



Using Data Mining Approaches for Analyzing Repeat Caller Trends

Michael Barnhart

Hood College’s Bachelor's in Computer Science Data Mining Presentation



Introduction

In the ever-increasing competitive market of our service economy, companies are looking for ways to decrease their costs, and increase the productiveness of their Customer Care Organizations (CCO)s. There are several ways in order to do this, but this paper will tackle the aspect of repeat callers and trying to identify possible causes if those repeat callers. Methods that will be used for this analysis is using clustering algorithms to detect patterns of the repeat callers. These patterns would open insight as to the cause of those repeat callers to allow for a solution to be more easily formulated to eliminate those repeat callers.

Why Repeat Callers are Important

Cutting costs are a huge focus of Customer Care Organizations and major cost issue is Repeat Callers. Repeat Callers cost at least twice as more as those who had First Call Resolution as they must call in multiple times to get an issue resolved instead of the first time. Repeat Callers end up becoming former customers as they become frustrated from having to call in multiple times for the same issue, taking their money with them. Furthermore, Repeat Callers lead to bad PR as customer will voice their frustrations to outside sources such as social media which can put affect how potential customers see the company leading to future possible missed losses.

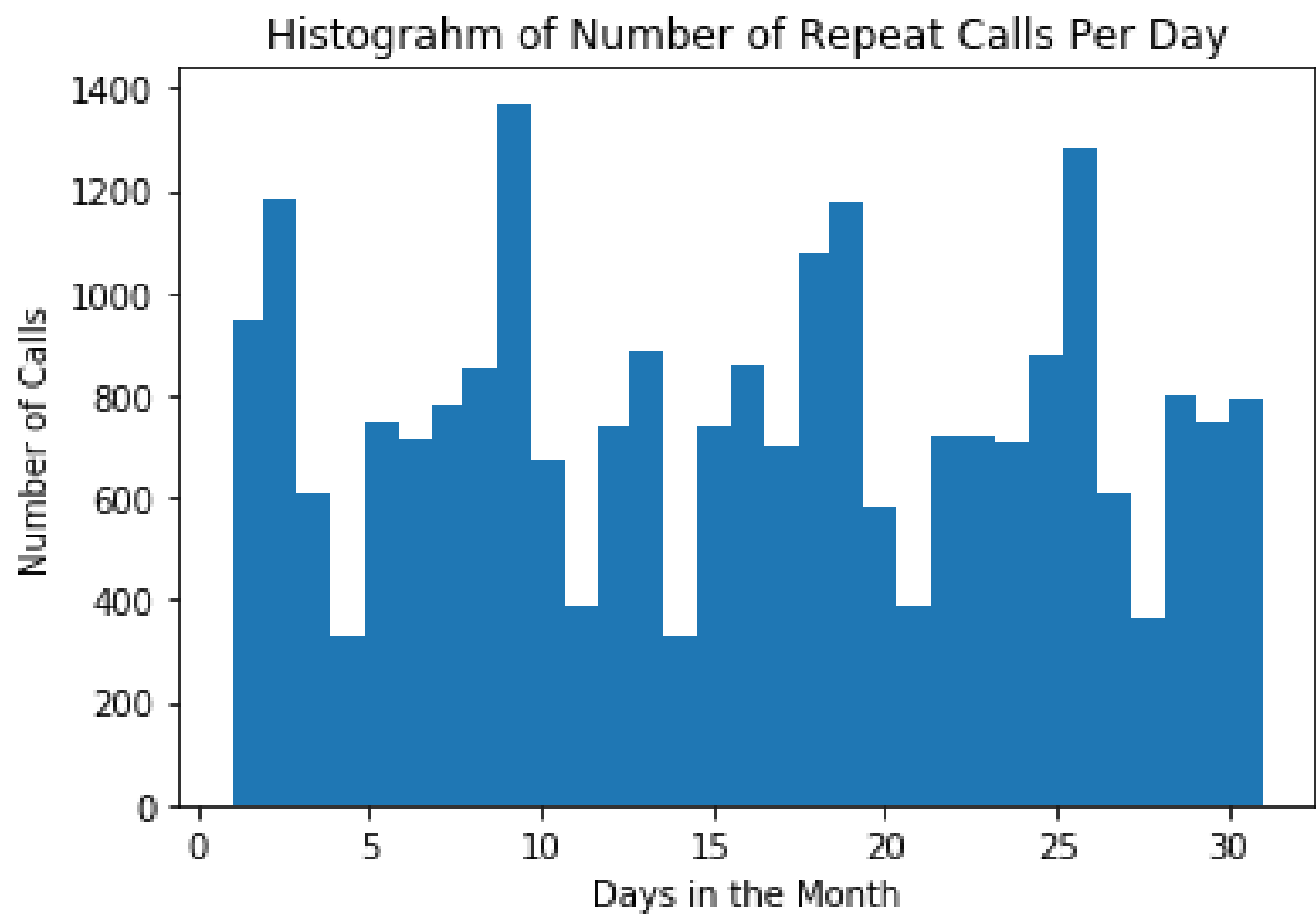
Identifying Repeat Callers

To determine how to handle repeat callers, repeat callers need to be properly identified and labeled using a set number of criteria. The data that is being used is a repeat caller report for a phone queue for supporting prepaid credit cards. The parameters for this data are that to be a repeat caller, someone must call in at least three times within a three-day period. The third and subsequent call ins will be added to the list. The entries will come with the time of that repeat call, the Line of Business (the client that supports that prepaid credit card), phone number that they are calling in on, and an ID to ID that call. The list is compiled at the end of the day to be seen the next day. The phone number has been removed as that is Person Identifiable Information as is not allowed to be given out as per the Payment Card Industry.

Record_Number	RecordWritten	DNIS	Cluster_ID	Cluster_Type	RepeatCall	Repeat_UID	Source
3782448	10/14/2018 1:26	2236	2	Identification	TRUE	73793717-0eb3-44ad-97a0-3047d8e09152	CM2
3782458	10/14/2018 1:31	1750	3	Identification	TRUE	0bdaea8f-17f5-4e43-829e-6437d07fc21f	CM4
3782464	10/14/2018 1:33	1750	3	Identification	TRUE	a67265ad-f360-4dd3-b99f-82d80d41899a	OM3

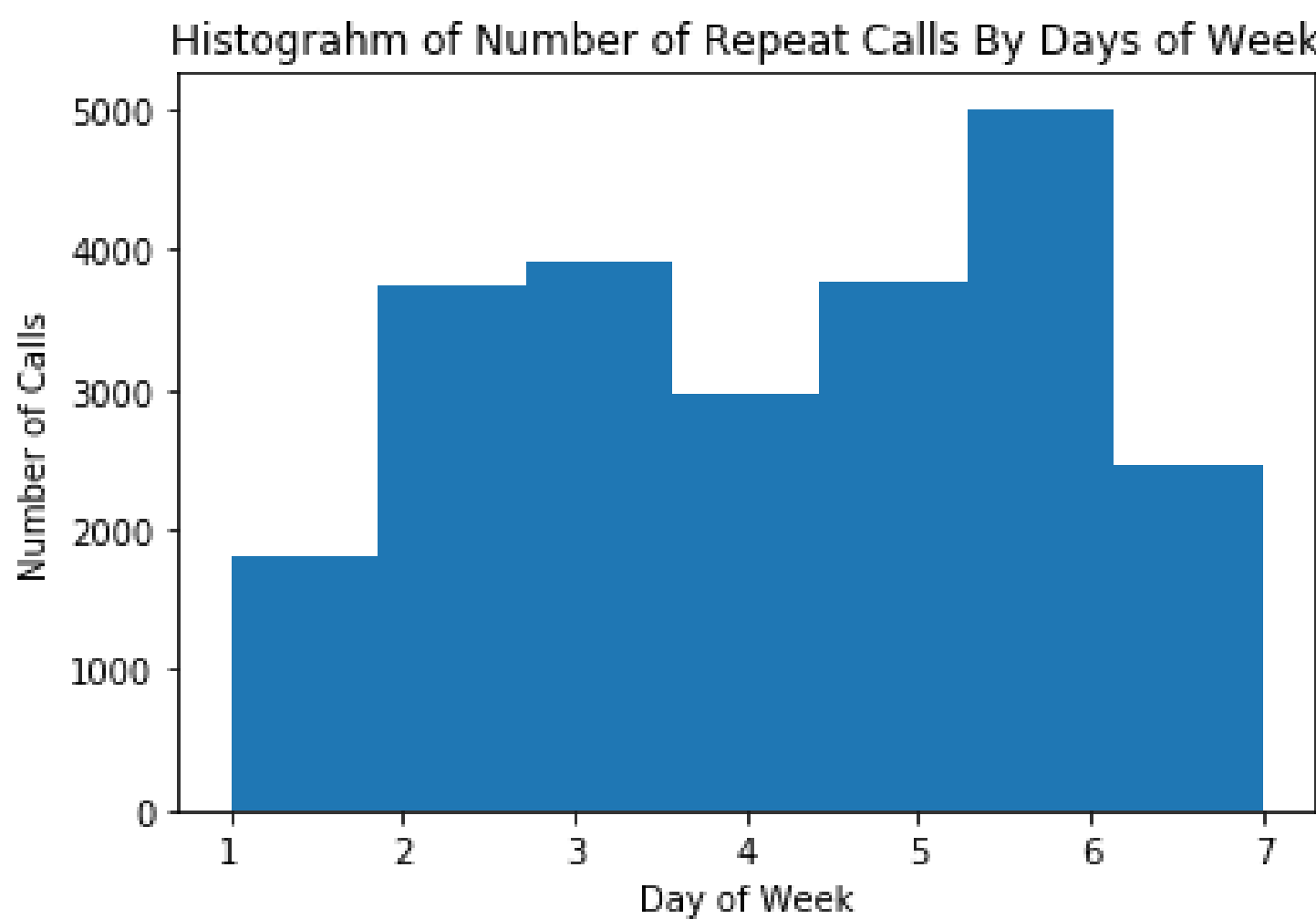
Days in the Month

The data was run through python library matplotlib to create a histogram of the to visualize the days of the month that experience the highest amount of repeat call volume versus other days. It was found that the day of highest repeat call volume was on the 9th day of the month, 11/9 to be exact, at 1368 repeat calls coming on that day alone. However, while this does show that the 8th has the highest value overall, the reason for that high number is most likely not because of it being the 9th day of the month, but rather that the day in question is a Friday. Looking at the histogram it can been seen that the volume of repeat calls seems to follow a trend. Looking at the Figure 1.3 the days with the highest repeat call volume are on Fridays (10/19, 10/26, 11/2, 11/9). A look into how the day of the week plays into the effect of repeat call volume will be investigated next to see if the relationship stands.



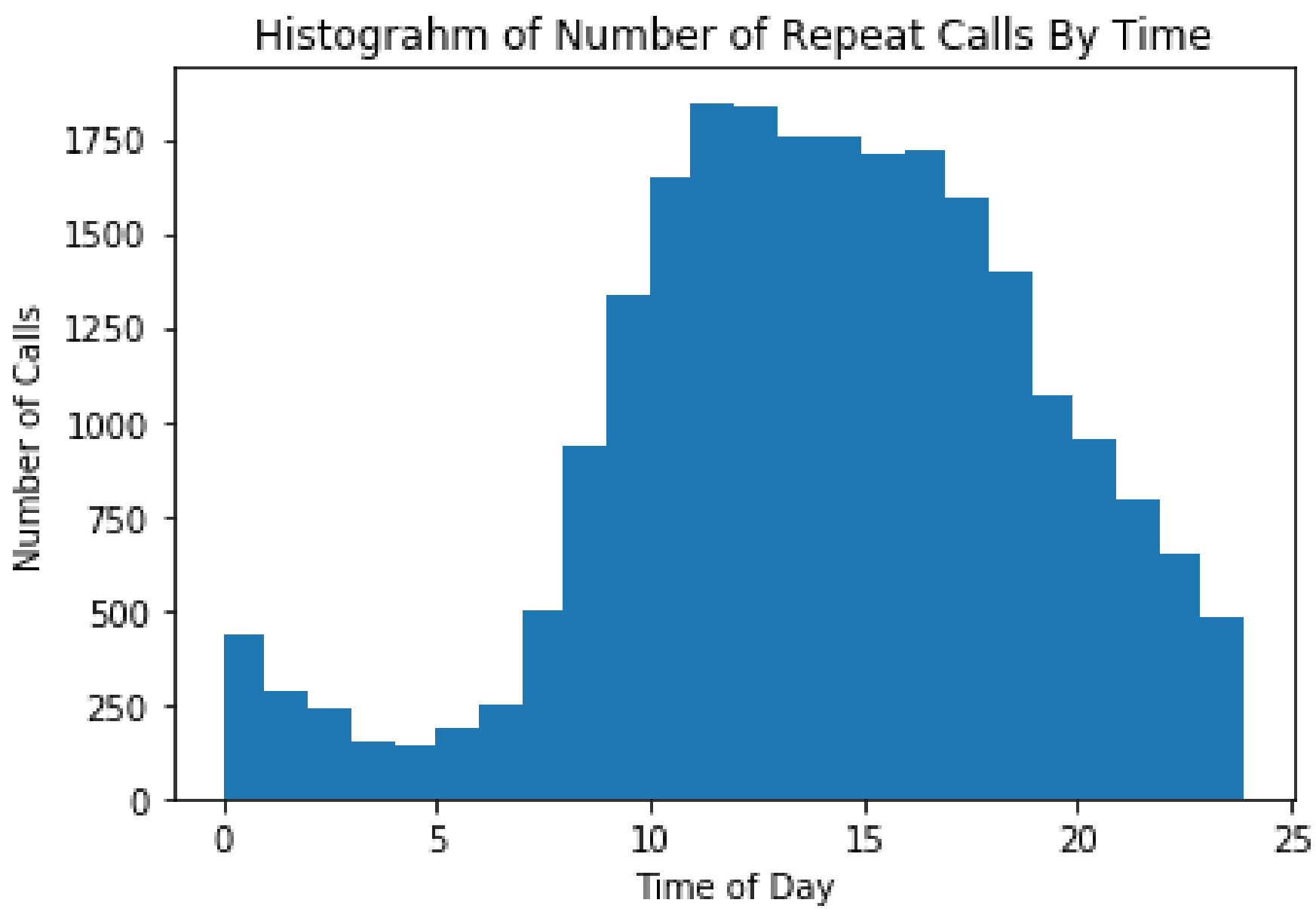
Days of the Week

From the histogram it can be seen that the data follows a similar trend that was previously seen in the “Days of the Month”. The trend being that repeat call volume seems to increase going from Sunday to maxing out on Friday and then dropping off dramatically on Saturday. The possible reason for this trend is that people tend to get paid closer to the end of the week, usually Thursday or Friday. The average user would most likely call on these days to see what their balance is on their card to see if their check went through and will most likely call back to see it’s in yet. The sudden drop off on weekends is an interesting case to look at. This could be explained by people simply not wanting to call in on their day off, or not knowing that the line is open on weekends, which is the case with a lot of call centers. However, these claims are outside the scope of this research and will require additional time and resources to find out the reason for this. Overall, it can be said that repeat call volume hits its highs on Fridays while dropping off for the weekend. Weekdays experience on average more per day repeat call volume then the weekends.



Time of Day

The data was split into 24 sections to represent the 24 hours of the day. The histogram shows the volumes for each hours of the day. From this graph the peak time for repeat calls is in the 11:00 AM to 1:00 PM timeslot with average of over 1750 repeat calls per hour as seen in Figure 1.7. The trend then starts to decay there after and continues to do so until 5:00 AM, where the number of repeat callers starts to climb back up to the peak at 12:00 PM. From this it can be deduced that repeat call volume tends to happen during the daylight hours instead of nighttime. The reason for this is most likely because most people are up at these hours of the day in the United States, the call center does not handle non-domestic calls for this call type. It can also be seen that the rate in which the repeat call volume increases at a much faster rate then it decreases. The reason for this phenomenon would need to be researched further to elucidate the reason, but a possible reason could do when they wake up versus when they go to sleep as people tend to wake up at the same time but go to sleep at different times.



Conclusion

In conclusion, after isolating the data to examine repeat call volume by a day of the month, day of the week, time of day it was found that repeat callers most often call in during the 11:00AM CST-1:00PM CST timeframe and during Fridays. Furthermore, it was found that day of the month seems to plays no real bearing on repeat call volume, but that would require a larger data set to see how day of the month data plays a role in repeat call volume. Using the information found it can be said that people usually call in during normal waking hours looking at time of day. Peaking out at lunch time on the east coast and slowing decaying. The call center would best utilize its workforce by scheduling to have most of its agent during the 12:00 EST time clock. With these being repeat calls it would also be best advised to have the most supervisors during this time as well as repeat calls tend to have a higher chance of supervisor calls vs first close calls as people are less willing to take answers that don’t accomplish their need. With repeat calls happening mostly during Fridays the call center should have their agents have Friday included in their schedule. The normal Monday to Friday workweek does cover this, however agents’ schedules do not always follow this, especially if said agents work the weekends.