Mijente Project Report

Tianqi Tan U25517253
Yunhan Huang U50572137

Instructors: Gowtham Asokan, Steve Backman, Jonathan Rodrigues

1 – Summary

Mijente is a political home for Latinx and Chicanx people who seek racial, economic, gender and climate justice. In this project, we focused on the political influence from police to legislation, in the form of contribution. We used 2010-2020 OCPF records as dataset and analyzed them with the help of pandas module of python in Jupyter Notebook. We've also made use of matplotlib module to visualize our result. With these experiments, we answered two questions: how much did police contribute to the politicians, and how would that affect the decision process.

2 – Data Processing

2010-2020 OCPF is a detailed record of contributions to MA's politicians during this decade. For each record, the information about both of its contributor and recipient is displayed below.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Address	Amount	CPF ID	City	City Nam	Contributor	County Ni	Date	Datetime	Employer	Occupatic	Principal	Recipient	Record Ty	Record Ty	Source De	State	Tender Ty	Tender Ty	UUID	Zip
2	63 Holden	70	16045	New Bedfi	New Bedfi	Cotter, Christopher	Bristol Cot	8/19/2015	######	City of Ne	Police Officer		Abreu, Ian	Individual	201	8/19/15 D	MA	Check	1	f2c79c4a-	2740
3	86 Campb	100	16045	New Bedfi	New Bedfi	Fernandes, Joshua	Bristol Cot	9/29/2015	######	New Bedfi	Police Officer		Abreu, Ian	Individual	201	9/29/15 D	MA	Check	1	1c85246b-	2740
4	36 Barker	100	16045	North Dar	North Dar	Taveira, Carlos	Bristol Cot	10/28/201	######	City of Ne	Police Detective		Abreu, Ian	Individual	201	10/28/16 I	MA	Check	1	9b24ea0b	2747
5	61 Durfee	100	16045	New Bedfi	New Bedfi	Hogan, Timothy	Bristol Cot	10/30/201	######	City of Ne	Police Officer		Abreu, Ian	Individual	201	10/30/16 I	MA	Check	1	d8d72684	2740
6	61 Durfee	60	16045	New Bedfi	New Bedfi	Hogan, Timothy	Bristol Cot	5/8/2017	2017/5/8	City of Ne	Police Officer		Abreu, Ian	Individual	201	5/8/17 De	MA	Check	1	b7d3aa4d	2740
7	61 Durfee	100	16045	New Bedfi	New Bedfi	Hogan, Timothy	Bristol Cot	10/19/201	######	City of Ne	Police Officer		Abreu, Ian	Individual	201	10/19/17 I	MA	Check	1	bc889007-	2740
8	15 Temple	100	16045	New Bedfi	New Bedfi	Fisher, Leanne & Earl	Bristol Cot	10/23/201	######	New Bedfi	Police Officer		Abreu, Ian	Individual	201	10/23/17 I	MA	Cash	6	7fbb8bc2-	2740
9	61 Durfee	80	16045	New Bedfi	New Bedfi	Hogan, Timothy	Bristol Cot	3/26/2018	######	City of Ne	Police Officer		Abreu, Ian	Individual	201	3/26/18 D	MA	Check	1	04e5eb8c-	2740
10	244 Leona	40	16045	Acushnet	Acushnet	Roderigues, Matthew	Bristol Cot	5/10/2019	######	City of Ne	Police Officer		Abreu, Ian	Individual	201	5/10/19 D	MA	Cash	6	71e86148-	2743

For contributor, we needed to filter out those police-related ones. Searching contributors with 'police' in their **Occupation** or **Employer** columns is a good start but it was not enough, as there're many other phrases that can represent police. Meanwhile, we also need to separate individual police contributions from those coming from police associations/unions, which can be determined by the **Record Type** column. The filter rule of police contributors is as followed:

```
# Individual
fillter1 = ["Law Enforcement", "Sheriff", "Patrol", "Detective", "Trooper", "Police"] # Occupation
fillter2 = ["Police"] # Employer
```

```
# Association/Union
fillter3 = ["Boston School Police Nepba Local 150", "Ma Correction Officers", "MA LAWPAC",\
            "MA State Police Commissioned Officers PAC", "Massachusetts Coalition of Police",\
            "Massachusetts Municipal Police Coalition", "New England Police Benevolent Association",\
            "State Police Assoc of Mass. Pol Action Comm", "MA Correction Officers Federated Union",\
            "State Police Association of Massachusetts"] # Occupation
fillter4 = ["Boston Police"] # Employer
fillter5 = "Union/Association" # Record Type
```

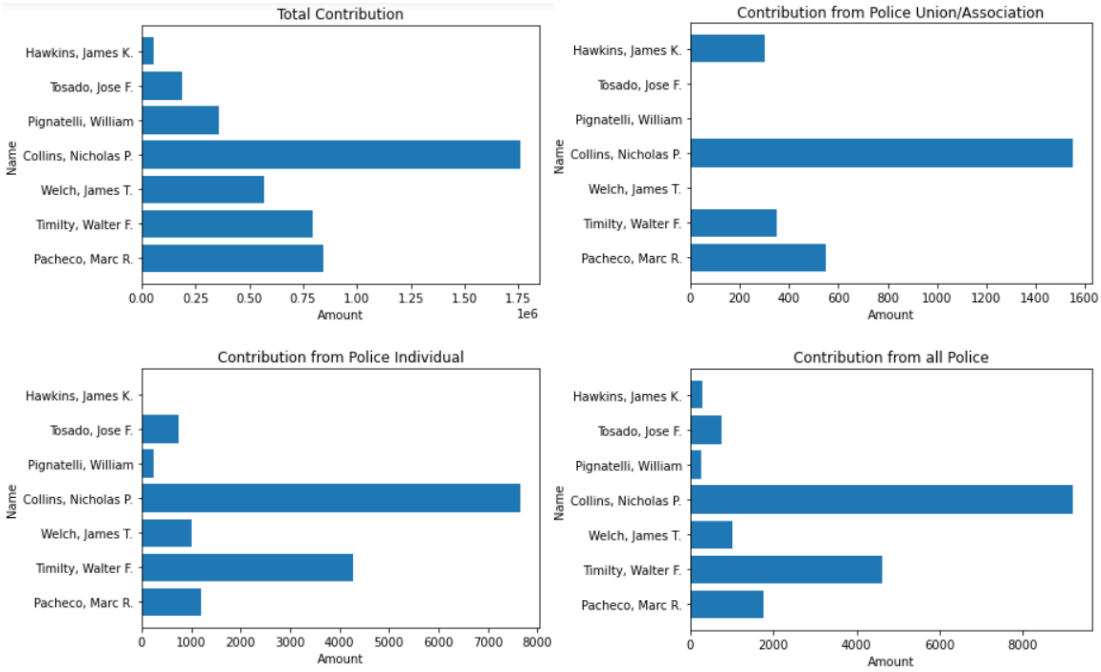
For Recipient, there's a one to one relationship with them and **CPF ID**. We built a map between their IDs and names to make it easy to be referred in the following processes.

3 – Calculating Police Contribution

Now let's focus on our first problem. Firstly, we need to find the top donors of police Individual and Association/Union, which can be done by adding all their contribution together and pick the largest ones.

```
Top Donor in Police Individual is: Hunter, Edward, 17175.0
Top Donor in Police Association/Union is: Boston Police Superior Officers Federation, 11450.0
```

Now for a designated recipient, we need to calculate the total amount of contribution he has received, as well as the total amount of police. Notice that the police records are divided by Individual and Association/Union, we'll count them separately as well as a sum for both:



We've also counted which cities received the most contribution from police:

```
Top 3 Cities that Received Donation from Police is:
('Boston', 278658.61)
('Dorchester', 161473.19)
('Quincy', 95578.9)
```

4 – Analysis of the Influence of Police Contribution

Now we need to research how these contributions could affect the legislation of Senates and House Candidates, especially those law that relates to police themselves. We took the example of a House legislation vote in July as well as some specific individual as our main focus, while using some other samples for supplement. The vote is about whether police reform should be against, which is definitely bad for police. The result of this vote is as followed:

MASSACHUSETTS HOUSE OF REPRESENTATIVES

S. 2820 On Engrossment

Yea and Nay 07/24/2020 10:01 PM

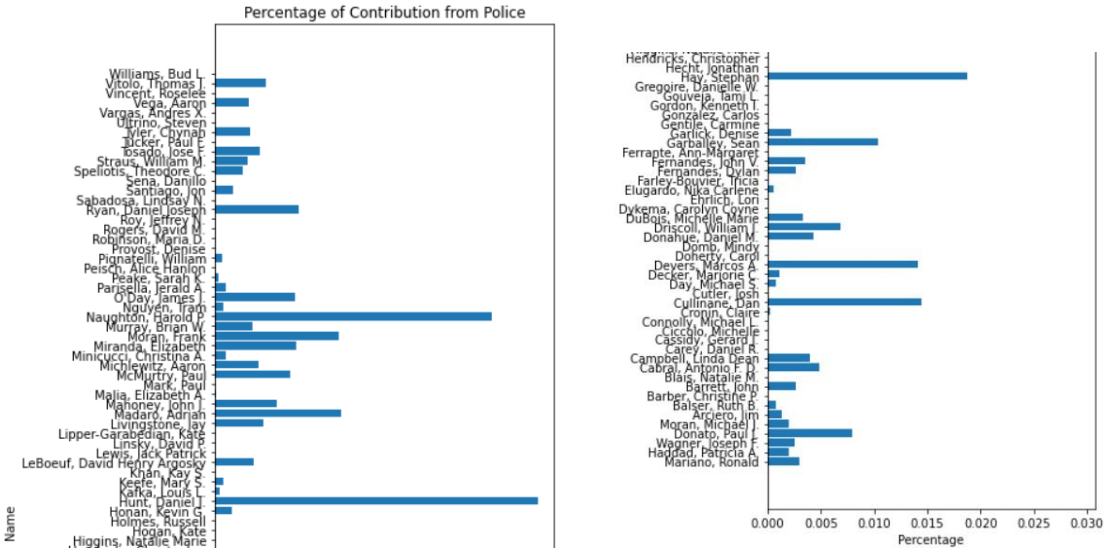
No. 226 93 YEAS 66 NAYS 0 N/V

Y	Mr. Speaker	Y	Fernandes	N	McGonagle	Y	Vargas
Y	Mariano	Y	Ferrante	Y	McMurtry	Y	Vega
Y	Haddad	N	Finn	N	Meschino	Y	Vincent
Y	Wagner	N	Fiola	Y	Michlewitz	Y	Vitolo
Y	Donato	N	Galvin	Y	Minicucci	N	Walsh
Y	Moran M.	Y	Garballey	Y	Miranda	Y	Williams
Y	Arciero	Y	Garlick	N	Mom	N	Zlotnik
N	Ashe	N	Garry	Y	Moran F.	N	Jones
N	Ayers	Y	Gentile	N	Murphy	N	Hill
Y	Balser	N	Golden	Y	Murray	N	Poirier
Y	Barber	Y	Gonzalez	N	Nangle	N	Gifford
Y	Barrett	Y	Gordon	Y	Naughton	N	Frost
N	Biele	Y	Gouveia	Y	Nguyen	N	Barrows
Y	Blais	Y	Gregoire	Y	O'Day	N	Berthiaume
Y	Cabral	N	Haggerty	Y	Parisella	N	Boldyga
N	Cahill	N	Hawkins	Y	Peake	N	Crocker
Y	Campbell	Y	Hay	Y	Peisch	N	D'Emilia
N	Capano	Y	Hecht	N	Petrolati	N	DeCoste
Y	Carey	Y	Hendricks	Y	Pignatelli	N	Dooley
Y	Cassidy	Y	Higgins	Y	Provost	N	Durant
N	Chan	Y	Hogan	N	Puppolo	N	Ferguson
Y	Ciccolo	Y	Holmes	N	Robertson	N	Harrington
Y	Connolly	Y	Honan	Y	Robinson	N	Howitt
N	Coppinger	Y	Hunt, D.	Y	Rogers, D.	N	Hunt, R.
Y	Cronin	Y	Kafka	N	Rogers, J.	N	Kane
Y	Cullinane	N	Kearney	Y	Roy	N	Kelcourse
N	Cusack	Y	Keefe	Y	Ryan	N	Lombardo
Y	Cutler	Y	Khan	Y	Sabadosa	N	McKenna
Y	Day	N	LaNatra	Y	Santiago	N	Mirra
Y	Decker	N	Lawn	N	Scaccia	N	Muradian
Y	Devers	Y	LeBoeuf	N	Schmid	N	Muratore
Y	Doherty	Y	Lewis	Y	Sena	N	Orrall
Y	Domb	Y	Linsky	N	Silvia	N	Smola
Y	Donahue	Y	Lipper-Garabedian	Y	Speliotis	N	Soter
Y	Driscoll	Y	Livingstone	N	Stanley	N	Sullivan
Y	DuBois	Y	Madaro	Y	Straus	N	Vieira
Y	Dykema	Y	Mahoney	Y	Tosado	N	Whelan
Y	Ehrlich	Y	Malia	Y	Tucker	N	Wong
Y	Elugardo	Y	Mark	Y	Tyler	N	Whipps
Y	Farley-Bouvier	N	Markey	Y	Ultrino		

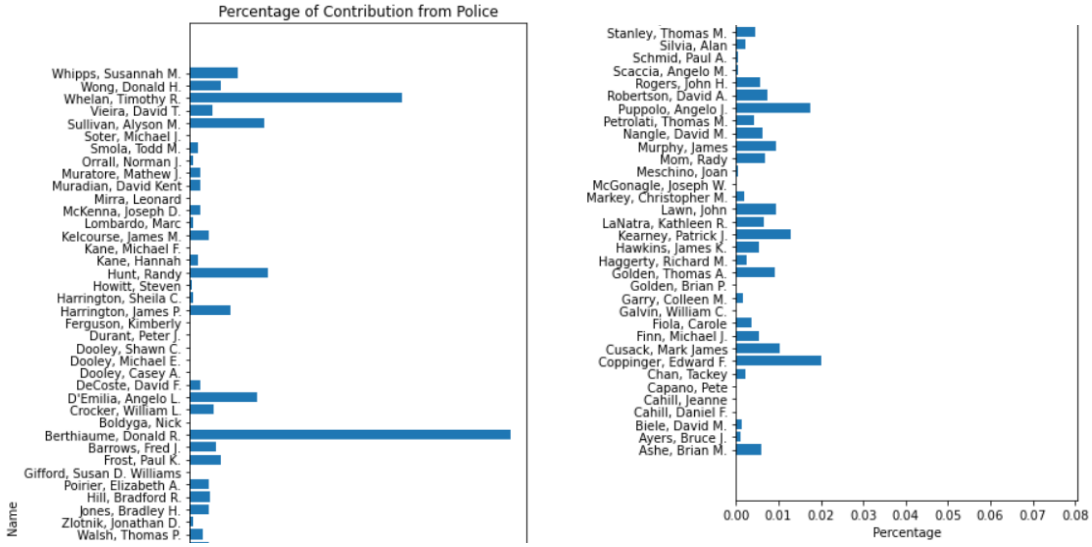
*=AFTER VOTE P=PRESENT X=NOT VOTING

Firstly, we used the counting methods above to count the contributions received by each candidate in the list from all sources as well as from Police Individual and Association/Union, grouping by their vote results. Then, we calculated the percentage of police contribution they've received as well as the weighted average, so that we can know how'll these contributions affect their decisions.

The percentage of police contribution for candidates voting **Yes**:



The percentage of police contribution for candidates voting **No**:



The average values of above percentage:

```
Percentage of Contribution from Police - Legislators vote for YES: 0.004138997347097214
Percentage of Contribution from Police - Legislators vote for NO: 0.006509409500378995
```

Obviously, candidates who voted for the benefits of police have received more contribution from them considering the percentage, from 0.41% to 0.65% in average. While **Berthiaume, Donald R** received nearly 8% of his contribution from police, which is the top among those who voted for No, **Hunt, Daniel J**, as the person who received the most contribution from police among those who voted for Yes, only takes about 3% in percentage.

Percentage is only one perspective as we also need to know about the amount of contribution. Here're the results:

```
Percentage of Legislators vote for YES: 0.5636363636363636
Percentage of Legislators vote for NO: 0.43636363636363634
Average - Total: 241157.71577030307
Average of Legislators vote for YES - Total: 252795.44529139792
Average of Legislators vote for NO - Total: 226125.64847222224
```

Not only did more candidates vote against police, but the contributions for those who voted for No were also significantly fewer than those who voted for Yes. Seemed like people really didn't like police, which is understandable as the protest of police violence was still ongoing in July.

```
Average - Police Individual: 1126.8953333333332
Average of Legislators vote for YES - Police Individual: 910.8358064516128
Average of Legislators vote for NO - Police Individual: 1405.9722222222222
Average - Police Union/Association: 105.15151515151516
Average of Legislators vote for YES - Police Union/Association: 135.48387096774192
Average of Legislators vote for NO - Police Union/Association: 65.97222222222223
Average - All Police: 1232.0468484848484
Average of Legislators vote for YES - All Police: 1046.3196774193548
Average of Legislators vote for NO - All Police: 1471.9444444444443
```

In regards to police contributions, we've already known that candidates supporting police get more from them than those who against them. After calculating the average contributions, however, we realized that they also received more police contribution in the aspect of total amount.

```
Weighted average of Legislators vote for YES - Total: 13251077.61409273
Weighted average of Legislators vote for YES - Police Individual: 47744.3569090909
Weighted average of Legislators vote for YES - Police Union/Association: 7101.818181818181
Weighted average of Legislators vote for YES - All Police: 54846.175090909084
Weighted average of Legislators vote for NO - Total: 7104456.737454546
Weighted average of Legislators vote for NO - Police Individual: 44173.090909090904
Weighted average of Legislators vote for NO - Police Union/Association: 2072.7272727272725
Weighted average of Legislators vote for NO - All Police: 46245.81818181818
```

The weighted average of different types can also illustrate the result well. The weighted average is calculated with this formula: The percentage of legislators who voted for Yes/No multiplying the amount of contribution they've received in a category. As there're more legislators who voted for Yes and received more total contribution, the weighted average of total contribution is vastly different.

As for weighted average of police contribution, despite those police opposers still has higher performance than police supporters, the difference is very small in contrast to total average's 6000000, which is not more than 10000. Considering the total amount of people and contributions, this is already a very close result and a prove of police contributions helping their supporters with legislation decisions.

Lastly, the result can be inaccurate concerning a few legislation votes. However, we couldn't find that much historical records of police-related voting. Therefore, we tried to do the above analysis to some individual politicians. Those who shifted their opinions in different votes were our target. For example, comparing the July vote and a recent one, Senates Pacheco, Timilty, and Welch flipped from Yes to No. Collins flipped from No to Yes. House Candidates Pignatelli and Tosado flipped from Yes to No. Hawkins flipped from No to Yes. We did a counting for these 7 people with the methods above:

```
Average YES to NO - Total: 548886.118
Average NO to YES - Total: 906170.6900000005
Average YES to NO - Police: 1675.0
Average NO to YES - Police: 4750.0
Percentage YES to NO - Police: 0.003051634838394656
Percentage NO to YES - Police: 0.00524183804709022
```

So, people who slipped from Yes to No has lower metrics in every perspective, including percentages of police contributions. This seems against the previous results, but considering the data are the collective ones for 10 years, we thought that it would be normal if the amount didn't change in time. Therefore, we did an extra analysis about the time they received police contributions. The result suggested that none of them have received contribution from police since August 2020, so we can sure that the results couldn't reflect their slipping here.

5 – Challenges and Future Plan

The challenges of this project mostly are coming from these aspects.

Firstly, the amount of records in a decade for thousands of politicians are too large to be processed. It's not only taking a lot of time to running an analysis method on them, but also hard to be visualized. For example, we tried to plotted all candidates' police contribution in bar chart at first but there're just too many bars and made the chart unreadable. Same with a chart that's supposed to reflect the contribution amount's relationship with date. Secondly, while there're a lot of records for contribution themselves, there weren't much of them about the legislation process. As suggested above, there's only seldom voting being held and people's opinion could shift based on current environment, the details of a bill, etc. It's lacking of confidential shows the relationship between contributions and decisions. Last but not least is the problem from real world. For example, even we've updated the rules of filtering police contributors there can still be missing one with all of our key words mismatched, there're candidates with same names during our analysis of voting which could distract the result a lot, and such.

Regarding to these challenges, we think the next step of this project should be improved the visualization methods of these numerous records, like using seaborn or tableau instead of matplotlib to make the plots more readable. We would also expand our field of investigation. Our team is small and consisted of 2 students only, which limited what we can do a lot. If time and people are allowed, we could do more research on legislation voting over this decade, and do it for different cities, or analyze its change with date, etc. There's still a lot of potentials of this project, and with the methods we've already established, we can extend its scale easily or even use it to analyze more relevant problems.