

Project Name – Operation Analytics and investigating Metric Spike

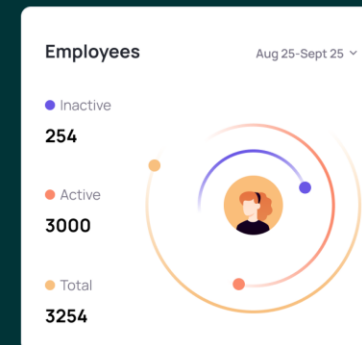
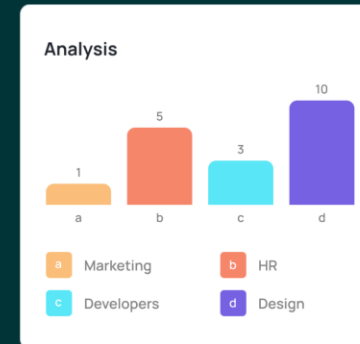
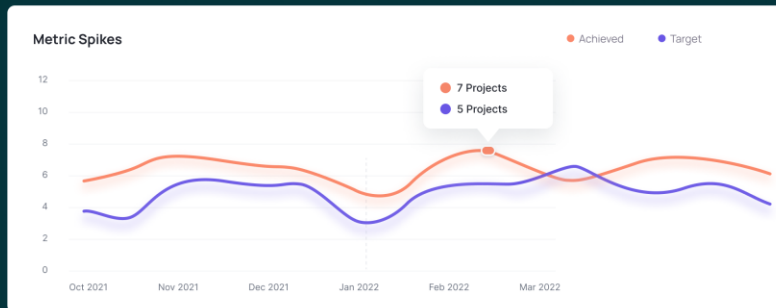
project 3

Name- Anirban Banerjee

reg mail -abanerjee 390@gmail.com

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Operation Analytics & Investigating metric spike case study



Description

Operation Analytics is the analysis done for the complete end to end operations of a company. With the help of this, the company then finds the areas on which it must improve upon. You work closely with the ops team, support team, marketing team, etc and help them derive insights out of the data they collect.

Being one of the most important parts of a company, this kind of analysis is further used to predict the overall growth or decline of a company's fortune. It means better automation, better understanding between cross-functional teams, and more effective workflows.

Investigating metric spike is also an important part of operation analytics as being a Data Analyst you must be able to understand or make other teams understand questions like- Why is there a dip in daily engagement? Why have sales taken a dip? Etc. Questions like these must be answered daily and for that its very important to investigate metric spike.

WE are working for a company like Microsoft designated as Data Analyst Lead and is provided with different data sets, tables from which you must derive certain insights out of it and answer the questions asked by different departments.

The things we are going to find in table 1 and table 2

- Number of jobs reviewed
- Throughput
- Percentage share of each language
- Duplicate rows
- User Engagement
- User Growth
- Weekly Engagement
- Weekly Retention
- Email Engagement

Approach

I have spent some time on understanding the data/table given. I cleared the questions which was in my mind like what does the job_id, actor_id, event means and what are the things to consider while reviewing the data. I use SQL to derive different insights from the dataset provided by the management team. I first created a database “operation_analytics” and then the tables using the structure and links provided by the team. Then, we performed analysis to generate valuable insights for the company.

A. Number of jobs reviewed: Amount of jobs reviewed over time. My task: Calculate the number of jobs reviewed per hour per day for November 2020?

```
select count(distinct job_id)/(30*24) as num_jobs_reviewed  
from job_data  
where ds between '2020-11-01' and '2020-11-30';
```

Result:: num_jobs_reviewd = 0.0083

B. Throughput: It is the no. of events happening per second. My task: Let's say the above metric is called throughput. Calculate 7 day rolling average of throughput? For throughput, do you prefer daily metric or 7-day rolling and why?

```
select ds,  
jobs_reviewed, avg(jobs_reviewed)over(order by ds rows between 6 preceding and current  
row) as throughput_7_rolling_avg from ( select ds, count(distinct job_id) as jobs_reviewed  
From job_data where ds between '2020-11-01' and '2020-11-30' group by ds order by ds )a
```

Result:: throughput_7 = 1.0000,1.0000,1.0000,1.2500,1.2000,1.333

C. Percentage share of each language: Share of each language for different contents. My task: Calculate the percentage share of each language in the last 30 days?

I

```
select language, num_jobs, 100.0* num_jobs/total_jobs as  
pct_share_jobs from  
(  
select language, count(distinct job_id) as num_jobs from  
job_data group by language )a  
  
cross join ( select count(distinct job_id) as total_jobs from  
job_data )b;
```

Result :: pct_share_lang
16.66667, total 6 same result

D. Duplicate rows: Rows that have the same value present in them. My task: Let's say you see some duplicate rows in the data. How will you display duplicates from the table?

```
select * from ( select *, row_number()over(partition by  
job_id) as rownum from job_data )a where rownum>1;
```

Result = total 7

Case Study 2 (Investigating metric spike):

- A. User Engagement: To measure the activeness of a user.
Measuring if the user finds quality in a product/service. My task:
Calculate the weekly user engagement?

```
select extract(week from occurred_at) as num_week, count(distinct
user_id) as no_of_distinct_user from tutorial.yammer_events group
by num_week;
```

- B . B. User Growth: Amount of users growing over time for a
product. My task: Calculate the user growth for product?

```
select year, num_week, num_active_users, sum(num_active_users)
over(order by year, num_week rows between unbounded preceding
and current row) as cumm_active_users from
```

```
(select extract(year from a.activated_at) as year, extract(week from
a.activated_at)as num_week, count(distinct user_id) as
num_active_users from tutorial.yammer_users a
```

```
where state='active' group by year, num_week order by year,
num_week)a:
```

C. Weekly Retention: Users getting retained weekly after signing-up for a product. My task: Calculate the weekly retention of users-sign up cohort?

```
select count(user_id), sum(case when retention_week = 1 then 1 else 0 end) as  
per_week_retention from
```

```
( select a.user_id, a.sign_up_week, b.engagement_week, b.engagement_week -  
a.sign_up_week as retention_week
```

```
from ( (select distinct user_id, extract(week from occurred_at) as sign_up_week from  
tutorial.yammer_events where event_type = 'signup_flow' and event_name =  
'complete_signup' and extract(week from occurred_at)=18)a left join (select distinct  
user_id, extract(week from occurred_at) as engagement_week from  
tutorial.yammer_events where event_type = 'engagement')b on a.user_id = b.user_id )  
group by user_id  
order by user_id;
```

D. Weekly Engagement: To measure the activeness of a user. Measuring if the user finds quality in a product/service weekly. My task: Calculate the weekly engagement per device?

```
select extract(year from occurred_at) as year_num,  
extract(week from occurred_at) as week_num, device,  
count(distinct user_id) as no_of_users from  
tutorial.yammer_events where event_type = 'engagement'  
group by 1,2,3 order by 1,2,3;
```

E. Email Engagement: Users engaging with the email service.
My task: Calculate the email engagement metrics?

```
select 100.0 * sum(case when email_cat = 'email_opened' then  
1 else 0 end) /sum(case when email_cat = 'email_sent' then 1  
else 0 end) as email_opening_rate, 100.0 * sum(case when  
email_cat = 'email_clicked' then 1 else 0 end) /sum(case when  
email_cat = 'email_sent' then 1 else 0 end)
```

```
as email_clicking_rate from ( select *, case when action in  
('sent_weekly_digest', 'sent_reengagement_email') then  
'email_sent' when action in ('email_open') then  
'email_opened' when action in ('email_clickthrough') then  
'email_clicked' end as email_cat from tutorial.yammer_events  
)a;
```


Tech used

- For table job data I have used MYSQL Workbench(version 8.0 CE): MYSQL Workbench provides
- For table two (Investigating metric spike) I have used Mode.com online it does not require download or installation
- I have used Microsoft power point for making ppt/pdf to make report for the team

Insights

Case study 1 (job Date)

- The number of distinct jobs reviewed per hour per day for November 2020 is 83%.
- We used the 7-day rolling average of throughput as it gives the average for all the days right from day 1 to day 7 whereas, daily metric gives the average for only that particular day itself.
 - The percentage share of Persian language is the most (37.5%).
 - There are two duplicate rows if we partition the data by job_id. But if we look the overall columns, all the rows are unique.

Case Study 2 (Investigating metric spike):

- The weekly user engagement increased from week 18th to week 31st and then started declining from then onwards. This means that some of the users do not find much quality in the product/service in the last of the weeks.
- There are in total 9381 active users from 1st week of 2013 to the 35th week of 2014.
- The overall count of weekly engagement per device used is the most for MacBook users and iPhone users.
- The email opening rate is around 34% and email clicking rate is around 15%.
The users are engaging with the email service which is good for the company to expand.

Result:

In this project, I learned how to apply advanced SQL concepts like Windows Functions, etc. I understood how the real-world industry works. It helped me in mastering my SQL concept.

[MY SQL QUERY LINK](#)