LA 311 Call & MyLA Request Analysis

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Content

1. Introduction

Non-emergency **311** call/request systems, used increasingly in U.S. cities, offer a number of advantages. They give citizens a quick, convenient way to kvetch about problems in their neighborhoods, and get a response. Los Angeles City, as one of the most prosperous U.S. cities, has received numerous services requests over the past few years, which has received great attention and interest of both government and the public.

Aiming at better enabling city governments to identify patterns and addressing issues proactively, this report conducted a thorough analysis on *311 Call Tracking Data* and *MyLA Services Request Data* provided by City of Los Angeles Open Data Portal. The report will first define business goals of the whole analysis, following by a brief dataset description. Next, major KPIs to evaluate on will be illustrated with reasons. Then, *5W1H* framework in terms of Issues Analysis, Seasonality Analysis, Geographic Analysis, Department In-Charge Analysis and Resolution/Channel Analysis will be implemented on *311 Call Tracking Data* and *MyLA Services Request Data* respectively. A conclusion with overall findings and specific recommendations will be discussed at last.

2. Business Goal & KPIs

- Increase request handling efficiency
- Minimize human capital cost
- Facilitate communication between the public and government
- Improve Los Angeles City residential quality

Major KPIs to evaluate our business goals including:

- Count of service requests
- Duration of services

3. Dataset Description

To obtain a comprehensive insight, *311 Call Tracking Data* with date range between 2011/01/01 and 2014/12/31(four years) and *MyLA Services Request Data* with created date ranging from 2016/01/01 to 2016/09/30 (three seasons) were selected for analysis.

In the *311 Call Tracking Data*, variables including 'Date', 'Time', 'Department Name', 'Service Name', 'Call Resolution' were chosen for analysis. Also, by joining the dataset with US Zip Codes Data (2013) on the common column 'Zip Code', new columns about longitude and latitude were acquired for each call. For the *MyLA Services Request Data,* we picked up columns about 'createdDate', 'createdDate', 'Owner', 'RequestType', 'Status', 'RequestSource', 'Zipcode', 'Lat', 'Lon', 'APC' for further analysis.

4. LA 311 Call

4.1 Issues Analysis

Figure 1 illustrates the top 20 issues sorted by count of service requests. 'Bulky Item Pick up', ' Online Request for Permit Inspection' and 'Graffiti Removal - Community Beautification' appear to be the most frequent service types over the four years from 2011 to 2014. This outcome arose our attention to propose ideas in handling these high frequency service requests.

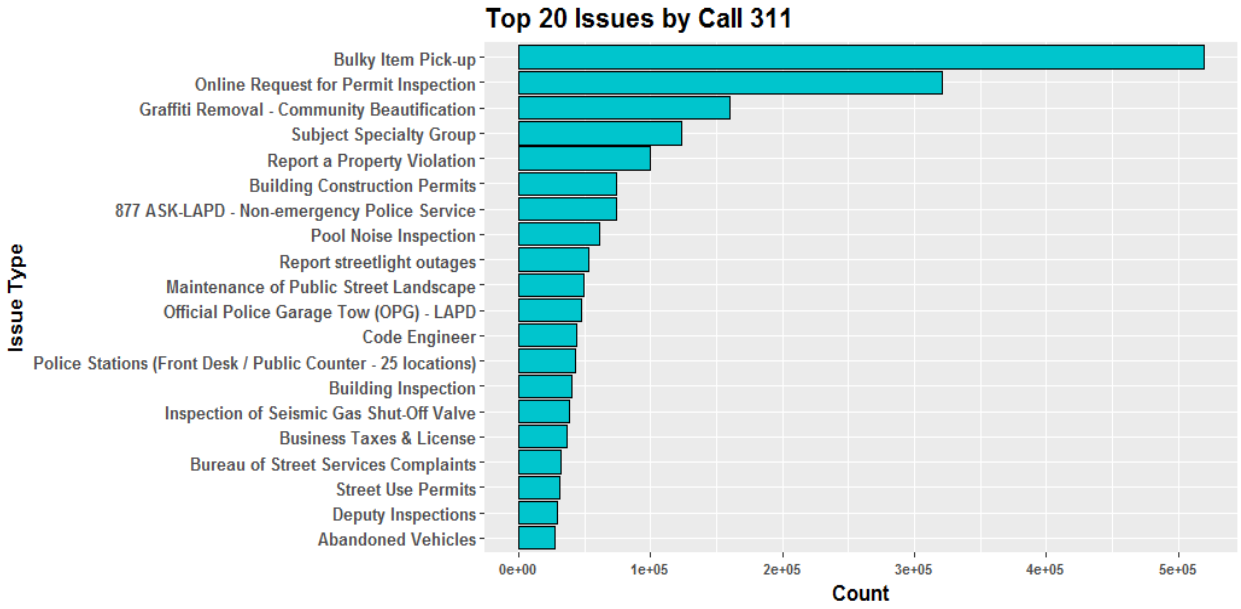

Figure 1: Count of Top 20 service names in 311 Call Center Tracking Data

4.2 Seasonality Analysis

The heat map in Figure 2 shows the count of total service requests by Day of Week and Hour of Day while the line chart in Figure 3 demonstrates the total amount of requests from 2011 to 2014 by months.

From Figure 2, it can be known that 311 call used to run from 7:00am to 10:00pm daily. However, based on the fill depth, it can be concluded that between 8:00 to around 16:00 has relatively high density of calls, especially on weekdays. Thus, judging by 2011 to 2014 311 call tracking data, the current 311 call center working between 8:00 to 16:45 daily is reasonable and sufficient to handle the service requests from the public.

Figure 3 indicates that from year 2012 to 2014, number of total service requests are increasing by years, and all of them except 2011 fluctuates but in general grows from January to September, and peaks in October while decreases in November and December. In this circumstance, it is anticipated that requests in current year (2016) or in the future would follow similar seasonality trend, and more importantly total annual requests will keep growing, and hence more agents and staff will be needed to tackle the service requests.

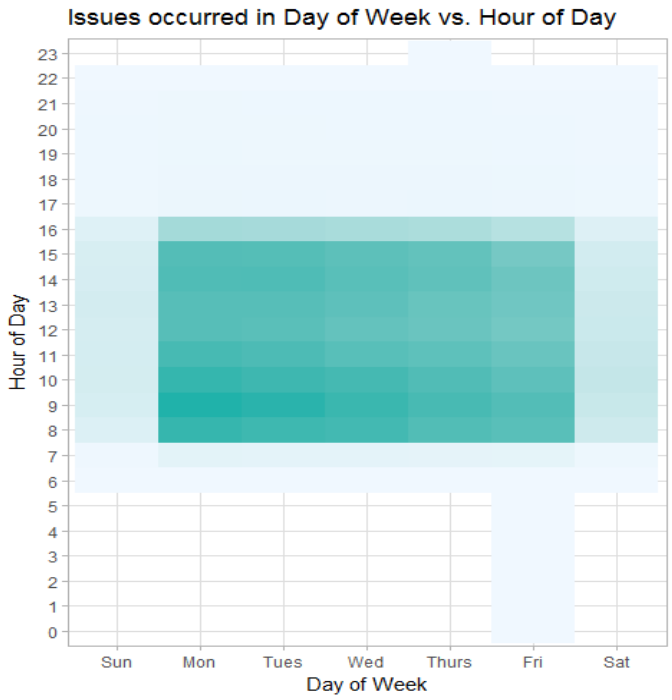

Figure 2: Count of Service Requests by Day of Week vs. Hour of Day in 311 Call Center Tracking Data

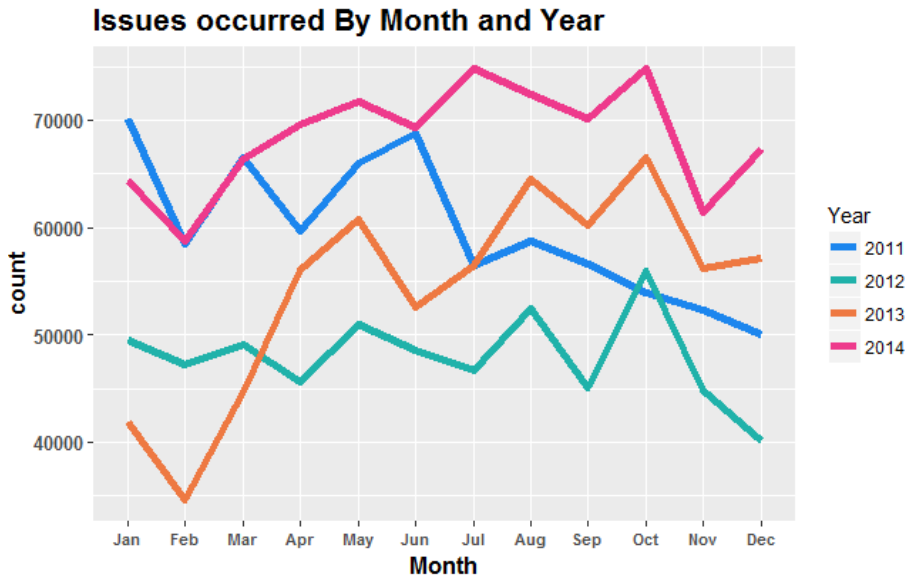

Figure 3: Count of Service requests by Year vs. Month in 311 Call Center Tracking Data

4.3 Geographic Analysis

We scrapped zipcode with latitude and longitude information from website and left join with the existing call dataset and mapped the distribution of the top eight most frequent service name. The map tells us that South Los Angeles area has the most frequent issues due to its high density plots on the map. Figure 4 is a dot plot which ranks the zipcode by count of issues. We found that the top zipcode is 99999, which means most people are not sure about their zipcode. Then, zipcode with the second highest count of issues is 900012, which is near Chinatown.

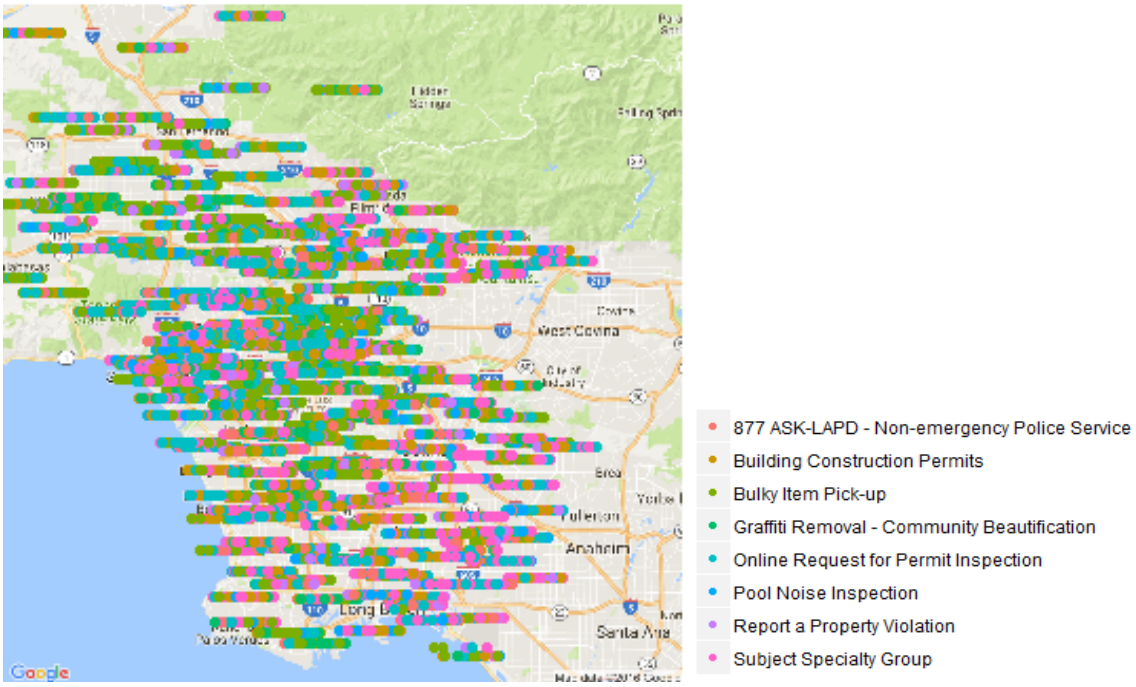

Figure 4: top 8 service type distribution on LA Map

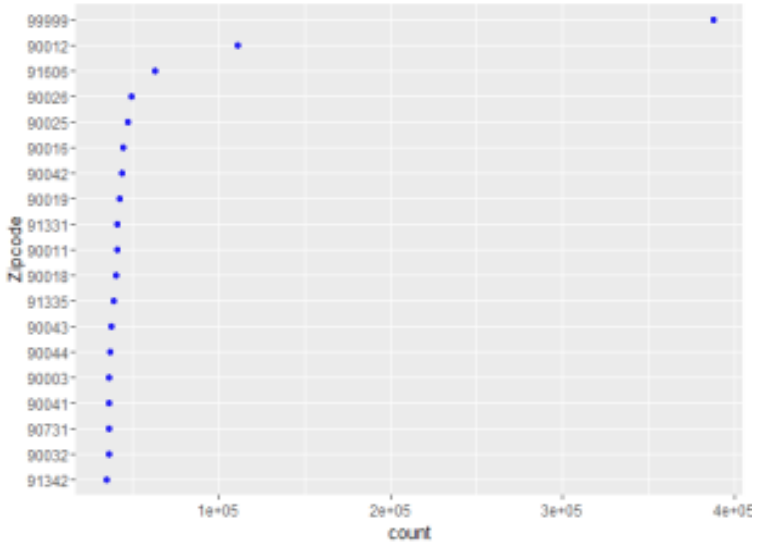

Figure 5: Top 20 zipcode by count of service

4.4 Department In-Charge Analysis

In figure 6, the dot plots show that the top 6 busy departments are LADBS, BOS, LAPD, DOT, BPW and BSS. Especially, the busiest department is LADBS and the next one is BOS. This information is very important for our further analysis on request dataset. In figure 7, the stacked barchart show us that during

2011-2014, the busiest department LADBS has the most service to provide. However ,the second busy department BOS only has one service type Bulky Item Pick-up to deal with .

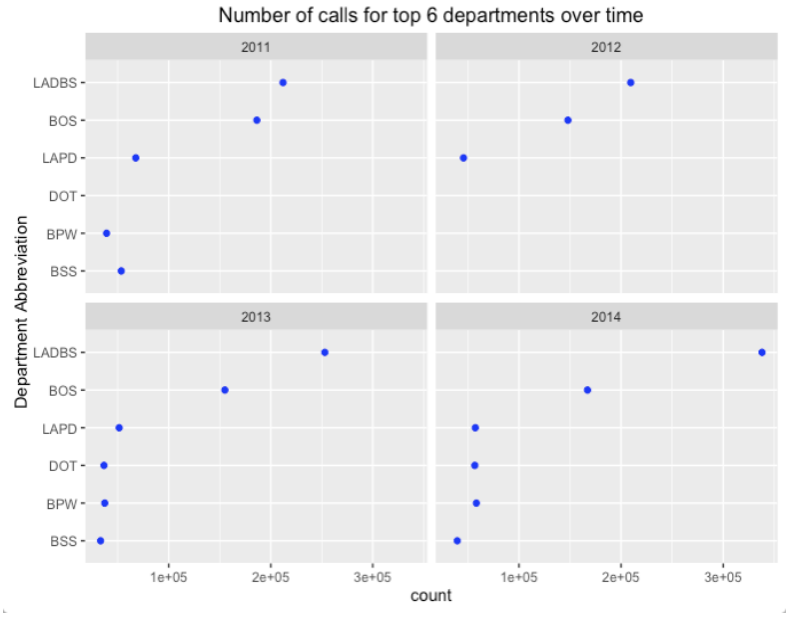

Figure 6: number of calls for top 6 departments over time

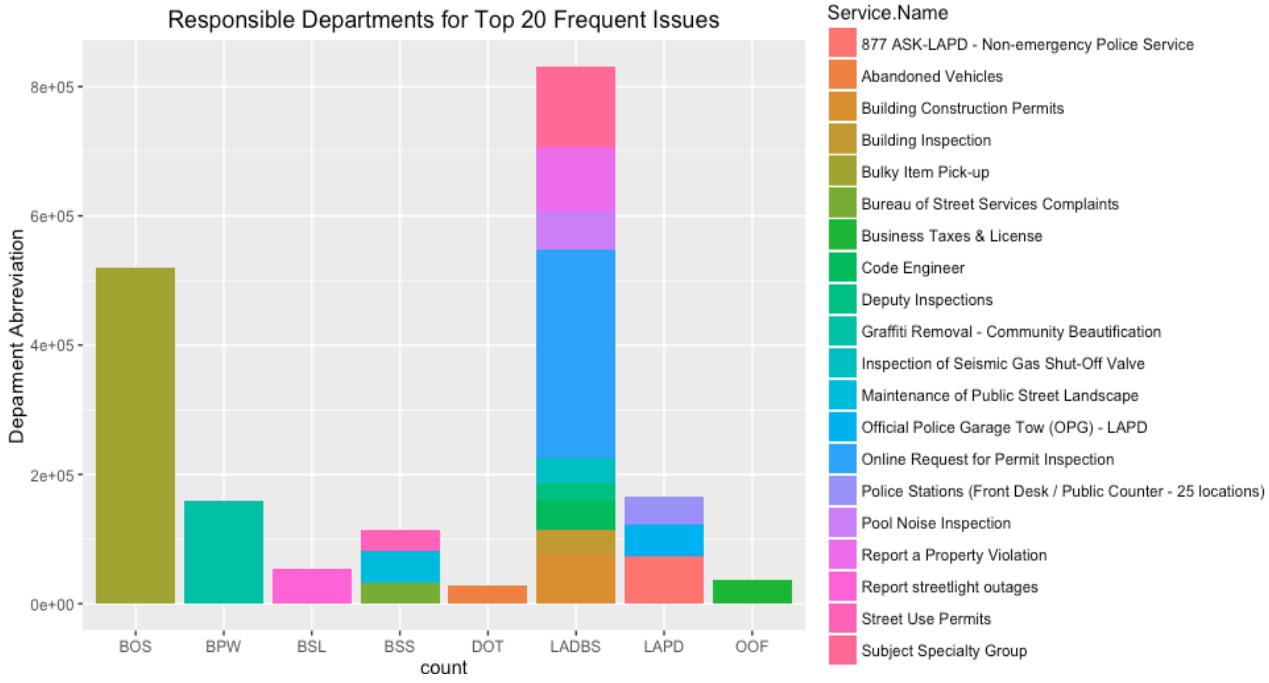

Figure 7: Responsible Department for Top 20 Frequent Issues

4.5 Resolution Analysis

In figure 8, it's a bar chart shows the main resolution for the most frequent twelve services. Six main resolution include Service Request Processed, Transfer (City), Gave Caller Information, Warm Transfer (City), Got Voicemail (City), and Referred To County.

Most issues, if successfully resolved, are in status of "Service Request Processed". However, except for "Bulky Item Pick-up", "Graffiti Removal", "Online Request for permit inspection", "Report a property violation", and "Report streetlight outages", the remain seven type of issues are mostly transferred. Thus, to improve efficiency, when receiving those calls, we could provide people several choice option to guide them to choose service type and transfer those service away directly.

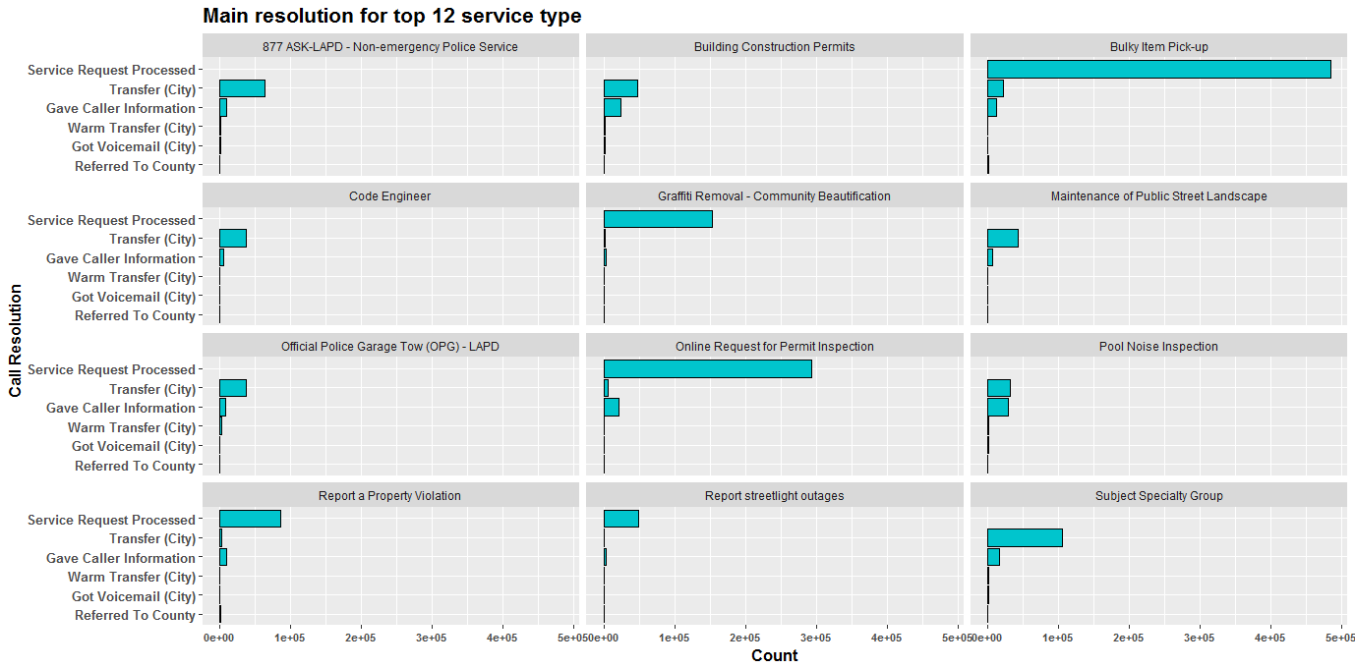

Figure 8: Main resolve method for 12 most frequent issues

In figure 9, it shows the relationship between resolution and request type from 2011 to 2014. Different color represents different resolve method, for example,blue represents transfer while green represents

service being processed. Since the proportion of different color hasn't changed over time, we can conclude that resolve method for different service type have remained unchanged over time.

Also, the request amount of call in "Graffiti Removal", "Online Request for Permit Inspection", "Property Violation" and "Subject Specialty Group" have the tendency of increasing, while "Building Construction Permits" is decreasing. We suggest adjusting staff allocation according to workload.

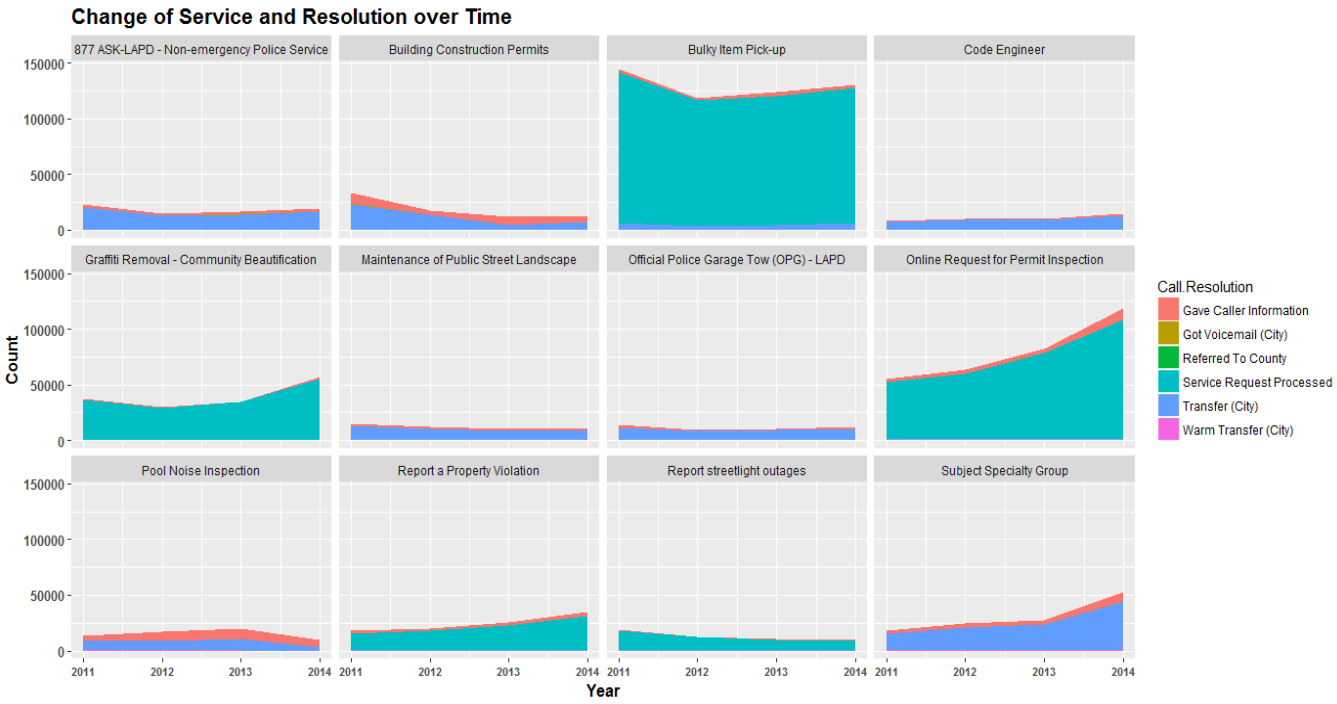

Figure 9: Relationship between request type and resolution over time (2011-2014)

5. MyLA Request

5.1 Issues Analysis

Similar to Figure 1, Figure 10 visualizes the count of requests by service types in the first three quarters of 2016. It also points out that 'Bulky Items', ' Graffiti Removal' and 'Metal/Household Appliances' are top three frequent service types, accounting for 44%, 32.4% and 6.3% of the total requests number respectively (Figure 11). Great attention should be further given to these categories of requests.

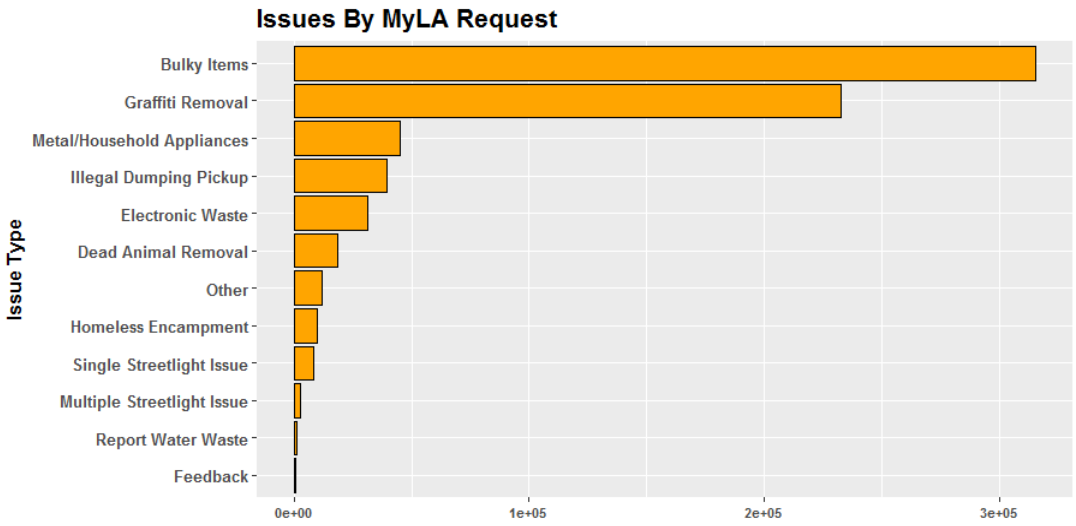

Figure 10: Count of service requests in MyLA Request Data

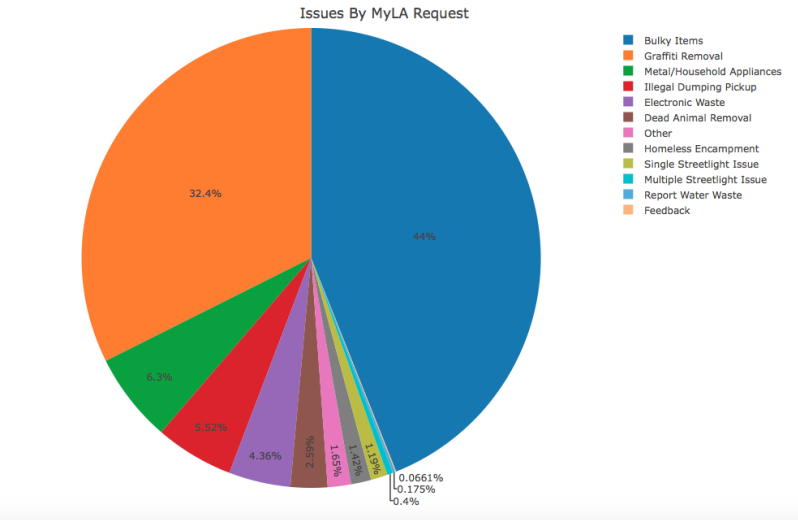

Figure 11: Percentage of Service requests in MyLA Request Data

5.2 Seasonality Analysis

As Figure 12 shows, in the first three quarters of 2016, requests are normally intensive between 8:00 to 17:00 during weekdays, in particular Monday, Tuesday and Wednesday. In the highest density request period (Monday at 10), the most frequently occurring types of requests are also ‘bulky items’ and ‘graffiti removal’.

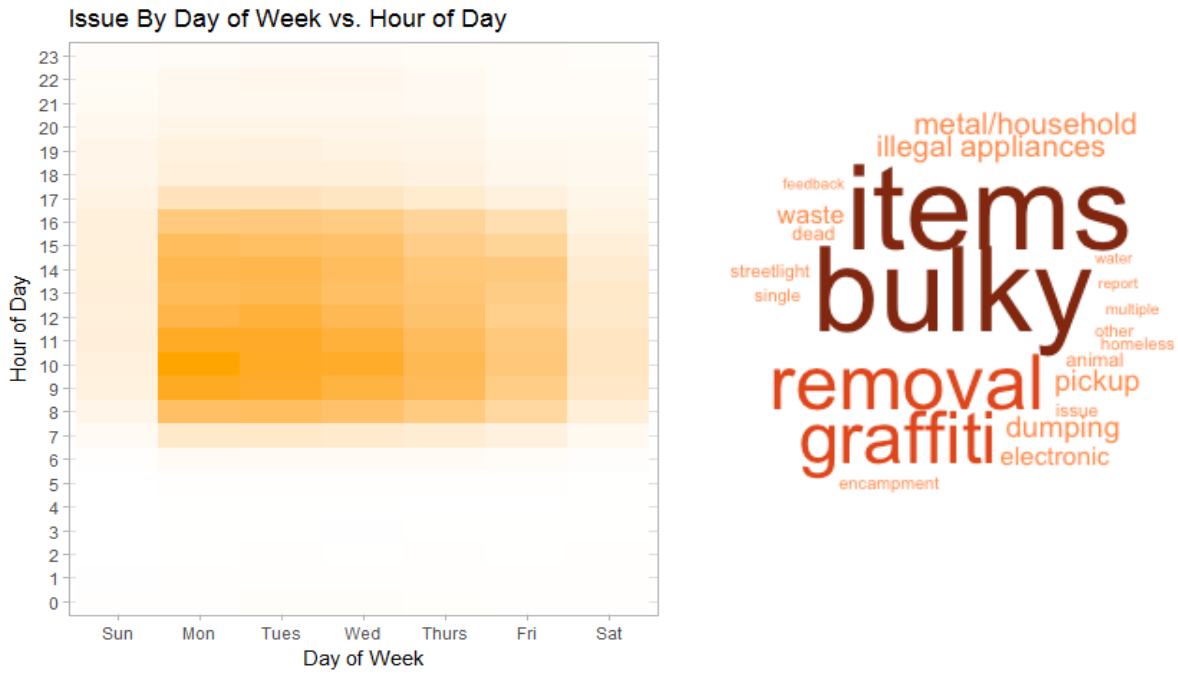

Figure 12: Count of Service Requests by Day of Week vs. Hour of Day in MyLA Request Data

In addition, Figure 13 about the count of total service requests over months exhibits seasonality of service requests. Among the first three quarters, quarter 3 has the highest number of requests whereas quarter 1 has the lowest. Very similar to the trend in Figure 3, the number of requests fluctuates but overall rises from January to September. Therefore, we could predict that it should experience a peak in the October, and drops in November and coming December, and the amount of annual requests will be larger than previous years.

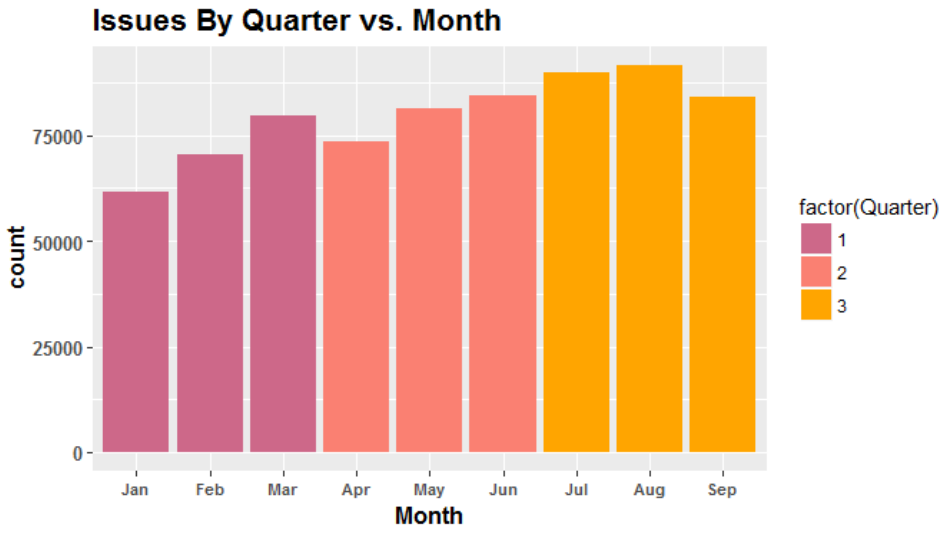

Figure 13: Count of Service requests by Year vs. Month in 311 Call Center Tracking Data

5.3 Geographic Analysis

Figure 14 visualizes the different distribution of top six count of request type on Los Angeles map. It shows us that the most frequent request type happened in South Los Angeles APC is Graffiti Removal. And the next barchart tells us even though different APC has its own service distribution on the map, the request type of different APC are nearly the same, for example, bulky items is always the highest item among all APC.

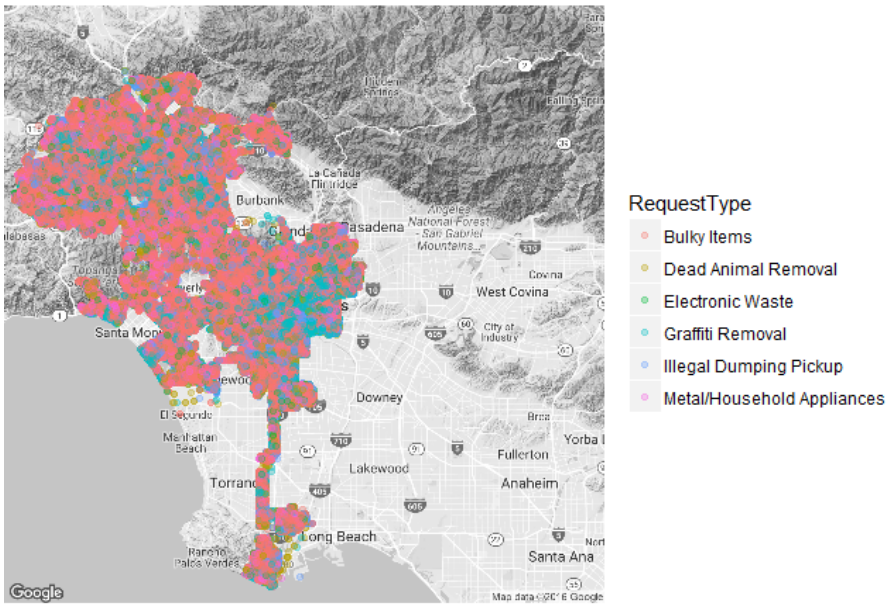

Figure 14: top 6 request type distribution on LA Map

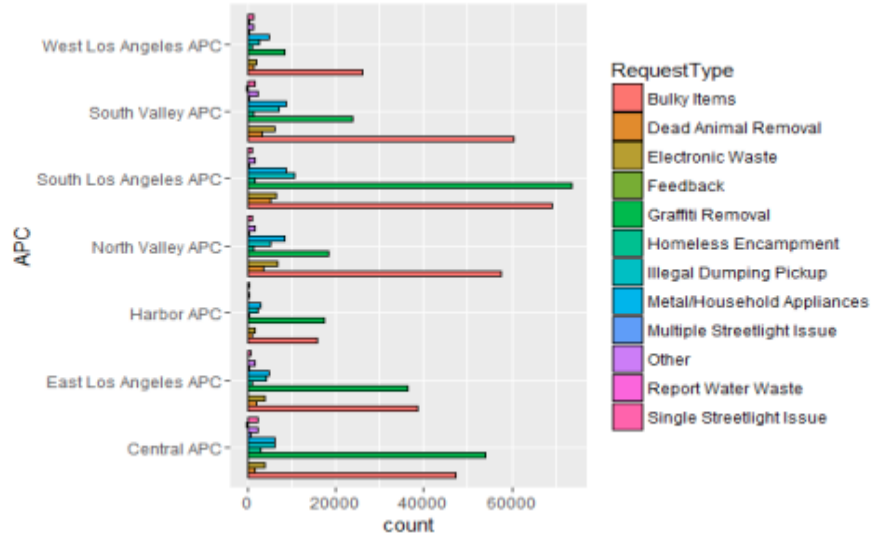

Figure 15: Responsible APC for 14 Frequent Issues

In Figure 16 we can get the information that Vague zipcode nearly all disappear and 90011, which covers the Southeast area of USC ranks first on the plot.

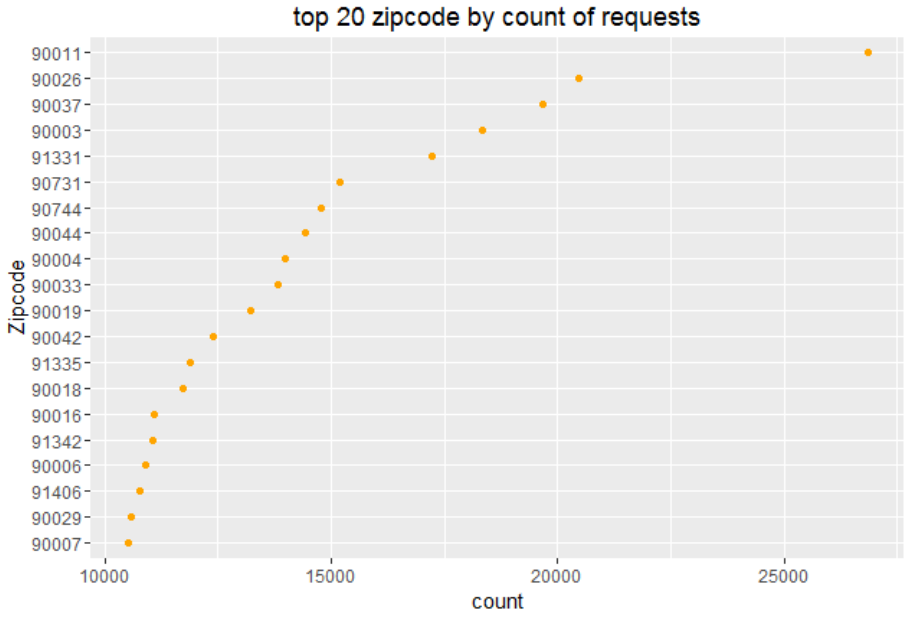

Figure 16: Top 20 zipcode by count of requests.

5.4 Department In-Charge Analysis

Figure 17 tells us that the top 6 departments with most number of requests are BOS, OCB, BSL,ITA, SBB and LADWP.Compared with the analysis in Call dataset that the busiest department was LADBS and next was BOS from 2011 to 2014 , the dot plot shows that now department BOS ranked NO.1 and Department LADBS disappears on the plot. We found out the reason is that department LADBS established its own app. In Figure 18, compared with 2011-2014, department BOS has a lot more different request types to tackle with and this problem may cause inefficiency in department BOS..Perhaps as what department LADBS did, creating a new app for department BOS will be a superb solution.

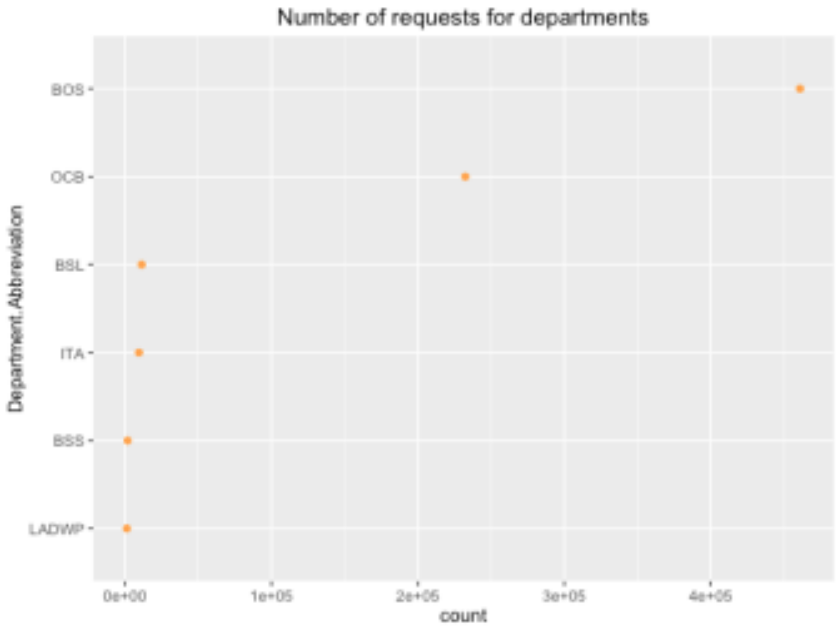

Figure 17: Number of Requests for Different Departments

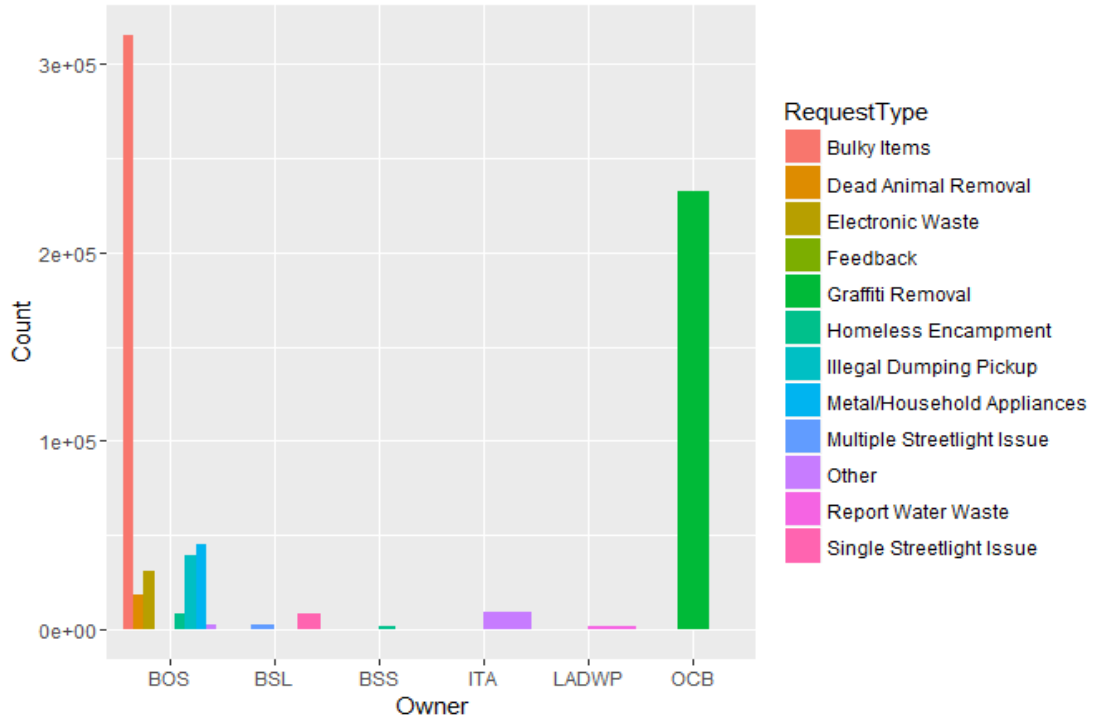

Figure 18: Responsible Department for Different Issues

5.5 Resolution Analysis

Figure 19 and figure 20 show that requests are most likely to be closed or cancelled. While several findings are that "Graffiti Removal" has higher possibility to be cancelled, "Feedback", are more likely to fall in cancelled or open status, and "Homeless Encampment" are more likely to be pended. Those unusual status may due to the "hard-to-resolve" nature of these three request type, and thus should be give more attention.

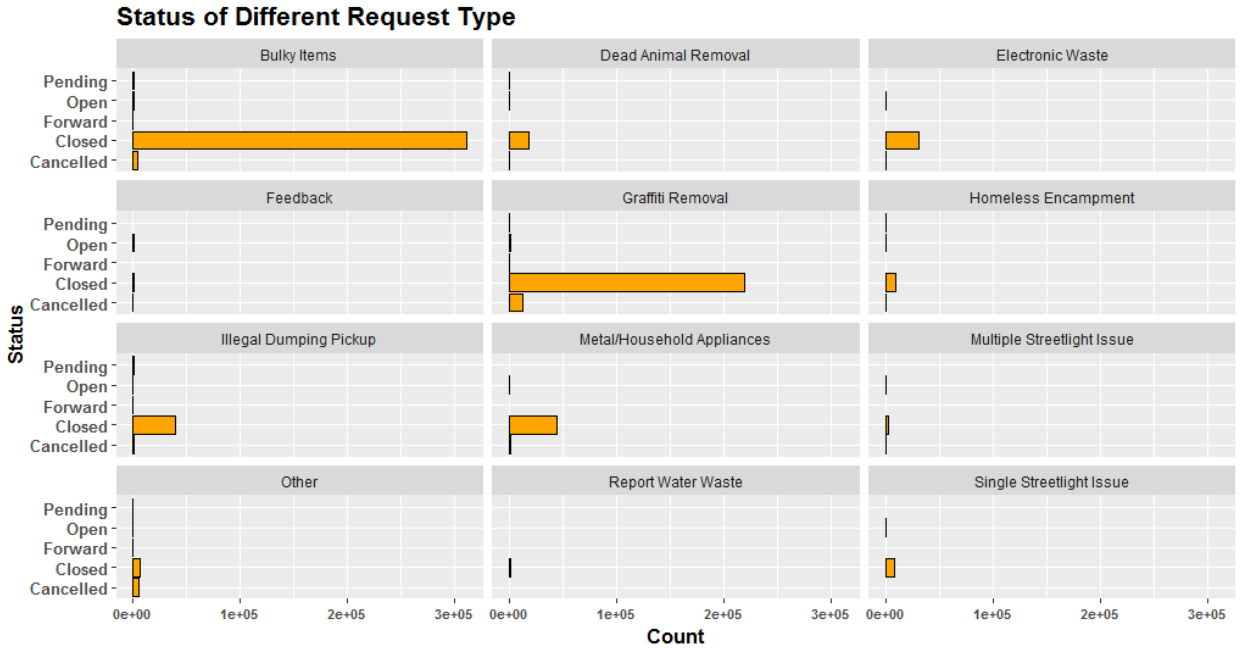

Figure 19: Status of different request type

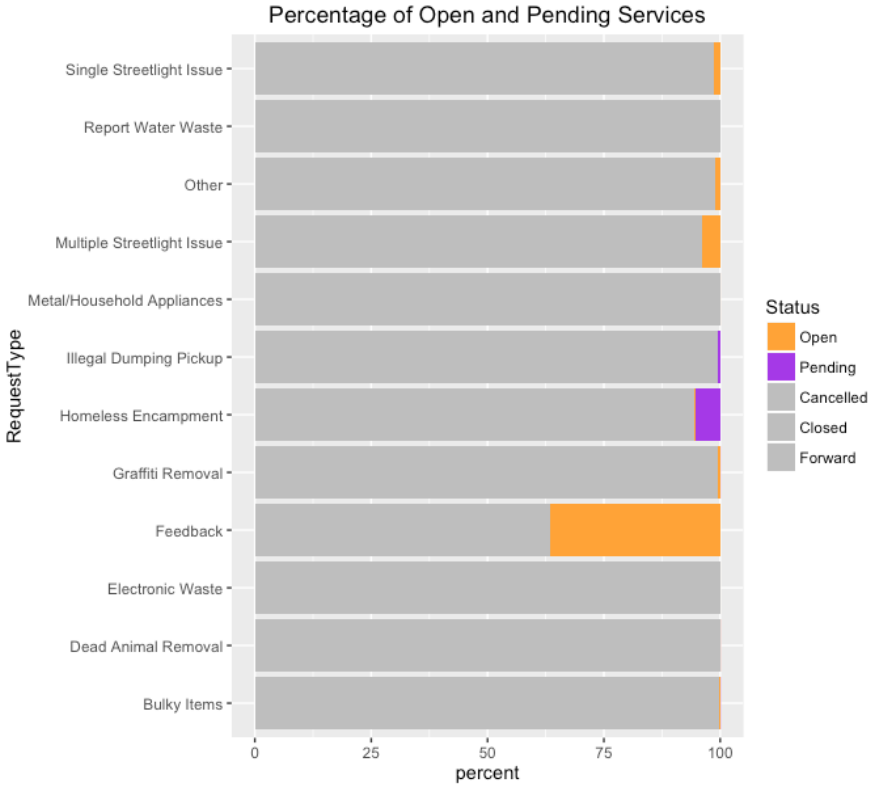

Figure 20: Open and Pending percentage in different request type

5.6 Request Source Analysis

Figure 21 shows the general trend of six main request source (including Call, Driver Self Report, Email, Mobile App, Self Service and Web Form) from January 2016 to September 2016. ALmost all sources have revealed steady growth through the first two quarters. Requests amount of Mobile App has remained steady throughout the 3 quarters of 2016. While Calls are more fluctuate and had a major decreased in September. 311 may strengthen advocacy of the Mobile App channel to relieve the pressure caused by call.

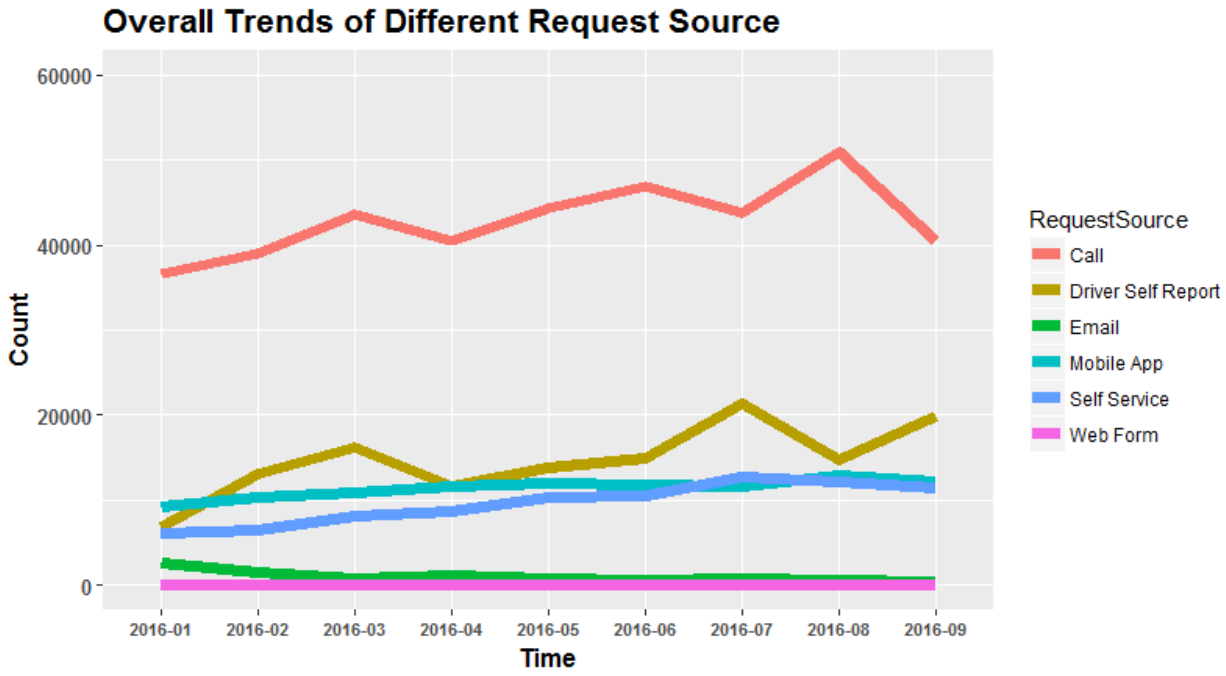

Figure 21: Overall trend of different request source from January 2016 to September 2016

Figure 22 shows the request source of twelve request types. Call is the most commonly used source to make request. Some findings are that “Graffiti Removal” rely more heavily on driver self report, most “Homeless Encampment” issue are made through Mobile App, and for “Single Streetlight Issue”, self service is also one important source.

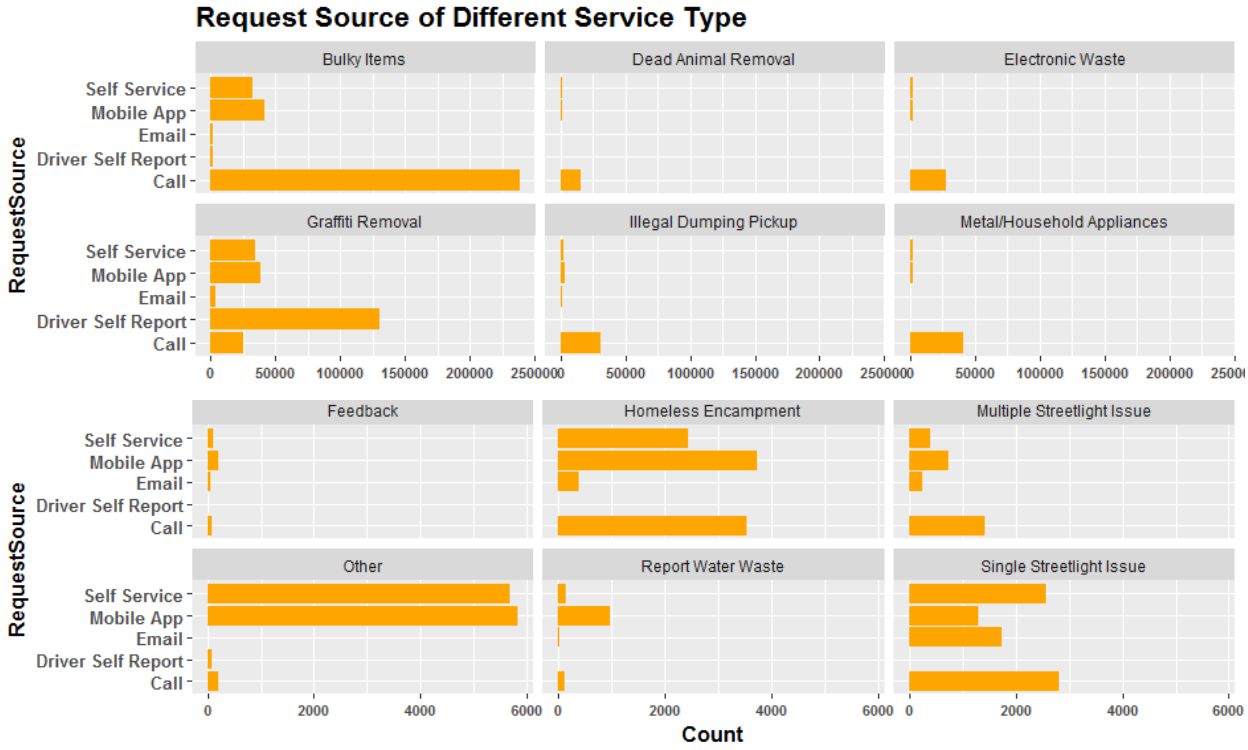

Figure 22: Request source of different request type

5.7 Service Duration Analysis

We calculated the service duration (average days taken) for a certain type of request to be resolved by subtracting Service Date from Created Date as shown in figure 23. We can see that some minor type of issues, such as “Homeless Encampment”, “Feedback” and “Multiple Streetlight Issue” take the longest time to be solved. This long duration may be attributed to the “hard-to-resolve” nature of that issue, but may also due to the lack of lack of necessary attention.

In contrast, some major type of issues, such as “Bulky Items” and “Graffiti Removal” takes only 3 to 4 days to be solved.

	Request Type	Average Day
1	Homeless Encampment	24
2	Feedback	20
3	Multiple Streetlight Issue	13
4	Single Streetlight Issue	7
5	Illegal Dumping Pickup	6
6	Bulky Items	4
7	Electronic Waste	4
8	Metal/Household Appliances	4
9	Other	4
10	Graffiti Removal	3
11	Dead Animal Removal	1
12	Report Water Waste	0

Figure 23: Average time it takes to resolve different request type

6. Key Findings by Comparison

Finding 1:

'Bulky Item Pick-Up' and 'Graffiti Removal' are two most frequent services over time. 'Online Permit Check' disappears in 2016 because its responsible department LADBS set up its own mobile app for accepting request in 2015. In this circumstance, LADBS also disappears from the top 6 busy departments in charge of service requests in 2016. However, BOS, as the responsible department of 'Bulky Item Pick up', keeps having numerous requests no matter from 2011 to 2014 or in the first three quarters of 2016. Besides, BOS started to undertake more roles by handling 7 high frequency requests, which made it very similar to LADBS previously in terms of busy level.

Finding 2:

Over the time, weekdays always have the much more requests than weekends. Nevertheless, high-intensity requests period changed from 8:00-16:00 to 9:00-17:00. This made the current working period 8:00-16:45 not sufficient enough for dealing with the issues. Also, it has been discovered that Monday, Tuesday and Wednesday become having more requests than Thursday and Friday, and thus different scheduling of staff should be applied.

Except 2011, all the years(2012 to 2014) fluctuated but in general increased from January to September, then peaked in October and finally dropped in November and December. In the first three quarters of

2016, it shows similar trends as the previous three years. Thus, we predict, in October of 2016, it should reach the peak of the year, and then the number of requests will drop through November and the coming December. Meanwhile, total number of requests kept growing from 2012 to 2014, and even though LADBS established its own channel to accept request in 2015, the first three quarters of 2016 still have much more requests than those of 2012, 2013 and 2014. This means the requests are significantly increased over the years.

Finding 3:

'South Los Angeles APC' have the highest number of service requests and have much more 'Graffiti Removal' issues than other areas judging by high density and color of the plots. Different APCs have similar composition of request types, mostly 'Bulky Item' and 'Graffiti Removal'. Comparing 2011-2014 and the first three quarters of 2016, vague zip codes (9999 or NA or ' ') largely reduces, which means multi-channel for reporting requests have positive impact on verifying the address. Chinatown area with the zip code of 90012 received fewer requests than before, whereas Southeast area to USC increases in requests significantly due to the growth in 'Graffiti Removal'.

Finding 4:

Two major resolutions in terms of 'Transfer city' and 'Service Request Processed' are implemented for handling the requests. Seven out of Twelve issues were well handled with the status of 'Closed', however, 'Homeless Encampment', 'Feedback' and 'Multiple Streetlight Issues' were tough nuts, with high percentage in the status of 'Open' and 'Pending'. Even in 'closed' status requests, these three also have relative high handling duration, at around 24 days, 20 days and 13 days respectively.

Finding 5:

Calls accounted for majority of the requests, at around 4 times of 'mobile app' and 2 times of 'driver self report'. What to be noted is that 'mobile app' seems to have a bad performance due to invisible increase in requests number though the mobile app was published as early as 2013. 'Driver self report' contributed to more in requests over the months. As for two most frequent requests, people are mostly comfortable in reporting them by 'call' and 'driver self report'. Regarding this, we suggest the government can promote the 'mobile app' and other request sources through these two channels.

7. Recommendation

7.1 Improve residential life

- High frequency issues:

‘Bulky item Pick-up’: Provide charitable organizations or thrift stores contacts to reduce work load of government and facilitate trades or donation

‘Graffiti Removal’: Community beautification: set up specific graffiti wall, give fine of disobey

- High Duration issues:

‘Feedback’: establish CRM system with sufficient information of previous request

‘Homeless Encampment’:open one-day service center

These are "one-stop shops" where the chronically homeless can access services, use bathing facilities, and receive health care, food, etc. People who reside in urban encampments are likely to benefit, and, at the very least, will be off the streets and out of public view for much of the day. Encampment dwellers who work during the day do not need the "drop-in" component of a day resource center, but could more efficiently access services. .

‘Streetlight Related Issues’: regularly check the streetlights and keep recording

7.2 Increase request handling efficiency

- Extend the working time of 311 call change from 8:00 - 16:45 to 8:00 - 17:45
- Reschedule to arrange more staff on Monday, Tuesday and Wednesday than Thursday and Friday
- Pay more attention to South Los Angeles APC (Graffiti Removal) and Northeast to USC area
- Establish better CRM to track requests

7.3 Minimize Human Capital Cost

- Corporate with Voluntary center and charitable organizations to handle issues or answer the call
- Add options in call before certain staff answer it and directly transfer them to specific departments

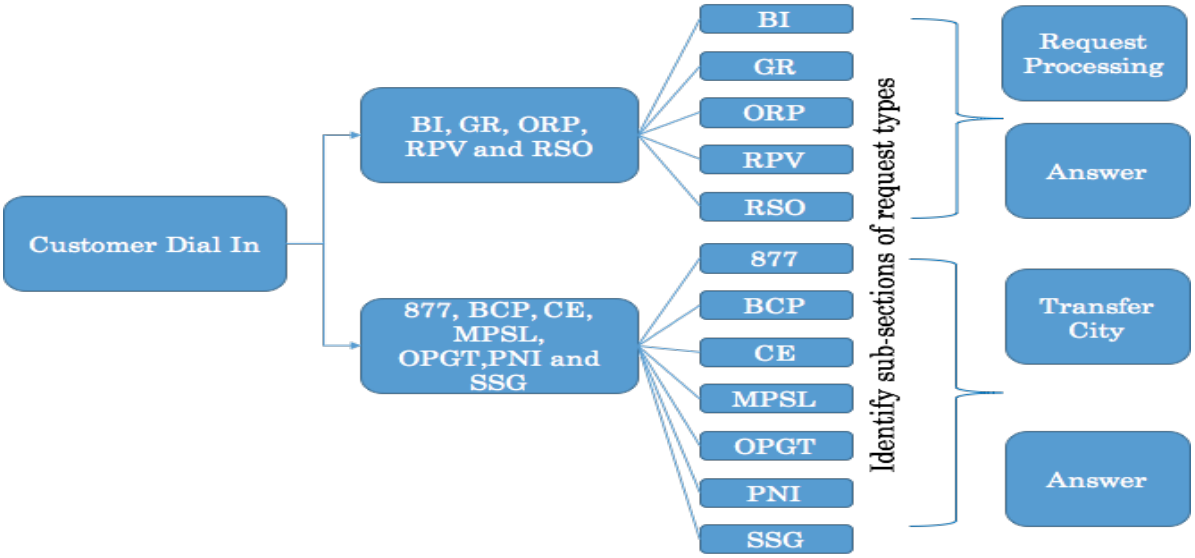

Figure 24: Decision Tree of automatic 311 call answer system

7.4 Facilitate communication between the public and the government

- BOS could set up its own mobile app as LAPDS does, but still need to be tested
- Promote mobile app by voice prompt in call saying 'You can go and set up a request by mobile app and other request sources'
- Consumer satisfaction level survey,and make the result available to the public

8. Reference

https://data.lacity.org/dataset/311-Call-Center-Tracking-Data/vmc3-stgb
https://data.lacity.org/A-Well-Run-City/MyLA311-Service-Request-Data-2016/ndkd-k878
https://gist.github.com/erichurst/7882666
http://www.zipmap.net/California/Los_Angeles_County.htm

9. Acknowledgement

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