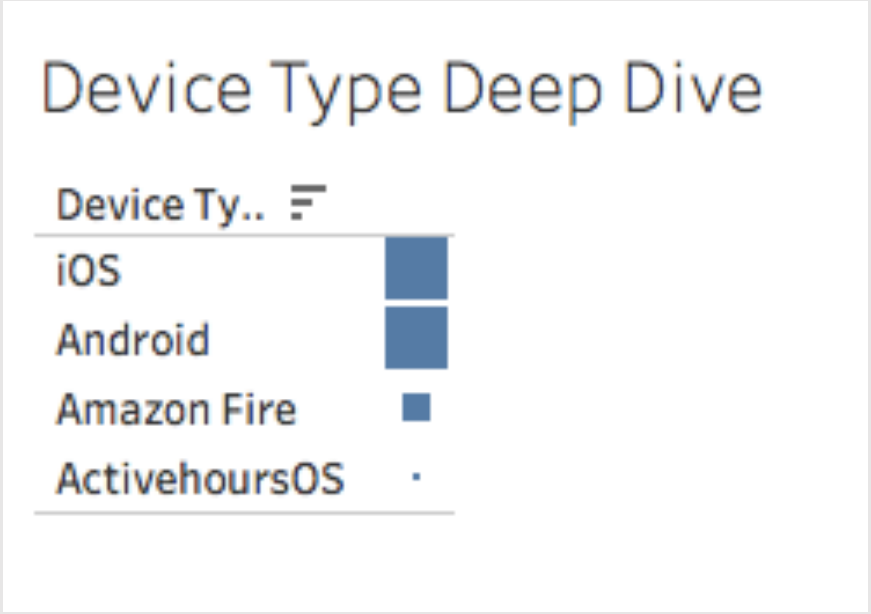
***Cons**: Under estimate for long term campaigns*

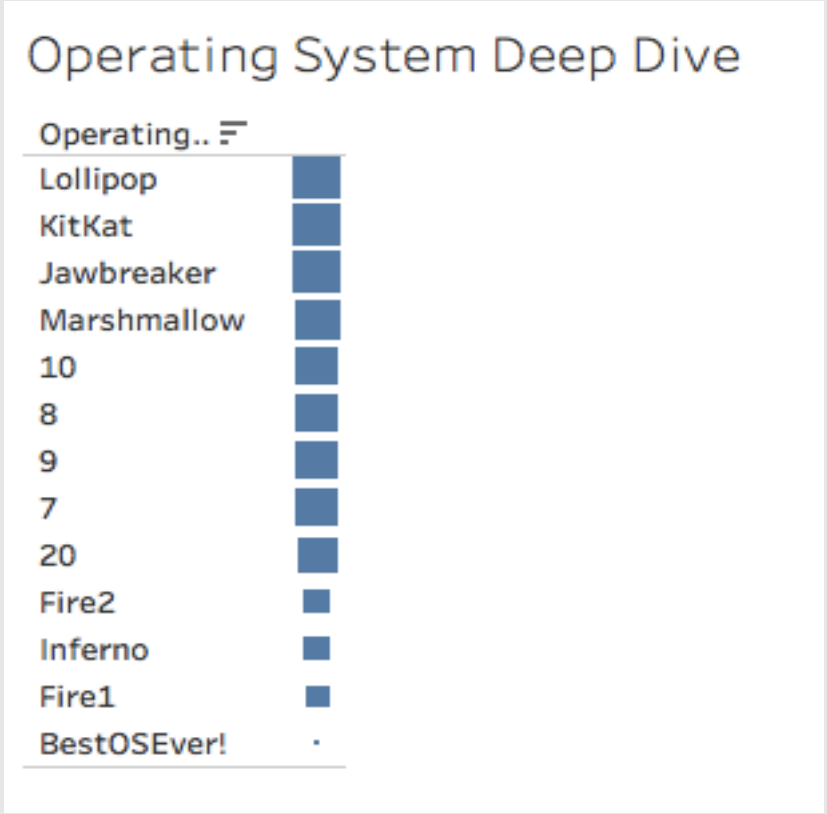


Marketing Evaluation -- Campaigns

Successful Campaign Insights

- *iOS and Android are the majority device type that the new users use*
- *Lollipop, Kitkat and Jawbreader are the operating systems our new users' favorite*

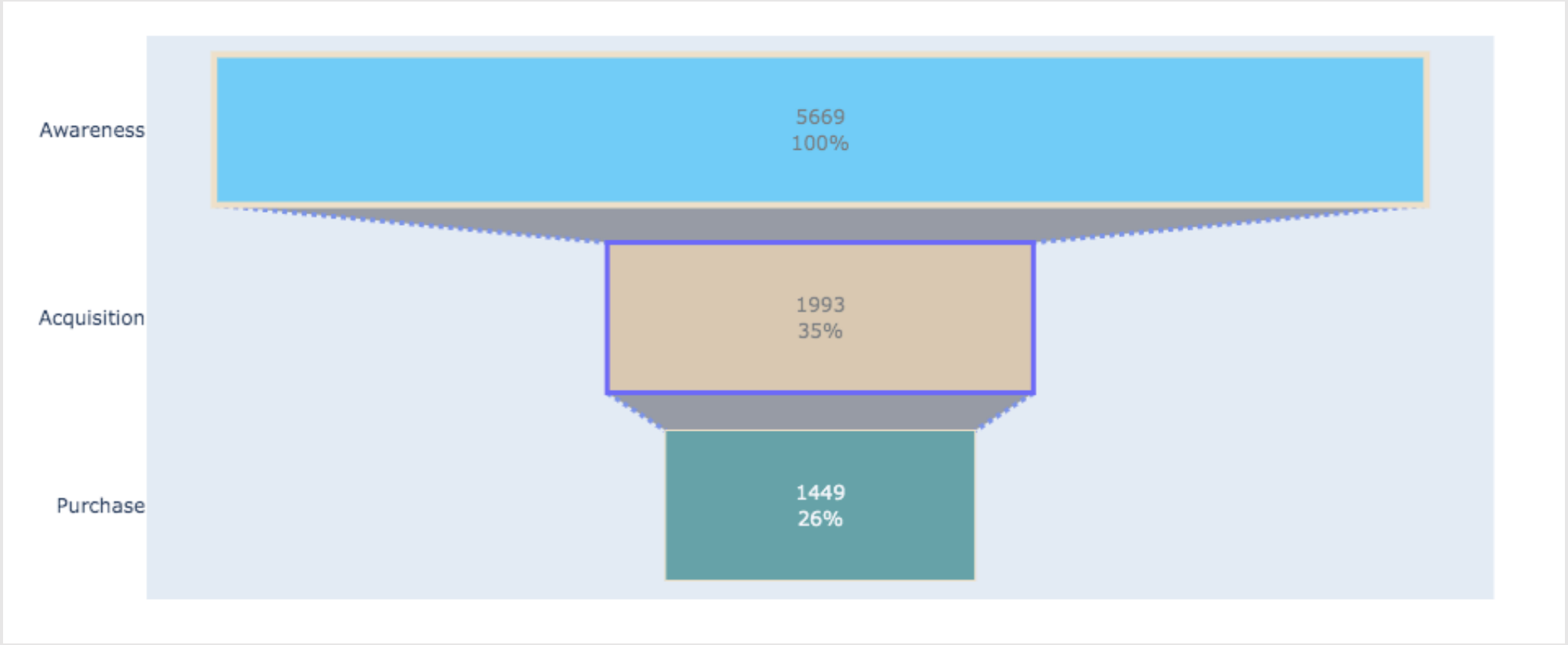




Marketing Evaluation -- Campaigns

Funnel analytics

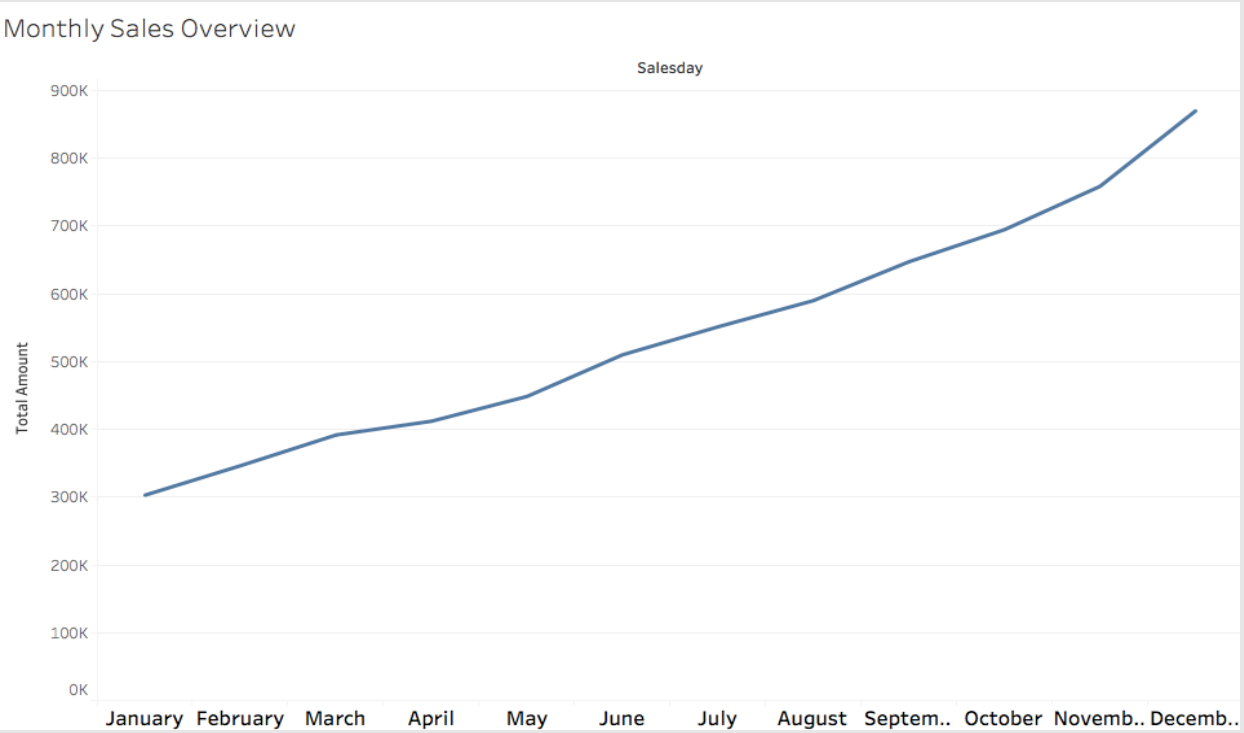
- *We launched 100 campaigns from 2013 to 2017, and made total of 5669 feeds*
- *1993 ads receivers successful made a register in 7 days*
- *1449 new users made a purchase*

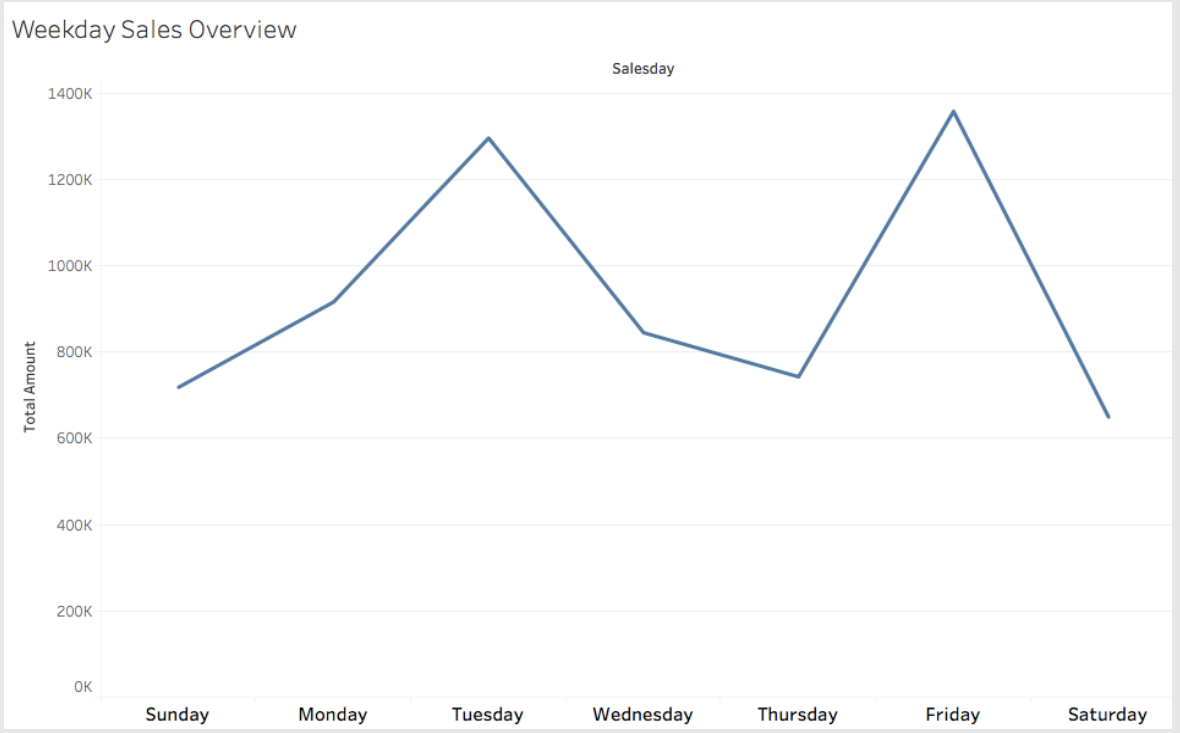


Marketing Evaluation -- Sales

Sales Overview

- *Our sales peak season in the winter, around Black Friday and Christmas season*
- *Customers like to make a purchase in Tuesday and Friday*

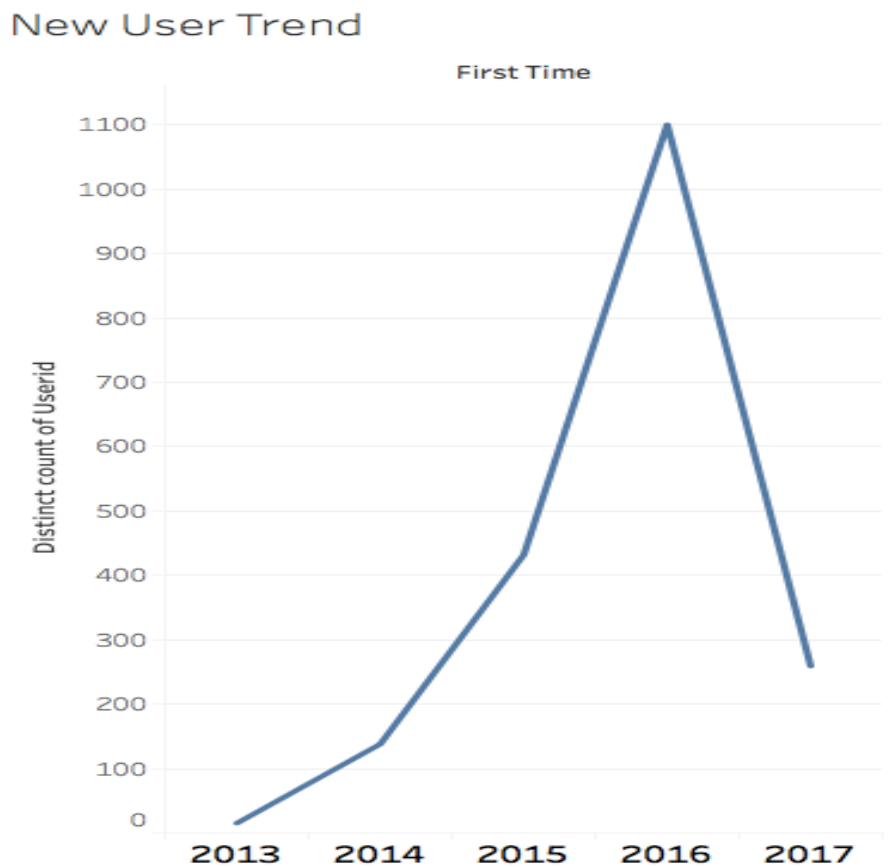


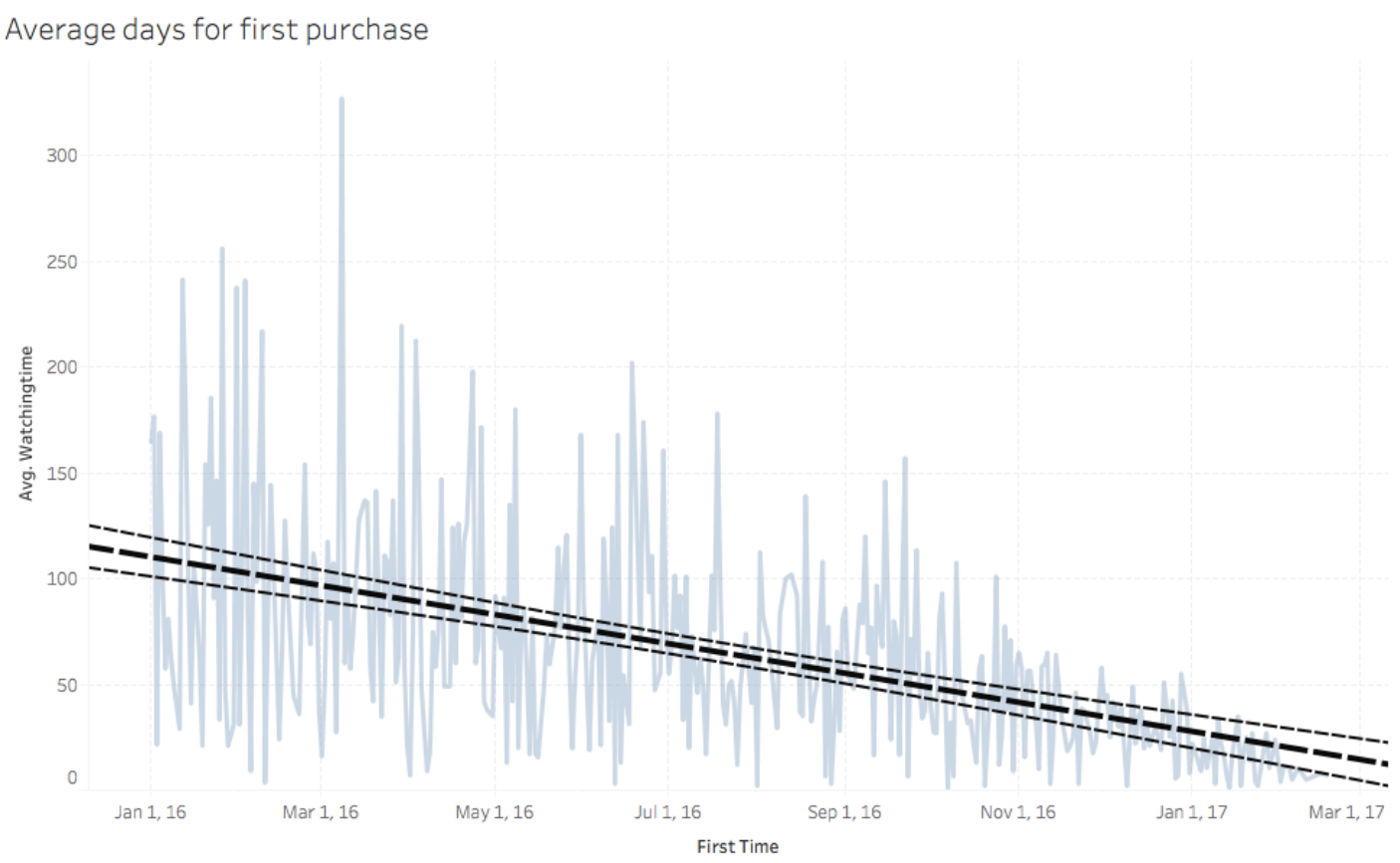


Marketing Evaluation -- Sales

Sales Overview

- *In year 2016, we achieved big won in user acquisition*
- *The average time spend for making a first purchase after the register is decreeing across years*

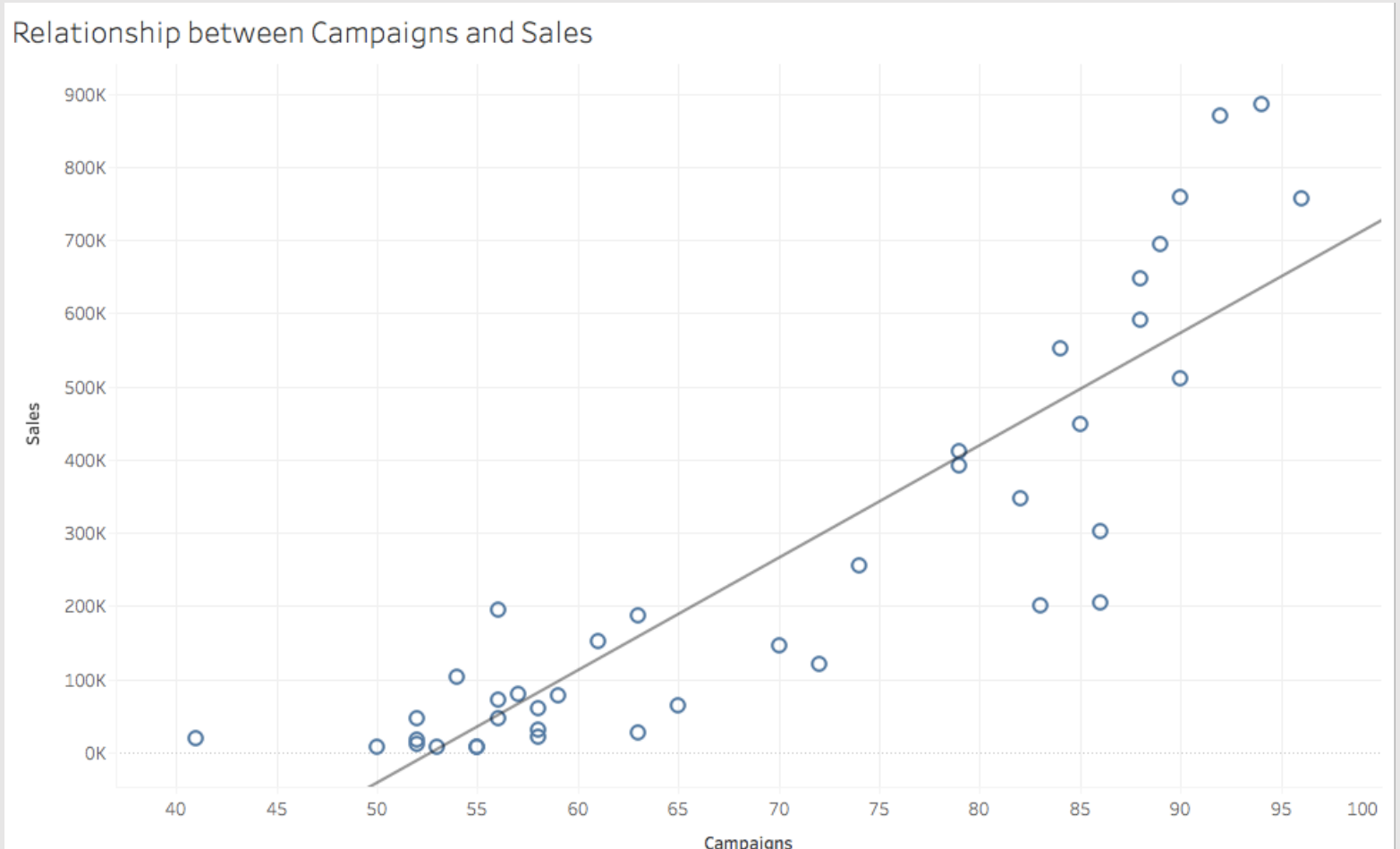




Marketing Evaluation -- Sales

Sales & Marketing Events

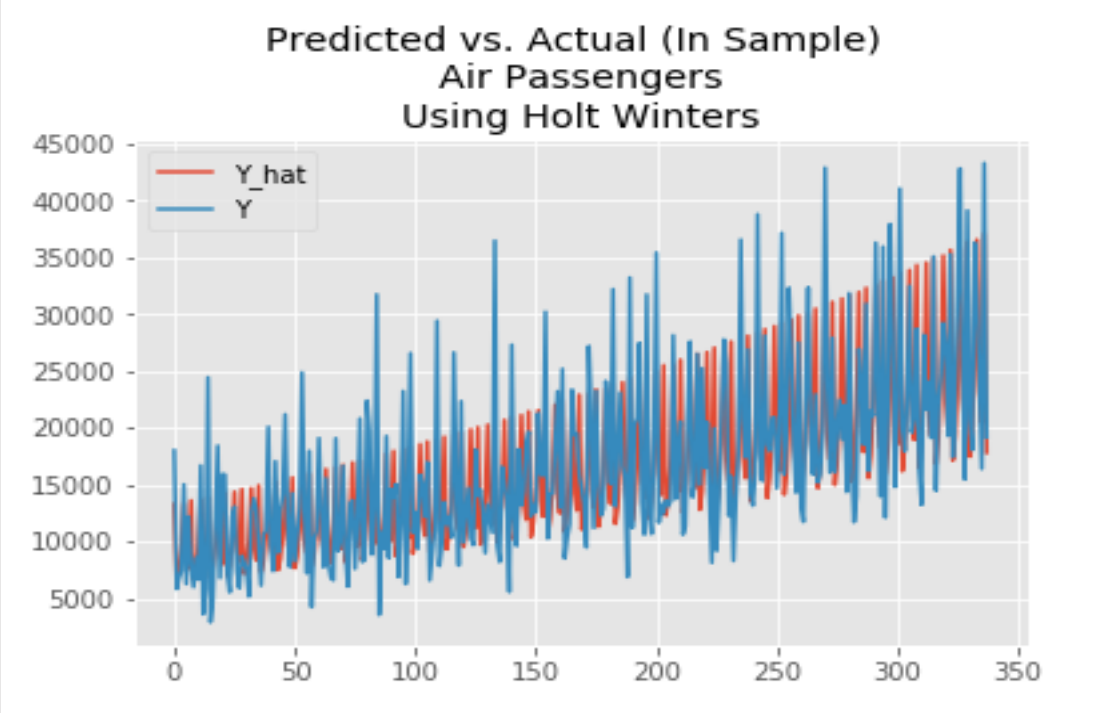
- ***Campaigns can drive our sales, they have a significant positive relationship with 80% accuracy***

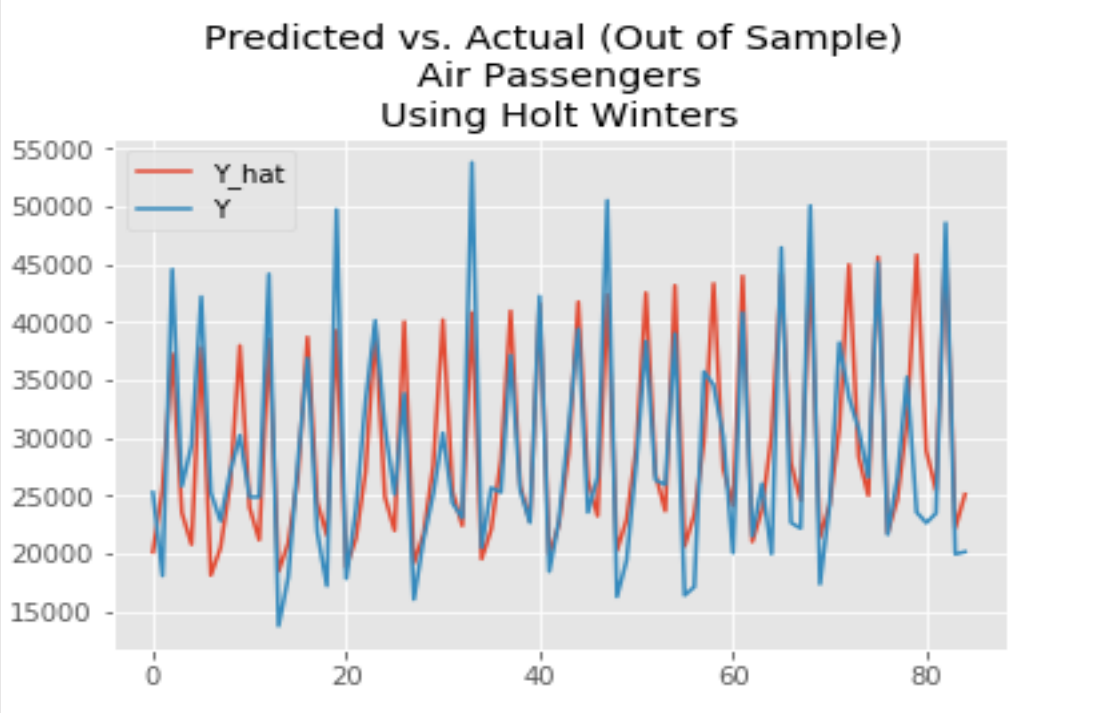


Marketing Evaluation -- Sales

Time Series Sales Forecast

- ***After decompose the sales data, we found the series has an increasing trend with seasonality***
- ***Applied BoxCox transform and built Fourier Series and Holt Winter model(Best model) to forecast the sales***
- ***Although we saw a drop in the last couple of days, the number still falls into our forecast number's confidence interval, which means we don't need to Panic!***

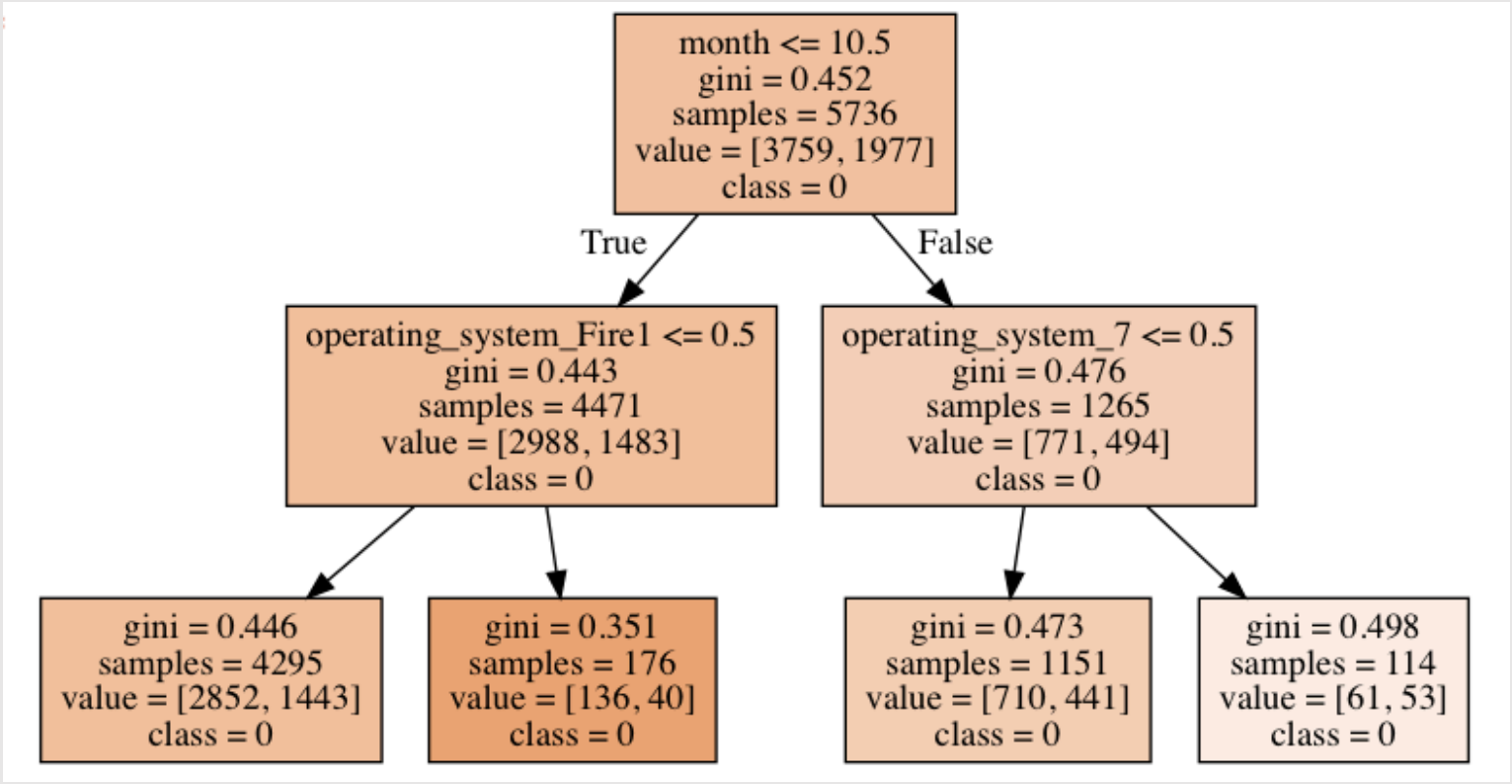




Marketing Evaluation – Customer

Customer Segmentation by Machine Learning

- *Using the View 5, we made a Decision Tree to target the customers who are most likely to register as a new user*
- *November and December will be a good time for campaign to achieve new customers*
- *Campaign send for Fire1 and 7 operating systems need further discuss*



Marketing Proposals

➢ *Power our sales peak season!*

Increase the marketing campaigns in November and December, those two months are sales peak season and have a high probability to increase our user base

➢ *Sanity check for our campaigns!*

Check the ads display and user experience on Fire1 and 7 operating system, optimize the performance for Funnel Phase One

➢ *Time limited offers!*

Current campaigns are long-term events, which decreased the motivation for register immediately and increased the difficulty for the marketing team to evaluate the performance

➢ *The next steps will be:*

- *Enrich the database for more user demographic to get a detail-oriented target customer profile*
- *Cost of attributions for ROI and Marketing Mix Modeling*

Summary

➢ *Take away:*

- *Funnel analytics can give us an overview of marketing events performance, and help us to take action to increase the won rate*
- *Time series analytics can help us to predict for abnormal sales, and to decrease the risk for financial issues*
- *Using machine learning and regression models for customer segmentation can help us to better target the customers*
- *Those data analytics techniques will give us insights for identifying issues and making the best business decisions*

➢ *The limitation:*

- *Data inconsistencies*
- *Lack of information for campaigns and user demographic and product categories*

Thanks!

Appendix-View 1

```sql
select
c.*,
datetime(substr(a.created_on,1,10)) as eventday,
a.campaign,
a.device_id,
d.device_type,d.operating_system,
julianday(first_time)-julianday(datetime(substr(a.created_on,1,10))) as ddf
from
(select
min(datetime(substr(created_on,1,10))) as first_time,
id as userid
from user
group by 2) as c
left join user_device ud on c.userid = ud.user_id
left join attribution a on ud.device_id = a.device_id
left join device d on d.id=a.device_id
where first_time >= eventday
```

	first_time	userid	eventday	campaign	device_id	device_type	operating_system	ddf
1	2017-02-15 00:00:00	0	2017-02-15 00:00:00	I5UB5Y	1	iOS	7	0.0
2	2016-09-22 00:00:00	2	2016-09-22 00:00:00	VR88YD	4	Android	KitKat	0.0
3	2016-07-11 00:00:00	3	2013-10-09 00:00:00	XGB35V	6	iOS	20	1006.0
4	2016-07-11 00:00:00	3	2016-07-11 00:00:00	72C6Y3	6	iOS	20	0.0
5	2015-02-23 00:00:00	4	2015-02-23 00:00:00	TI1ZOJ	7	Amazon Fire	Fire1	0.0
6	2015-02-22 00:00:00	6	2014-08-25 00:00:00	1ZDQF0	9	Android	Lollipop	181.0
7	2015-02-22 00:00:00	6	2014-11-13 00:00:00	DMWLE1	9	Android	Lollipop	101.0
8	2015-11-14 00:00:00	9	2015-11-14 00:00:00	EH7LXL	11	iOS	7	0.0

Appendix-View 2

```
1  select
2  datetime(substr(created_on,1,10)) salesday,
3  count(distinct user_id) buyers,
4  sum(amount) total_amount
5  from sale
6  group by 1
7  order by 1
```

	salesday	buyers	total_amount
1	2013-11-05 00:00:00	1	2361.618399
2	2013-11-18 00:00:00	1	215.8671657
3	2013-11-20 00:00:00	1	502.8721843
4	2013-11-22 00:00:00	1	2316.966268
5	2013-11-24 00:00:00	1	1243.262477
6	2013-12-03 00:00:00	1	659.876257
7	2013-12-04 00:00:00	1	273.0499671
8	2013-12-12 00:00:00	1	263.4959253

Appendix-View 3

```
1   select
2   saleda,
3   sales,
4   campaigns
5   from
6   (select
7   substr(created_on,1,7) as addate,
8   count(distinct campaign) campaigns
9   from attribution
10  group by 1) ad
11  join
12  (select
13  substr(date,1,7) as saleda,
14  sum(amount) as sales
15  from
16  sale group by 1) s
17  on ad.addate = s.saleda
18
```

	saleda	sales	campaigns
1	2013-11	6640.586494	55
2	2013-12	6929.03334785	55
3	2014-01	16857.5267109	52
4	2014-02	6566.4813502	50
5	2014-03	7853.17100088	53

Appendix-View 4

```
with abc as
(select c.*,
datetime(substr(a.created_on,1,10)) as eventday,
a.campaign,
a.device_id,
d.device_type,
d.operating_system,
julianday(first_time)-julianday(datetime(substr(a.created_on,1,10))) as ddf
from
(select
min(datetime(substr(created_on,1,10))) as first_time,
id as userid
from user
group by 2) as c
left join user_device ud on c.userid = ud.user_id
left join attribution a on ud.device_id = a.device_id
left join device d on d.id=a.device_id
where first_time >= eventday),
sa as(
select
min(datetime(substr(created_on,1,10))) as buytime,
user_id,
sum(amount) as buyamount
from sale
group by 2)
select
abc.*,
sa.buytime,
sa.buyamount,
julianday(sa.buytime)-julianday(abc.first_time) as watchingtime
from
abc
left join sa on abc.userid=sa.user_id
```

userid	eventday	campaign	device_id	device_type	operating_system	ddf	buytime	buyamount	watchin
2	2016-09-22 00:00:00	VR88YD	4	Android	KitKat	0.0	2017-02-26 00:00:00	191.1178185	157.0
3	2016-07-11 00:00:00	72C6Y3	6	iOS	20	0.0	2016-09-01 00:00:00	960.2494765	52.0
4	2015-02-23 00:00:00	TI1ZOJ	7	Amazon Fire	Fire1	0.0	2015-04-05 00:00:00	9915.9914285	41.0
9	2015-11-14 00:00:00	EH7LXL	11	iOS	7	0.0	2016-07-24 00:00:00	530.0873268	253.0
14	2015-06-07 00:00:00	98WM2K	20	Android	Marshmallow	0.0	2015-08-26 00:00:00	11898.247896	80.0
16	2016-05-11 00:00:00	705605	23	Amazon Fire	Fire1	1.0	2016-05-28 00:00:00	3094.81212671	16.0
18	2016-10-26 00:00:00	88UOUO	25	iOS	20	1.0	2017-02-06 00:00:00	208.4409907	102.0

Appendix-View 5

```
1  with newuser as (
2  select
3  c.*,
4  datetime(substr(a.created_on,1,10)) as eventday,
5  a.campaign,
6  a.device_id,
7  d.device_type,
8  d.operating_system,
9  julianday(first_time)-julianday(datetime(substr(a.created_on,1,10))) as ddf
10 from
11 (select
12 min(datetime(substr(created_on,1,10))) as first_time,
13 id as userid
14 from user
15 group by 2) as c
16 left join user_device ud on c.userid = ud.user_id
17 left join attribution a on ud.device_id = a.device_id
18 left join device d on d.id=a.device_id
19 where first_time >= eventday
20 and ddf<=7)
21 select
22 strftime('%m', datetime(substr(a.created_on,1,10))) as month,
23 a.campaign,a.device_id,d.device_type,d.operating_system,
24 case when n.userid is not null then 1 else 0 end as won from attribution a
25 left join
26 device d on a.device_id = d.id
27 left join
28 newuser n on a.campaign=n.campaign and a.device_id=n.device_id
29
```

	month	campaign	device_id	device_type	operating_system	won
3	02	Y59GNL	2604	Android	KitKat	0
4	12	T8RNOQ	3559	iOS	9	0
5	12	OGMRY2	3915	Android	Jawbreaker	0
6	10	6JI9BO	4459	iOS	20	0
7	02	TI1ZOJ	1118	Android	Marshmallow	0
8	09	YEB8I4	909	iOS	8	0
9	12	ZBW0OM	3351	iOS	7	0
10	01	XGB35V	2509	Android	Lollipop	0
11	09	0837KH	3599	Android	KitKat	0
12	12	ZBW0OM	216	Android	Lollipop	1
13	07	S1LZNC	1454	Android	Lollipop	0
14	03	3J5HIF	870	Amazon Fire	Fire1	1