mAd Politics - How is money influencing democracy?

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Github Link for project: https://github.com/ravibhandia/mAD_Politics_Remastered

Motivation

In the 2016 Presidential election, Donald Trump outspent all other candidates on social media platforms like Facebook. On Facebook, he spent $44 million between June and November of 2016, running over 5.9 million ads. This is largely seen as one of the strategies that helped him reach and influence his voters. In contrast, his opposition, Hillary Clinton only ran 66,000 ads on Facebook during this period. The Facebook ad machine in particular has a special knack for influencing people through its targeting and rewarding of the highest bidder on its ad platform, which had then been Donald Trump.

Data and social media seem to be a new battleground that can significantly alter the outcome of a political election. It was later revealed that Cambridge Analytica, a British consulting firm, was accused of stealing user data from Facebook and misusing it for the purpose of a political campaign. Voter data has now become one of the most powerful resources in elections. In response to the whiplashing for allowing the public's data to be stolen and misused, Facebook has now created an ad library where it publishes every political ad that is used on their website in hopes of creating more transparency.

Fast forward to 2020, it seems the digital ad strategies of the majority of opposing candidates has not changed dramatically. Only Michael Bloomberg came close to Donald Trump in total ads run on Facebook at 50,000 during one month. Whereas, Donald Trump seems to have doubled down on his ad strategy and is hoping to spend over $1 billion on digital ads during his 2020 presidential campaign.

However, there are some groups which are responding to this unbalanced digital battlefield. A nonprofit called Acronym and a political action committee named Pacronym are working to launch a campaign that disapproves of Trump's presidential bid across Google, Hulu,

Facebook, Youtube, and Instagram platforms. These groups together aim to spend $75 million on criticizing Trump's presidency on these platforms.

Using this newly public information, our aim is to create a database that can house presidential candidate advertising information from advertisement platforms and public polling data to better understand the influence of advertising and money on politics.

Our database is designed for three types of personas. Firstly, the voter who wants to be well-informed. Voters using our database can see the leaders in the presidential race based on new polling data. Additionally, voters will be given a perspective on how different ads can change polling performance before and after the ad is run. Voters will also be given visibility into the specific affiliated groups that are responsible for paying for the advertisement run to promote a particular candidate. This will enable voters to take greater control over the new digital advertising machines that have been created.

Secondly, campaign strategists can use our database in a number of ways to help promote their candidate. Strategists can monitor a candidates' performance based on a number of polls in various states, including looking at a particular candidate's home state. A strategist will also be able to check competitor spending in various states and how the launch of their ads may have correlated with a change in their polling success. This database can help campaign strategists analyze their current performance and potentially provide data for altering their optimal ad strategies.

Thirdly, policy makers will be able to use our database to get political ad information that will help them pass regulations that they believe will protect the democratic process. One aspect of our database is that it can provide up-to-date information about both advertisement spending and polling data on a state and advertisement platform basis. This will help policy makers investigate the operations of various ad platforms as well as potentially support regulation that aims to limit the influence of these digital ads.

Database Entities:

State

The state entity contains information about the state including the abbreviations, the number of presidential delegates, the population, the median income of the population, and finally the median age. In the future, much more information can be added about the state. This would include other demographic information like religious preferences, age, and the previous election's winning party.

The source of the data used to fill this is predominantly from Wikipedia.

Candidate

The candidate entity contains information about the name of the candidate, the birthday, the home state, election year they are running for, and their party affiliation. In the future, this candidate table can be expanded to include much more personal information including type of career (politician, businessman, tech evangelist) or college alma mater.

This information is sourced primarily from Wikipedia.

Affiliates

The affiliates entity contains information about the affiliated groups which paid for a particular advertisement. This entity just includes the name of the group and the particular candidate it supports. These affiliates only support a specific candidate. There can however be multiple affiliates per a candidate. In the future, a whole new entity can be created for the political action committees that support the affiliates and perhaps the largest donors for those political actions committees. This would provide further transparence for the voters to know who exactly is

paying for the ads and supporting specific candidates. This would also require a many to many relationship. But as it is right now there can only be many affiliates to one candidate.

The list of affiliates is scraped from facebook ad report and then modified for demonstration purpose.

Ad Platform

The ad platform entity contains information about the ad platform type and name. In the future, we can add information about the financial status of these ad platforms including their market cap.

The sampled data is mainly constructed from the two major digital advertisement platforms: Facebook and Google.

Advertisement

The advertisement entity contains information about the ad that ran including the candidate it was for, the run date, the last run date, the cost in $, the number of impressions of the advertisement, the ad title, the state it ran in, the platform it was on, and the affiliated group which paid for it.

The source of this data is mainly from Google Transparency report and Facebook's ads report.

Polling

The polling entity contains information about polling data which includes the state the poll was conducted in, the candidate it was done for, the date it was completed, and the polling percent it recorded for that specific candidate. All of the polling data is from democratic polls. Our data is specific to the top six democratic candidates. The sum of the polling percentages does not add up to 100%, since there are undecided and other smaller candidates that are chosen in the poll. To simplify our database, we made the choice to exclude these candidates in our database.

The polling data that is used in this database is manipulated by our team to demo this functionality of the database, as real data requires pooling information from many sources for our use case.

Future Work:

In addition to the additional features for each entity, our database can be improved in the future through a number of additions. First in order to incorporate real-time changes in the data-store, Kafka can be used to update our database as new ads are launched on facebook. A similar pipeline can be set up for polling data.

Secondly, visualizations like charts that can showcase the raw data regarding costs of ads, number of ads, and polling results in much more user friendly format. Ideally our web app could have interactive visualizations that would enable exploration of the data beyond the preset queries that are defined by our current webapp.

Additionally, there could be a greater focus on the source of financing for these advertisements. As discussed earlier, an entity for the political action committees (PACs) linked to the affiliates groups would provide valuable insights. Moreover, linking these PACs to individual philanthropists, corporations, and other lobbyists can provide more understanding behind the true backers of a specific candidate.

Lastly, our database can be expanded to include other types of elections including senate and house. We can make our database and web app a one stop site for the purpose of informing campaign strategy, voters, and policy makers.

Data sources:

1. Political Advertisements from Facebook
   https://www.propublica.org/datastore/dataset/political-advertisements-from-facebook
2. Facebook Ads Report
   https://www.facebook.com/ads/library/report/
3. Independent Political Ad Spending (2004-2016)
   https://www.kaggle.com/fec/independent-political-ad-spending
4. Tracking Every Presidential Candidate's TV Ad Buys
   https://projects.fivethirtyeight.com/2020-campaign-ads/
5. Political advertising on Google
   https://transparencyreport.google.com/political-ads/home?hl=en

Preliminary Database Dictionary:

Candidate

Attribute	Attribute Description	Data Type	Primary Key	Nullable
Candidate_id	Candidate_id; Autogenerated	INTEGER	Y	N
First_name	Candidate's first name	VARCHAR(30)	N	N
Last_name	Candidate's family name	VARCHAR(30)	N	N
Birthday	Candidate's Birthday	DATE	N	N
State_id	Candidate's home state	INTEGER	N	N
Election_year	Which year the candidate is running for president	YEAR	N	N
Party	Which part the candidate belongs to	VARCHAR(30)	N	N

Advertisement Platform:

Attribute	Attribute Description	Data Type	Primary Key	Nullable
Platform_id	Platform_id; Autogenerated	INTEGER	Y	N
Platform_name	Platform name	VARCHAR(30)	N	N
Platform_type	Type of platform (e.g. digital, TV)	VARCHAR (100)	N	N

Advertisement:

Attribute	Attribute Description	Data Type	Primary Key	Nullable
Ad_ID	Unique id for a new ad	INTEGER	Y	N
Platform_ID	Unique id for a new platform	INTEGER	N	N
State_ID	Unique id for a state	INTEGER	N	N
Group_ID	Unique id for groups	INTEGER	N	N
Ad_title	Title of advertisement	VARCHAR (100)	N	Y
Created_time	When was the advertisement first used on the platform	DATE	N	Y
End_time	When was the advertisement ended	DATE	N	Y
Cost	What was paid to run the advertisement	DECIMAL	N	Y
Impression	How many people viewed the advertisement	INTEGER	N	Y

State:

Attribute	Attribute Description	Data Type	Primary Key	Nullable
State_ID	Autogenerated	INTEGER	Y	N
State_name	State name	VARCHAR(20)	N	N
State_abbreviation	State abbreviations	VARCHAR (20)	N	N
Population	Population of the state	INTEGER	N	N
Delegates	Number of delegates assigned to the state	INTEGER	N	N
Median_income	Medium income of the state	INTEGER	N	N
Median_age	Median age of the state	DECIMAL	N	N

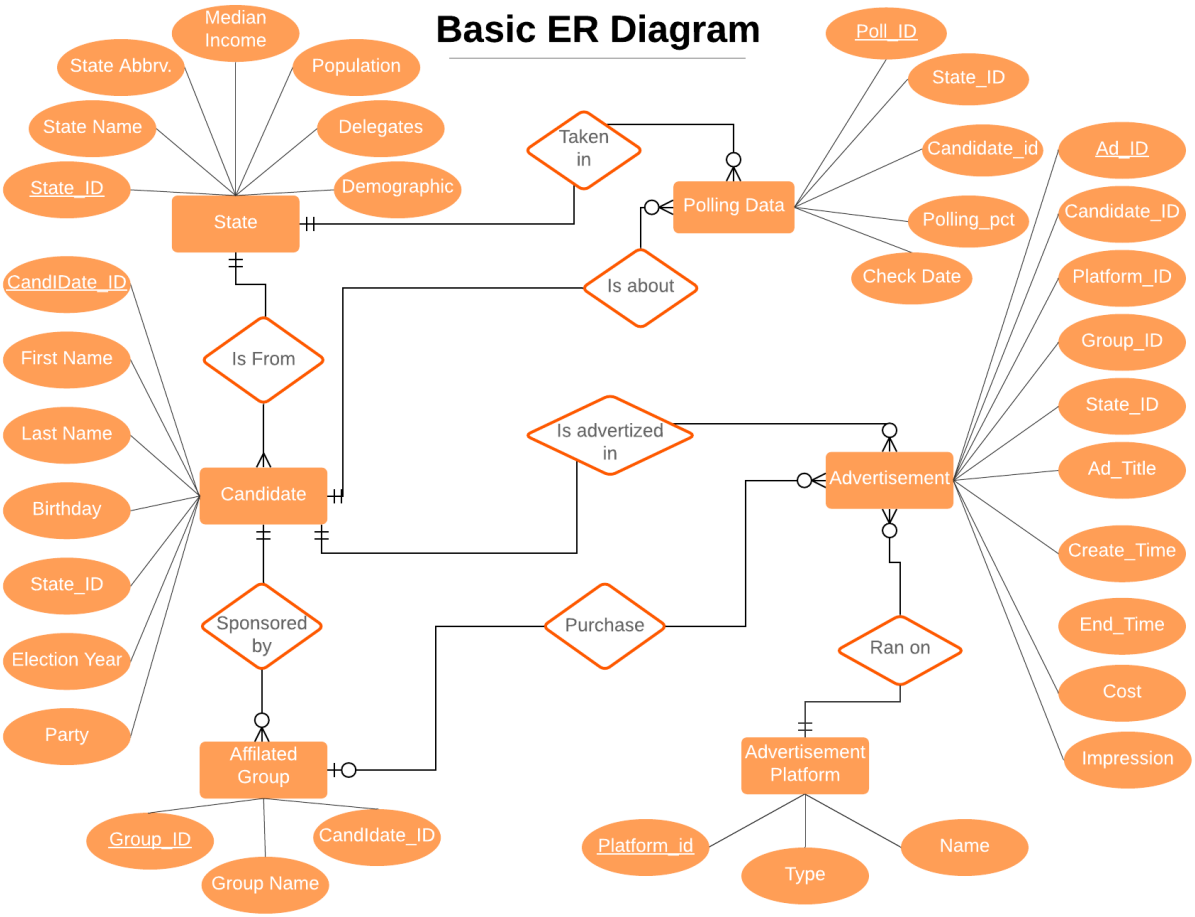
Polling:

Attribute	Attribute Description	Data Type	Primary Key	Nullable
Poll_id	Poll_id; Autogenerated	INTEGER	Y	N
State_id	Unique state id	INTEGER	N	N
Candidate_id	Unique candidate id	INTEGER	N	N
Check_date	When the poll took place	DATE	N	N
Polling_percent	Percentile that the candidate won for this specific poll	DECIMAL	N	N

Affiliated Groups:

Attribute	Attribute Description	Data Type	Primary Key	Nullable
Group_id	Autogenerated	INTEGER	Y	N
Group_name	Name of the group	VARCHAR (100)	N	N
CandIdate_id	The candidate ID that the group is supporting	INTEGER	N	N

Basic ER Diagram:


Basic ER Diagram
Median Income
State Abbrv.
Population
State Name
Delegates
State_ID
Demographic
State
Taken in
Polling Data
Poll_ID
State_ID
Candidate_id
Polling_pct
Check Date
Is about
CandIDate_ID
First Name
Last Name
Birthday
State_ID
Election Year
Party
Is From
Candidate
Is advertized in
Advertisement
Ad_ID
Candidate_ID
Platform_ID
Group_ID
State_ID
Ad_Title
Create_Time
End_Time
Cost
Impression
Sponsored by
Purchase
Ran on
Affilated Group
Group_ID
CandIdate_ID
Group Name
Advertisement Platform
Platform_id
Type
Name

Sample Use Case Queries and Results

Use Case 1: Which candidate has the most advertisement spending?

Query in SQL

```
SELECT rank() OVER(ORDER BY sum(cost) DESC) AS 'Ads Spending Ranking',
       CONCAT(CANDIDATE.First_name, ' ', CANDIDATE.Last_name) AS Candidate_Name,
       IFNULL(sum(cost), 0) AS Total_Cost
FROM Advertisement
LEFT JOIN Affiliates
    ON Advertisement.Group_id = Affiliates.Affiliate_id
RIGHT JOIN CANDIDATE
    ON CANDIDATE.Candidate_id = Affiliates.Candidate_id
GROUP BY Candidate_Name
ORDER BY `Ads Spending Ranking`;
```

Results

	`Ads Spending Ranking`	Candidate_Name	Total_Cost
1	1	Donald Trump	44927
2	2	Mike Bloomberg	28576
3	3	Joe Biden	15014
4	4	Bernie Sanders	12185
5	5	Pete Buttigieg	8025
6	6	Elizabeth Warren	6441
7	7	Andrew Yang	0

Webpage Input

Webpage Output

The following candidates have the top 3 advisement spending:

Rank	Candidate Name	Sum of Advertisement Spending
1	Donald Trump	$44927
2	Mike Bloomberg	$28576
3	Joe Biden	$15014

Report Summary

In this use case, we allow users to investigate which candidate has spent the most in the advertisement with the user specified top N candidates. We are helping users to understand how much they spend on political ads as compared to other candidates.

Use Case 2: Which candidate has the best poll?

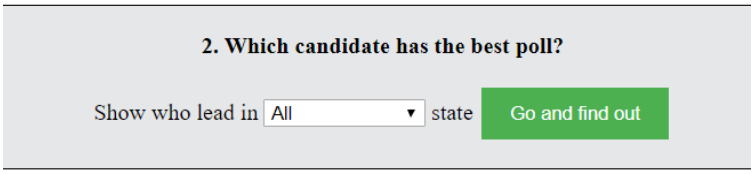
Query in SQL

```
WITH vote_rank AS
    (SELECT State_id,
            RANK() OVER(PARTITION BY State_id ORDER BY AVG(Polling_percent) DESC) AS Polling_rank,
            Candidate_id,
            ROUND(AVG(Polling_percent),2) AS Average_Poll
    FROM Polling
    GROUP BY State_id, Candidate_id
    ORDER BY State_id, Polling_rank),
    runner_up_diff AS
    (SELECT State_id,
           Polling_rank,
           Candidate_id,
           Average_Poll,
           Average_Poll - (LEAD(Average_Poll, 1) OVER(PARTITION BY State_id ORDER BY Average_Poll DESC)) AS Runner_up_poll_Diff
    FROM vote_rank)
    SELECT State.state_name,
           CONCAT(First_name, ' ', Last_name) AS Candidate_Name,
           Average_Poll,
           Runner_up_poll_Diff AS 'Percent Lead'
    FROM runner_up_diff, CANDIDATE, State
    WHERE runner_up_diff.Candidate_id = CANDIDATE.Candidate_id AND runner_up_diff.State_id = State.State_id AND runner_up_diff.Polling_rank = 1
    ORDER BY State_name;
```

Results

	state_name	Candidate_Name	Average_Poll	`Percent Lead`
1	Arizona	Joe Biden	29.38	3.95
2	California	Joe Biden	26.44	4.63
3	Indiana	Bernie Sanders	30.39	0.25
4	Massachusetts	Elizabeth Warren	24.20	0.54
5	New York	Mike Bloomberg	25.93	3.64
6	Pennsylvania	Joe Biden	28.82	4.25
7	Vermont	Bernie Sanders	29.29	17.33
8	Washington	Bernie Sanders	25.94	7.65

Webpage Input



Webpage Output

The following candidates are leading in the selected states:

State Name	Candidate Name	Front Runner Poll (%)	Poll leads by (%)
Arizona	Joe Biden	29.38	3.95
California	Joe Biden	26.44	4.63
Indiana	Bernie Sanders	30.39	0.25
Massachusetts	Elizabeth Warren	24.20	0.54
New York	Mike Bloomberg	25.93	3.64
Pennsylvania	Joe Biden	28.82	4.25
Vermont	Bernie Sanders	29.29	17.33
Washington	Bernie Sanders	25.94	7.65

Report Summary

In this use case, we would like to let users know who leads in each candidate in user specified state and how close the poll was as compared to runner-up. As for campaign strategists, they will have a view of which state the candidate is winning and decide if they need to apply new strategies to further improve poll numbers if the front runner and the runner is getting too close in poll numbers.

Use Case 3: Forecasted total leading states and delegates of all candidates

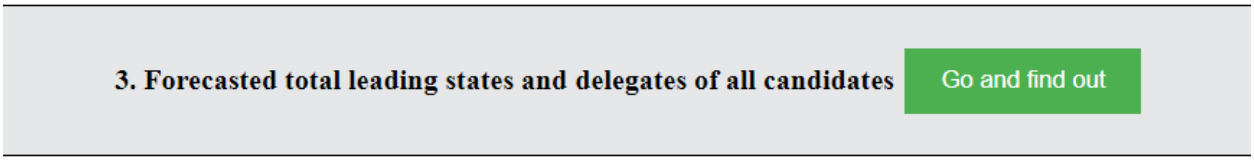
Query in SQL

```
WITH State_lead AS
   (SELECT  State_name,
            RANK() OVER(PARTITION BY Polling.State_id ORDER BY AVG(Polling_percent) DESC) AS Polling_rank,
            CONCAT(CANDIDATE.First_name, ' ', CANDIDATE.Last_name) AS Candidate_name,
            Candidate_id,
            AVG(Polling_percent),
           Delegates
    FROM Polling
    LEFT JOIN  State USING (State_id)
    RIGHT JOIN CANDIDATE USING (Candidate_id)
    GROUP BY Polling.State_id, Candidate_name
    )
SELECT ROW_NUMBER() OVER(ORDER BY sum(State_lead.Delegates) DESC) AS Rank,
        Candidate_name,
        IFNULL(COUNT(State_lead.Delegates), 0) AS Total_States,
        IFNULL(sum(State_lead.Delegates), 0) AS Total_Delegates
FROM State_lead
WHERE Polling_rank = 1
GROUP BY Candidate_name
ORDER BY Rank;
```

Results

	Rank	Candidate_name	Total_States	Total_Delegates
1	1	Joe Biden	3	646
2	2	Bernie Sanders	3	189
3	3	Elizabeth Warren	1	91
4	4	Mike Bloomberg	1	81
5	5	Donald Trump	0	0

Webpage Input



Webpage Output

Forecasted total leading states and delegates of all candidates:

Rank	Candidate Name	Total Leading States	Total Leading Delegates
1	Bernie Sanders	4	604
2	Joe Biden	2	231
3	Elizabeth Warren	1	91
4	Mike Bloomberg	1	81
5	Donald Trump	0	0

Report Summary

In this use case, we summarized the candidates current total leading states and total leading delegates. This result allows campaign strategists to have an overview on how specific candidates perform.

Use Case 4: Which platform is the most popular one for ads posting?

Query in SQL

```
SELECT Platform_name,count(*) as Total
    FROM Advertisement, Ad_platform
    WHERE Ad_platform.Platform_id = Advertisement.Platform_id
    GROUP BY Platform_name
    ORDER by Total DESC
    LIMIT 3;
```

Results

Output | Result 5

3 rows

	Platform_name	Total
1	Google	10
2	Facebook	9
3	Hulu	5

Webpage Input

Webpage Output

The following platforms contains the most political advertisements:

Advertisement platform	Total Number of Political Advertisement
Google	10
Facebook	9
Hulu	5

Report Summary

In this query, we are trying to help users find out which platforms are the most popular ones that candidates prefer to post ads on. By selecting the top n of platforms, you would like to see, the result page will present the platform names ordered by the number of advertisements in the corresponding platforms.

Use Case 5: Check to see how candidates do in their home states?

Query in SQL

```
SELECT DISTINCT(CONCAT(CANDIDATE.First_name,' ',CANDIDATE.Last_name)) AS Candidate_Name,State.State_name,
                Polling.Polling_percent,Polling.Check_date
    FROM CANDIDATE,State,Polling
    WHERE CANDIDATE.State_id = Polling.State_id
      AND CANDIDATE.Candidate_id = Polling.Candidate_id
      AND CANDIDATE.State_id = State.State_id
      AND (CONCAT(CANDIDATE.First_name,' ',CANDIDATE.Last_name)) = 'Joe Biden'
    ORDER BY Check_date;
```

Results

2 rows

	Candidate_Name	State_name	Polling_percent	Check_date
1	Joe Biden	Pennsylvania	43.56	2020-03-07
2	Joe Biden	Pennsylvania	45.08	2020-04-24

Webpage Input

5. Check to see how candidates do in their home states

Show the results for candidate Joe Biden Go and find out

Webpage Output

Joe Biden's Election Poll Results :

Candidate	Home State	Election Polls Results	Polling Check Date
Joe Biden	Pennsylvania	43.56	2020-03-07
Joe Biden	Pennsylvania	45.08	2020-04-24

Report Summary

In this query, we are trying to help users find out whether a candidate can be expected to win his/her own state. By selecting the candidate, you would like to learn about, the result page will present the candidate's name, home state and the election poll result in his/her home state. In the sql, we showed the poll results for all candidates of their home states, in webpage, as we are letting users to choose candidate, we passed the input information from home page to backend, attached this condition like below:

```
# Query
query = "SELECT DISTINCT(CONCAT(CANDIDATE.First_name,' ',CANDIDATE.Last_name)) AS Candidate_Name,\
State.State_name,Polling.Polling_percent,Polling.Check_date\
FROM CANDIDATE,State,Polling\
WHERE CANDIDATE.State_id = Polling.State_id AND CANDIDATE.Candidate_id = Polling.Candidate_id AND CANDIDATE.State_id = State.State_id"

query += " AND "
query += "CONCAT(CANDIDATE.First_name,' ',CANDIDATE.Last_name) = '%s' " % canName
query += "  ORDER BY Check_date"
```

Then we are able to output the poll result for the selected candidate. We've also included the check dates of poll results to present support rate changes over the time period.

Use Case 6: Find out the relationship between advertisement spending vs. change of polling result

Query in SQL

```
WITH Ads_by_date AS (
    SELECT Ad_id,
           Platform_name,
           State_name,
           Ad_title,
           Advertisement.State_id,
           Affiliates.Candidate_id,
           CONCAT(First_name, ' ', Last_name) as Candidate_Name,
           Created_time as Ad_Start_Date,
           End_time as Ad_End_Date,
           Cost
    FROM Advertisement
    LEFT JOIN Affiliates ON Affiliates.Affiliate_id = Advertisement.Group_id
    LEFT JOIN State ON State.State_id = Advertisement.State_id
    LEFT JOIN Ad_platform using(Platform_id)
    LEFT JOIN CANDIDATE on CANDIDATE.Candidate_id = Affiliates.Candidate_id
    ),
     Ad_Start_Poll AS (
    SELECT Ad_id,
           Advertisement.Created_time AS Ad_Start_Time,
           Check_date AS Poll_Check_Date,
           Polling_percent AS Ad_Start_Poll
    FROM Polling, Advertisement, Affiliates
    WHERE Polling.Candidate_id = Affiliates.Candidate_id AND Polling.State_id = Advertisement.State_id AND Group_id = Affiliate_id AND Check_date < Created_time
    ORDER BY Polling.Candidate_id, Polling.State_id
    ),
     Ad_End_Poll AS (
    SELECT Ad_id,
       Advertisement.End_time AS Ad_End_Time,
       Check_date AS Poll_Check_Date,
       Polling_percent AS Ad_End_Poll
    FROM Polling, Advertisement, Affiliates
    WHERE Polling.Candidate_id = Affiliates.Candidate_id AND Polling.State_id = Advertisement.State_id AND Group_id = Affiliate_id AND Check_date > End_time
    ORDER BY Polling.Candidate_id, Polling.State_id
    )

```

```sql
SELECT Candidate_Name,
       Ad_title,
       Platform_name,
       State_name,
       Ad_Start_Date,
       Ad_End_Date,
       (Ad_End_Poll - Ad_Start_Poll) AS Poll_Difference,
       Cost
FROM Ads_by_date
LEFT JOIN Ad_Start_Poll USING (Ad_id)
LEFT JOIN Ad_End_Poll USING (Ad_id)
WHERE (Ad_End_Poll - Ad_Start_Poll) IS NOT NULL ;
```

Results

	Candidate_Name	Ad_title	Platform_name	State_name	Ad_Start_Date	Ad_End_Date	Poll_Difference	Cost
1	Mike Bloomberg	'Go Mike Bloomberg'	Hulu	Washington	2020-03-10	2020-04-11	-0.23	7419
2	Bernie Sanders	'Vote for Bernie'	Google	New York	2020-03-11	2020-04-06	-3.48	4377
3	Elizabeth Warren	'Warren for president'	Google	Washington	2020-04-04	2020-04-19	0.31	3879
4	Mike Bloomberg	'Go Mike Bloomberg'	Hulu	California	2020-03-14	2020-04-04	-3.23	2300
5	Bernie Sanders	'Vote for Bernie'	Facebook	Washington	2020-03-23	2020-04-07	3.20	2656
6	Pete Buttigieg	'Pete for America'	Google	New York	2020-03-21	2020-04-15	-2.44	4262
7	Bernie Sanders	'Vote for Bernie'	Google	New York	2020-03-08	2020-04-06	-3.48	5152
8	Pete Buttigieg	'Pete for America'	Google	California	2020-04-05	2020-04-15	4.92	3763
9	Mike Bloomberg	'Go Mike Bloomberg'	Google	Washington	2020-03-14	2020-04-06	-0.23	2187
10	Mike Bloomberg	'Go Mike Bloomberg'	Hulu	Washington	2020-04-14	2020-04-18	-0.23	6323
11	Mike Bloomberg	'Go Mike Bloomberg'	Facebook	New York	2020-04-04	2020-03-29	-0.85	2638

Webpage Input

Webpage Output

Find out the relationship between advertisement spending vs. change of polling result:

Candidate Name	Ad Title	Platform Name	Distributed at	Run Date	End Date	Poll Difference (%)	Ad Cost
Bernie Sanders	'Vote for Bernie'	Google	New York	2020-03-08	2020-04-06	-3.48	5152
Bernie Sanders	'Vote for Bernie'	Facebook	Washington	2020-03-23	2020-04-07	3.20	2656
Bernie Sanders	'Vote for Bernie'	Google	New York	2020-03-11	2020-04-06	-3.48	4377
Elizabeth Warren	'Warren for president'	Google	Washington	2020-04-04	2020-04-19	0.31	3879
Mike Bloomberg	'Go Mike Bloomberg'	Hulu	California	2020-03-14	2020-04-04	-3.23	2300
Mike Bloomberg	'Go Mike Bloomberg'	Hulu	Washington	2020-03-10	2020-04-11	-0.23	7419
Mike Bloomberg	'Go Mike Bloomberg'	Facebook	New York	2020-04-04	2020-03-29	-0.85	2638
Mike Bloomberg	'Go Mike Bloomberg'	Hulu	Washington	2020-04-14	2020-04-18	-0.23	6323
Mike Bloomberg	'Go Mike Bloomberg'	Google	Washington	2020-03-14	2020-04-06	-0.23	2187
Pete Buttigieg	'Pete for America'	Google	California	2020-04-05	2020-04-15	4.92	3763
Pete Buttigieg	'Pete for America'	Google	New York	2020-03-21	2020-04-15	-2.44	4262

Report Summary

In this use case, we want to relate ad spending with the change of polling result. By referring to ad distribution state and poll results before/after the ad start/end date, we are able to obtain the poll differences. From the output table above, users can easily see how much a candidate spent on a specific ad and how the polling result changes to evaluate the effectiveness of a specific political ad. For campaign managers, they can further analyze whether an ad calls significant attention to their target audience or if they need to put out additional ads to deliver their messages.

Use Case 7: Check to see candidates are supported by which affiliated groups

Query in SQL

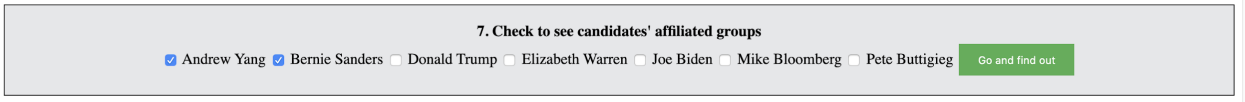
```
SELECT DISTINCT(Affiliates.Affiliate_name),(CONCAT(CANDIDATE.First_name,' ',CANDIDATE.Last_name)) AS Candidate_Name
    FROM CANDIDATE, Affiliates
    WHERE CANDIDATE.Candidate_id = Affiliates.Candidate_id
    AND
        ((CONCAT(CANDIDATE.First_name,' ',CANDIDATE.Last_name)) = 'Bernie Sanders'
       OR (CONCAT(CANDIDATE.First_name,' ',CANDIDATE.Last_name)) = 'Andrew Yang')
    ORDER BY Candidate_Name
```

Results

5 rows

	Affiliate_name	Candidate_Name
1	FRIENDS OF ANDREW YANG	Andrew Yang
2	Legal Action Media	Bernie Sanders
3	BERNIE 2020	Bernie Sanders
4	Angel Avinash Persaud	Bernie Sanders
5	VOTE NURSES VALUES POLITICAL ACTION COMMITTEE: CALIFORNIA NURSES ASSOCIATION	Bernie Sanders

Webpage Input



Webpage Output

Affiliated Groups for Candidates ['Andrew Yang', 'Bernie Sanders']:

Candidate	Affiliated Group
Andrew Yang	FRIENDS OF ANDREW YANG
Bernie Sanders	VOTE NURSES VALUES POLITICAL ACTION COMMITTEE: CALIFORNIA NURSES ASSOCIATION
Bernie Sanders	Legal Action Media
Bernie Sanders	BERNIE 2020
Bernie Sanders	Angel Avinash Persaud

Report Summary

In this case we would like to show users which affiliated groups are supporting the candidates. Through selecting the candidates, you can check the result page to see the corresponding candidates' names and their affiliated groups. From there, you may explore those groups and foresee their political ideology and even their focus in the presidential term if he/she gets elected.

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