

Virtual Meetings in Madison

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1 Introduction

The City of Madison Boards, Commission, and Committee (BCC) transitioned regular meetings to online form after the outbreak of COVID-19. Participants from all areas either inside or outside Madison can join meetings to voice their opinions and perspectives. We explore the information collected for these online meetings since the end of March and give a general look at the virtual meeting characteristics in terms of duration, starting time, contents, and so on. Based on this, we want to help committees target possible concerned people to join, ensure the equal rights of all citizens involved in certain projects, and increase the efficiency of virtual meetings.

2 Geography of Participants

In this section, we display the geographic information for meeting participants. We look into the zipcode distribution of all meeting participants and participants who are willing to speak at the meeting within the nationwide range and the local range.

For Figure 1, we can observe that the colored patches are widely distributed across the whole country. If the zipcode data are correct, then this indicates that the online form of meetings makes the location of participants more flexible and allows people in other states to join as well. But about 91 percent of participants still come from Madison.

Figure 2 uses the same data as Figure 1 but zooms in to the local area of Madison. This helps to find specific zipcode areas with high participant numbers. For this goal, we can ignore the area outside the range of this graph as the outer areas only have a few participants, which can be noticed

from the above graph.

For Figure 2, we can observe that most participants input a zipcode near the capital, where has a large population. The top 5 zipcodes are: 53703, 53704, 53711, 53715, 53705.

For Figure 3, we observe that the participants who are willing to speak at the meetings have a similar geographic distribution to the one of all participants. However, among these participants, only about 84 percent are from Madison. This smaller number compared to 91 percent for all participants indicates that people who are outside Madison are more likely to speak at the meetings.

For Figure 4, we observe a similar distribution pattern to the pattern of all participants on the local scale, which shows that people living near the capital have stronger interests in both participating and speaking at the virtual meetings.

3 Meeting Contents

In this section, we analyze the texts of meeting agendas for each committee. Due to the limited meeting agenda sources for some committees, we select some committees with more content for finding the trend of popular topics and how similar the meeting content between committees is after switching to online meetings.

3.1 Top Words

We show the top words in meeting agendas to reveal a trend of popular topics committees dealt with from 2018 to 2020.

Figure 5 identifies the top 25 words among all virtual meeting texts and shows the word frequencies

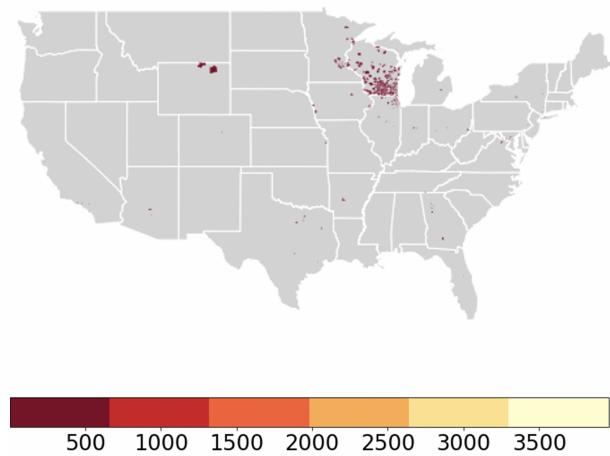


Figure 1: Participant Zipcode Distribution (General View)

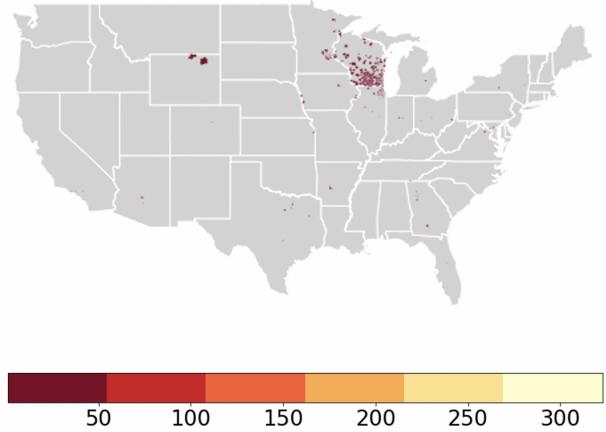


Figure 3: Zipcode Distribution of Participants Who Want to Speak (General View)

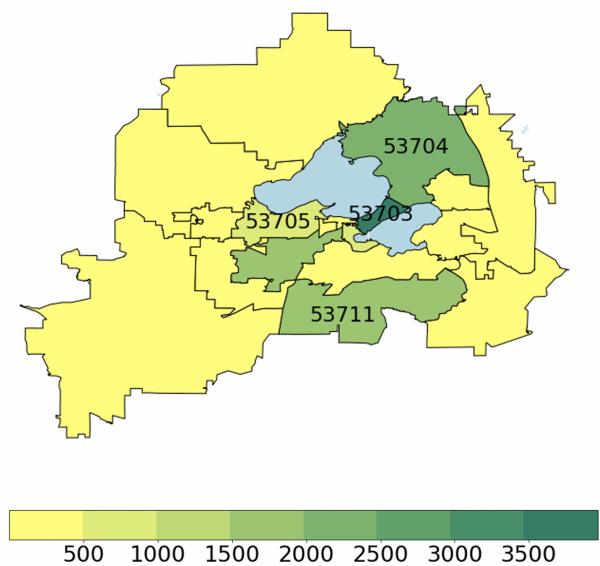


Figure 2: Participant Zipcode Distribution (Local View)

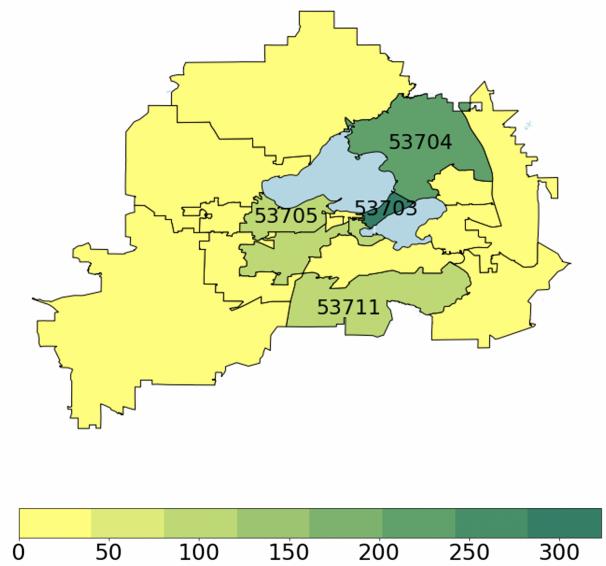


Figure 4: Zipcode Distribution of Participants Who Want to Speak (Local View)

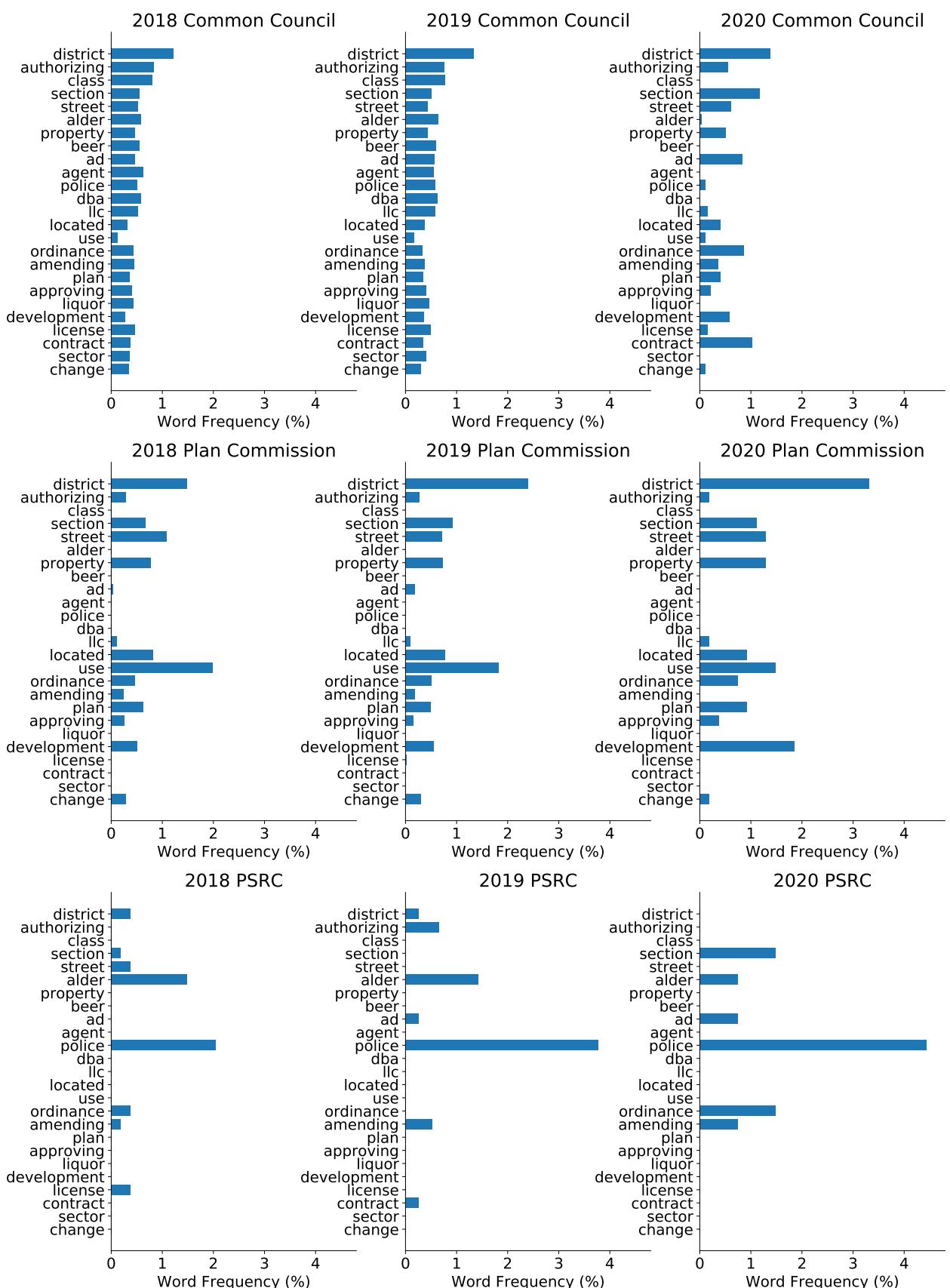


Figure 5: Top Words Frequency for Committees

of meeting texts specifically for Common Council, Plan Commission, and Public Safety Review Committee (PSRC) in 2018, 2019, and 2020.

Public Hearing - New License
 I/O Arcade Bar LLC • dba I/O Arcade Bar
 720 Williamson St • Agent: Mitchell Turino • Estimated Capacity: 155
 Class B Combination Liquor & Beer • 75% alcohol, 15% food, 10% other
 Aldermanic District 6 (Alder Rummel) • Police Sector 408

Figure 6: Alcohol License Entry Format

From Figure 5 we observe that the word frequency of committees is related to their functions. As a supervising committee, Common Council has the evenest word frequency distribution. The meeting contents of the Plan Commission have higher word frequencies for words like 'district', 'street', 'property'. The contents for PSRC include more words such as 'police' and 'alder'.

During the virtual meeting period, we see more word frequency variance of the top 25 words compared to those of 2018 and 2019. For Common Council, the appearance of words like 'class', 'beer', 'alder', 'liquor' reduce in 2020 by 99%, 99%, 93%, and 99% than the average of 2018 and 2019, respectively. This might be caused by fewer issues related to licenses during the COVID-19 pandemic, as most license texts show in similar formats in the meeting agenda. One example of an alcohol license event on the agenda is Figure 6. For Plan Commission, the bar plots indicate a tendency of increasing development in district areas and property changes with a higher frequency of words 'district', 'development', 'property' in 2020. For PSRC, the appearance of words 'police' and 'ordinance' increase, which might correlate with the protests after the killing of George Floyd.

3.2 Committee Content Similarity

To assess the collaboration between two committees, we check the similarity of committee contents using the distance between feature vectors. For each committee, we count the word occurrences of the top 30 words and divide it by the total word count of certain committee texts. We use these word frequencies as feature vectors.

Figure 7 displays the top 30 words in 2019 and

2020, which we used as feature vectors to compare committee content similarities.

Figure 8 displays the heatmap showing the similarity of committee content in 2019 and 2020. Each small square corresponds to two committees. And the data for each square is the distance between feature vectors of the two committees. Therefore, the larger the distance, the darker the color of the square, and the less similar are the contents of the two committees. The squares on the diagonal show the comparison of similarities of the same committee, thus, these squares always show the same color representing zero distance. We use abbreviations of committee names for simplicity. The correspondence is shown as below:

- Common: Common Council,
- Finance: Finance Committee,
- Trans.: Transportation Commission,
- Plan: Plan Commission,
- UrbanD.: Urban Design Commission,
- PublicW.: Board of Public Works,
- Personnel: Personnel Board,
- Alcohol: Alcohol License Review Committee

From Figure 8 we observe that among these committees, the collaboration between other committees and Common Council seems to be influenced least by the transition to virtual meetings. In both two years, Finance Committee and Transportation Commission have similar meeting content, which may demonstrate closer collaboration. In general, the color of squares in 2020 is darker compared to those in 2019. This might indicate that the collaboration between two committees in 2020 might be less than in 2019 due to the restrictions during this pandemic.

4 Recommendations

In this section, we propose recommendations about virtual meetings, including developing more efficient meeting schedules and better targeting audience from certain areas.

4.1 Schedule of Meetings

We look at participants' preference on the starting time and their different level of interest to different

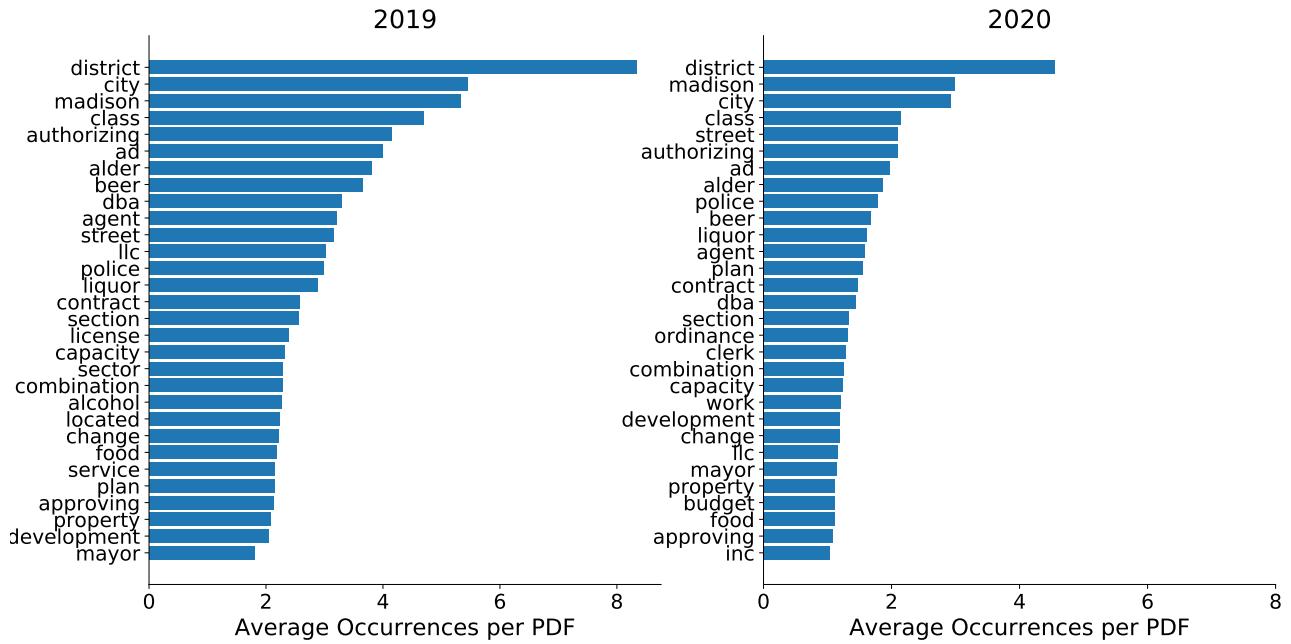


Figure 7: Feature Words Used For Content Similarity

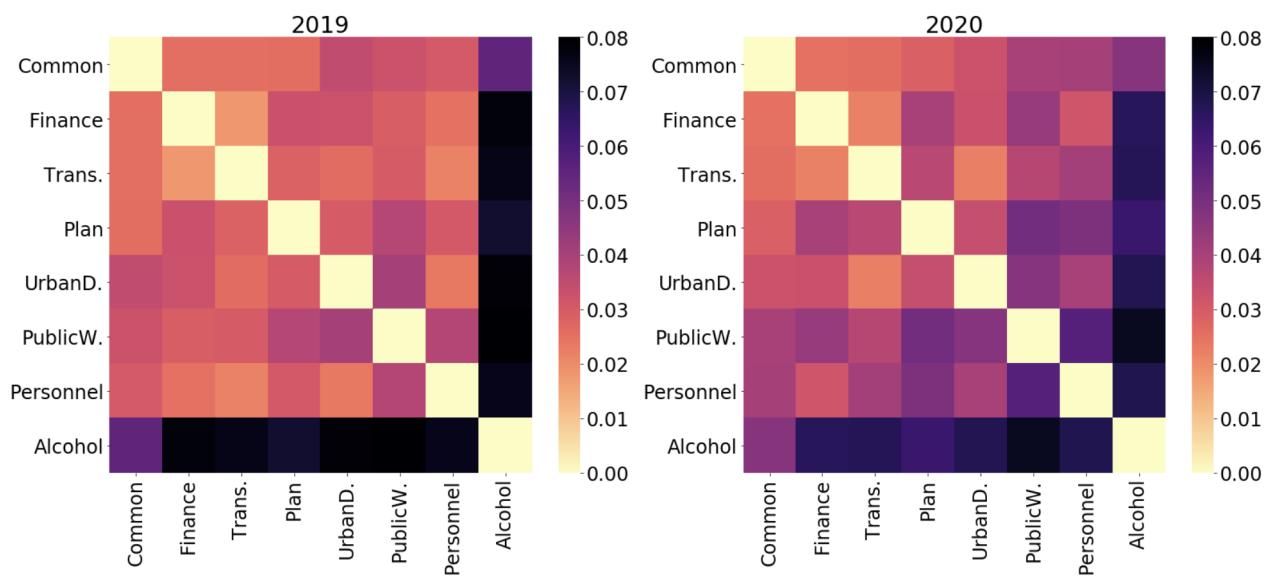


Figure 8: Committee Content Similarity

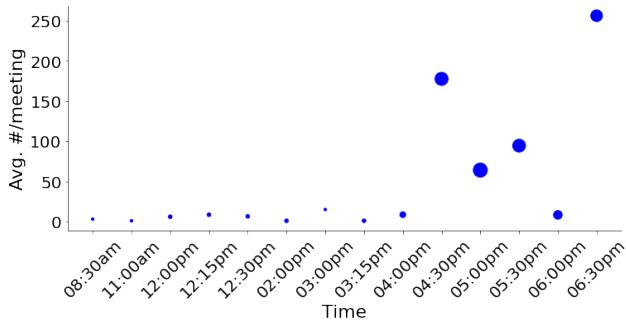


Figure 9: Starting Time Preference

committees to determine if we could build a more efficient meeting schedule.

Figure 9 shows the average number of participants per meeting for different starting times, and the size of the bubbles shows the number of meetings scheduled at that time.

From Figure 9 we have seen that meetings start in late afternoon after 4 pm has the most audience, while meetings in the morning does not have much participants. We want to run regression determining the effect of meeting start time on number of participants.

Running the Ordinary Least Squares (OLS) regression, we get:

$$Participant = \begin{pmatrix} -5.40 * StartingTime[7-10] \\ + StartingTime[10-13] \\ + 21.12 * StartingTime[13-16] \\ + 41.91 * StartingTime[16-19] \\ + 26.80 \end{pmatrix}$$

However, only 8.6 percent of the variance in participation could be explained by starting time. This indicates that starting time itself has very limited effect on the number of participants, and there exists other factors associated with the meetings in the late afternoon with much strong affecting power on people's participation.

We found out that, this more important factor is which committee the meetings are held by.

Figure 10 shows the meeting starting time of the 10 committees with the most audience. We could observe that all the meetings from the top 10 committees are scheduled after 4:30 pm. This indicates

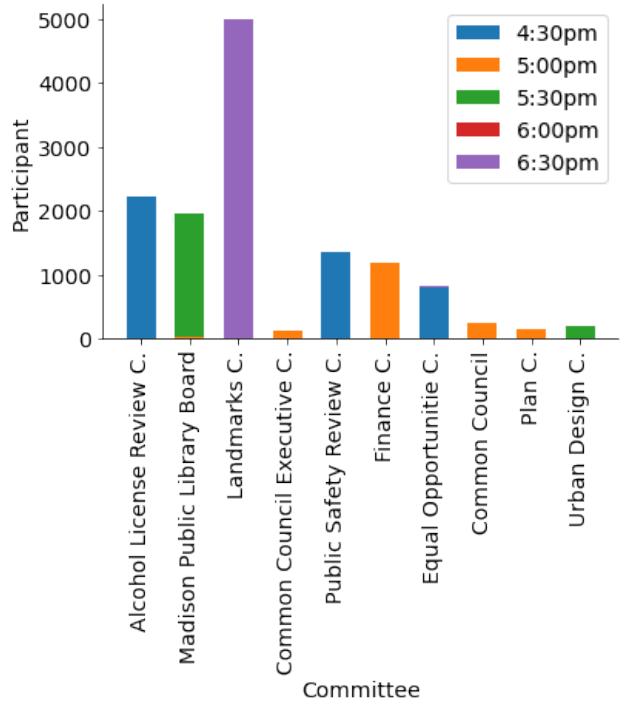


Figure 10: Starting Time for Top 10 Committees

that, participants' preference is more affected by which committee is holding the meeting, and the cluster of popular meetings in the afternoon gives a trend of having more participants in the afternoon.

4.1.1 Recommendation

From plots above, we could see that meeting content and its committee plays a much more important role than starting time on the meeting participants. We recommend scheduling meetings that do not require much citizen participation in the morning, and save the topics people pay more attention to in the late afternoon.

4.2 Features of Different Areas

Seeing the spread of participation, we want to look into characters of different areas, so that we could better attract our targeted audience from certain areas when necessary (such as when the topic is particularly relevant to certain areas).

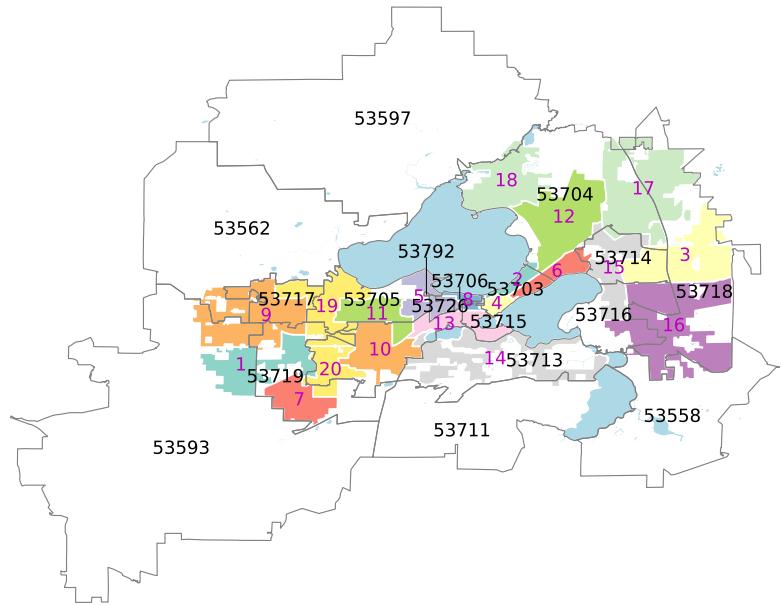


Figure 11: Zipcode and Aldermanic District Map

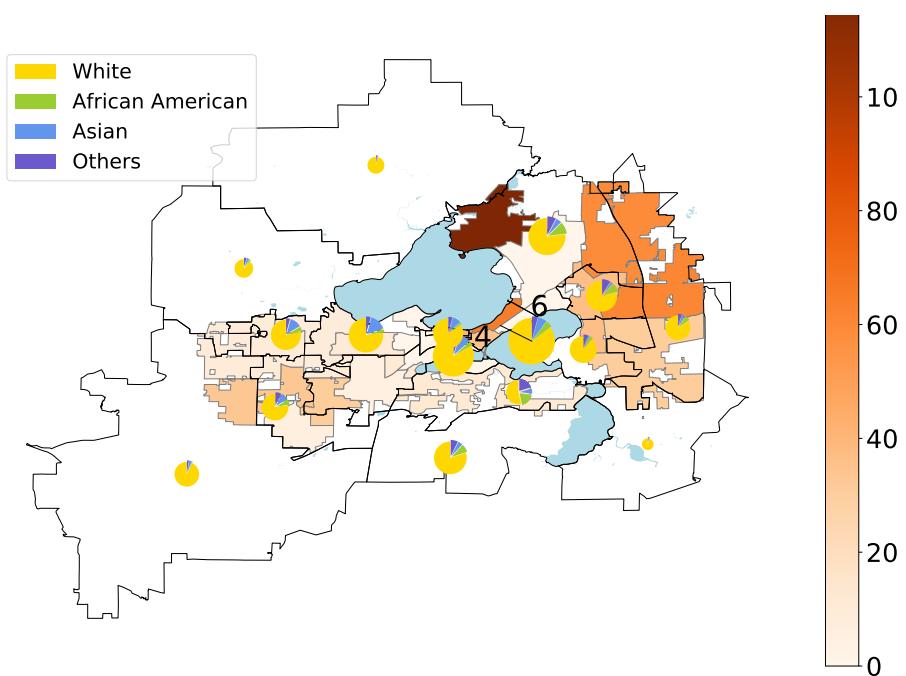


Figure 12: Participants Distribution (Normalized), Local Race Composition, and Local Blogs

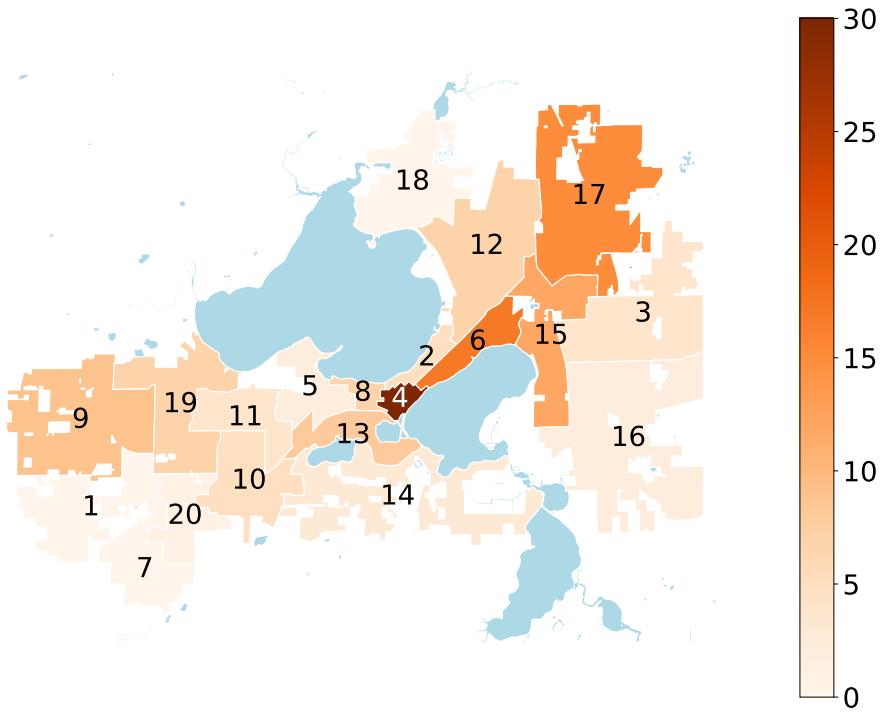


Figure 13: Number of Events by District

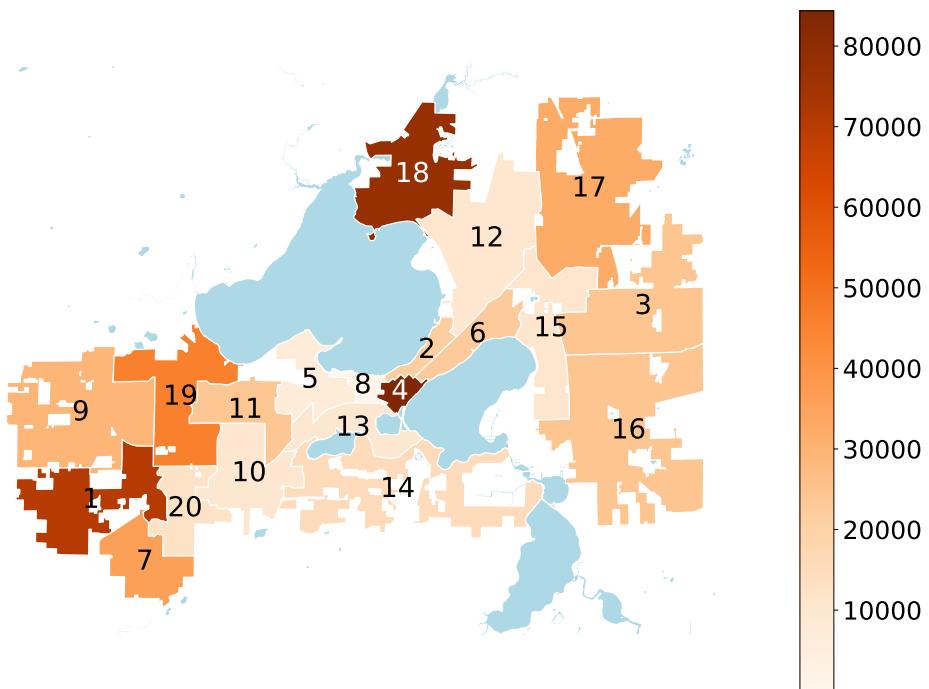


Figure 14: Number of Households By District

4.2.1 Zip Code and Aldermanic District

Figure 11 displays both the zipcode area and the aldermanic district area.

The distinct divisions of districts and zip codes presents challenges for building models based on geographical features. For example, zip code 53704 overlaps with district 6, 12, 17 and 18. We combine several zip code and district features based on estimations, including event counts, blog posts by alders, household amount and wealth level. Running the Ordinary Least Squares (OLS) regression on participant, we get:

$$\text{Participant} = \begin{pmatrix} 93.518 * \text{Events} \\ + 5.113 * \text{Blogs} \\ + 0.002 * \text{Households} \\ + 0.00 * \text{Wealth} \\ -154.499 \end{pmatrix}$$

Figure 12 shows the combined version of race population by zip-code category with pie charts and the alder blog numbers of each district. We observe that the race composition does not vary much by area, so we did not include this feature in the regression.

The amount of alder's blog post include posts since March 2020, when we begin to convert to virtual meetings. This helps to find the specific district where the alder does much effort advertising upcoming events.

The formula predicts that each additional post made by the alder would bring 5 more constituents to the meetings. The positive coefficient associated with the number of blog posts indicates that alder's advertising do encourage their constituents to come to meetings, which is what we could do to attract audience from certain areas.

Figure 13 maps the number of events for different districts. The more event indicates that affairs associated with the district is discussed in meetings more frequently. This means we would want more people from the district to attend these meetings since the meeting contents are more relevant to them.

The formula predicts that each additional event about a district would bring 93 more people from

the district to attend the meetings. The high coefficient associated with the number of events indicates that people from districts being discussed more attend meetings more frequently.

Figure 14 shows the estimated number of households by district. We observe that districts 1, 4, 18 are more crowded than others, but comparing to Figure 13, district 1 and 18 are not discussed much in the meetings.

4.2.2 Recommendation

We recommend that all alders blog frequently to keep their citizens updated, especially alder from district that have a lot relevant affairs going on, since the few posts do not match the high number of affairs associated with that district (for example district 6 and district 4).

We also recommend committees pay more attention to district 1 and district 18, since the high population density from the two districts may suggest that they require more attention than the less crowded districts, and it may also be more efficient if we discuss these districts more in meetings as more people would be affected by the decisions.

5 References

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- <https://data-cityofmadison.opendata.arcgis.com/datasets/tax-parcels-assessor-property-information/data?page=8025>
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- <https://github.com/greencoder/us-zipcode-to-geojson>
- <https://eric.clst.org/tech/usgeojson/>
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