CHAMBERLAIN®

OUTSIDE THE

DATA CONSULTING

Outside the Garage Data Consulting

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Executive Summary

CGI Group Inc. (CGI) seeks to improve the customer experience for their myQ technology. We have identified how myQ has been received by customers through analyzing Technical Support Center (TSC) data and app release data, both provided by CGI.

We explored the relationships between call volume, app releases, polarity and emotion in app reviews, and topics in app reviews over time.

Call volume per user has stayed steady for most products over the last 1.5 years, except for myQ, which has steadily increased in call volume per user. The main issues that arose from call volume analysis include **problems connecting adding devices to the myQ app, installing the internet hub, some of Chamberlain's GDO products being incompatible with the users' phones or other devices**, **difficulty getting serial numbers to be recognized by the myQ app, devices not responding to the app, and problems connecting to Wi-Fi.**

Our sentiment analysis revealed several trends over time. The major issues include **connecting myQ reliably to the garage door, connecting it to other devices, particularly in the smart home, clunky UI, slow app response, lack of support for additional features such as multiple users, auto-scheduling, or rearranging garage doors in the app, and annoyance with notifications.**

To alleviate difficulty with setup, CGI can improve user interface to make the process easy, even as the app attains more complicated capabilities. CGI can continue improving connectability between the app and other devices to decrease user disappointment. The app could also include the extra features that customers want in order to increase happiness and retain customers.

Introduction

CGI Group Inc. (CGI) is a global leader in opening "doors" for consumers around the world. CGI empowers residential and commercial customers so they can move safely throughout their day. With offerings in residential garage openers, commercial door operators, gate entry systems, and perimeter access control equipment via LiftMaster, CGI, Merlin, Grifco, and Controlled Products Systems Group, CGI is the champion of security and access across the globe. CGI's technology, myQ, is a thread that runs through its residential and commercial offerings. myQ "empowers users to control or monitor their entry points through smartphone access."[1] While CGI has offered myQ for at least two years, customers still have a difficult time connecting the technology to their legacy garage door systems. Our analysis summarizes customer sentiment of myQ, explains specific problems, and offers solutions for CGI to implement. Our goal is to enhance the customer experience so they can more seamlessly and safely go through their day, empowered by CGI's myQ technology.

Our Task

In pursuit of excellence and high quality customer experience, CGI has asked our team to uncover the patterns of issues in customer experience with myQ, and in particular with garage hubs. We hope to

a) figure out what the current sentiment is regarding myQ
b) illustrate how the sentiment and customer experiences have changed over time;
c) reveal the consistent issues that customers have been experiencing;
d) suggest possible marketing and product changes that can solve these issues;
e) provide CGI with a data analysis tool that will allow them to measure the impact of marketing/product changes on customer experience and sentiment over time;
f) and give CGI resources, including R code and documentation, that will allow them to continue this iterative analysis on future data sets

as they pertain to the myQ product, and potentially other products in the future. The main problem area CGI wishes to focus on is trouble connecting existing garage doors to Wi-Fi via the smart garage hub. There are a few ways to approach this data in which CGI is interested, including iOS vs. Android apps, and connectable vs. non-connectable devices (older garage devices are not connectable). We centered our analysis on these stratifications.

[1] https://www.chamberlaingroup.com/our-company/

Section 1: App Releases and Call Volume

Data Summary

Summary Statistics

We provide summary statistics for the App Release and TSC datasets. The App Release dataset includes the timing of each app release for Android and iOS. See Table 1 in the Appendix for summary statistics for the App Release data.

The TSC data encapsulates four Excel spreadsheets that were given to us by CGI. It has 109,061 observations from 03-10-2017 through 12-08-2018. It includes the name (Material Name) and number (Material Number) of the device/material that was a topic of concern in the call. There is a customer-generated Issue and Issue Detail. The Resolution, Internal Notes, Case Comments, and Subject are generated by the CGI technician and includes more detail and far more categories than the customer-generated variables (262 Resolution categories and 14,891 distinct subjects compared to 66 Issue Detail categories and 13 Issue categories). See Table 2 in the Appendix for summary statistics by variable for the TSC data.

Our Assumptions

We assume that the Issues and Issue Details categories represent the problem the caller experienced and the Resolution variable represents the solution reached by the call center employee during the call. We assume that the information contained in these variables is accurate to the true experiences of the customers.

In order to make our customer normalization calculations simpler, we assumed that between any two given months (i.e March & April), the number of users follows a linear growth. Without week-level aggregation, this calculation would be overly complicated.

Methods

Overview of the Process

We created several interactive visualizations that incorporated the TSC, App Release, and Call Volume datasets. Our visualizations show normalized call volume over time for several combinations of factors. You can view and interact with these graphs in our HTML/PDF process book.

Data Preprocessing

CGI provided four different datasets - Technical Support Center (TSC), App Release, User Call Volume (Call Volume), and App Reviews data. This section of the analysis used the TSC, App Release, and Call Volume data, while the second section of our analysis utilizes the App Reviews data, as well as a few external sources that we gathered.

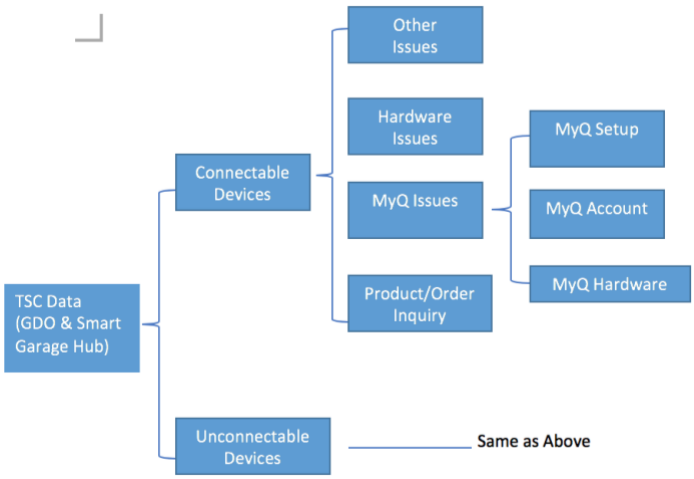
We joined the TSC, App Release, and Call Volume datasets so we could normalize call volume based on user volume and monitor changes in call volume based on app version releases.The

main tasks of the data cleaning process included combining the factor levels, aggregating the data, joining different datasets, normalizing call volume by number of users, and visualization.

During our last client meeting, the representatives from CGI mentioned they are only interested in their GDO (garage door opener), CDO (commercial door opener), and smart garage hub products. So, the first thing we did with our data is sort out the observations related to these three products. Since CDO only has 122 total observations, we will not be able to to derive any useful insights by visualizing the data. Therefore, we decided to disregard the data related to CDO. We then partitioned the TSC data related to GDO and Smart garage hub products based on whether the products can be connected to Wi-Fi or not. CGI mentioned that every observation in the TSC data that has “Wi-Fi” or “MyQ” in the Material Name can be connected to Wi-Fi. We decided to visualize data related to connectable and unconnectable devices separately because CGI mentioned they would like to compare the call volume between the two major categories of devices. For each category of device, we partitioned the data further according to the Issues column. For each major category of issues, we further partitioned the data according to detailed issue type derived from the Resolution variable. We decided to further classify the dataset by the type of issues because we believe some types of issues may be unrelated to app releases (i.e. hardware malfunctioning is probably not related to whether a new app version being released or not). How we partitioned the TSC data is shown below in Figure 1. We parsed the data by Issue because it had the fewest (12) distinct categories, which helped to create large groupings of observations. We also parsed the data by Resolution, which had the most (282) distinct categories and the most detail regarding the call. We did not use Issue Detail, because it was in between the two at 66 distinct categories.

Figure 1

Method of partitioning TSC data



For each subcategory, we aggregated the call volume by week, normalized the call volume by number of users after joining the datasets together, and finally created interactive visualizations. The detailed steps and codes of our data cleaning process are included in our Markdown file.

Results

Insights

For Wi-Fi connectable devices, we found the following insights.

- After June 1, 2018, calls related to users having **problems setting up their myQ devices** (adding devices) started to increase. With every new app release after June, the call volume related to this issue decreases, yet the decrease only lasts one or two weeks, until the number bounces back and continues increasing. This pattern tells us that the **users do not understand how to add devices to their app or install their internet hub.** This pattern might be due to several reasons. **Every time a new app version releases, the app itself becomes more and more complex, and the company did not offer enough guidance on how to connect the app to devices for the first time.** This pattern implies the myQ app might have a bad **user interface design**, giving the users a hard time to find the instructions on how to add devices to the app or link the app to third party devices like Google Home. If possible, we would recommend that Chamberlain improve the user interface design so that the users can quickly locate and follow the instructions on how to add devices.
- In general, call volume related to users having malfunctioned devices is not related to whether a new app version is released or not. Although the call volume related to malfunctioned door control, opener,and logic boards started increasing from June 2018, the volume began to fall starting in November 2018. One thing we found out is that for the week ending 3/19/2017, a relatively large amount of users had problems with their garage doors, either because the garage door could not close all the way or because the gears controlling the doors' movement was broken. Although we do not know why this pattern occurred, (it might just be an anomaly) it might be interesting for Chamberlain to investigate this.
- Starting in June 2018, there was a stark increase in calls related to customers asking for **device compatibility** or returning the products they bought. By further investigating this pattern, we noticed that during that specific period of time, **some of Chamberlain's GDO were not compatible with the users' phones or other devices**. Chamberlain released a new product that can be installed onto the products having compatibility problems to fix this issue and they were giving out the new product for free. Many users did not receive this new product and they were calling Chamberlain to ask for it. Some users, after finding out the products they bought are not compatible with their garage doors, simply returned the products. After September 2018, the call volume started decreasing.
- From March to August 2017 and from December 2017 to March 2018, the call volume related to customers asking information about serial numbers has been increasing occasionally. It seems like users were having **difficulty getting their serial numbers to be recognized by the myQ app**. We don't know what might have caused this trend, but it might be due to a glitch in their website or app. When they fixed the app after May 2018, we can see the call volume drastically decreased and never going up again.

- However, starting from June 2018, there was a big increase in the call related to **devices not responding to the app.** The call volume related to these problems has been increasing for the last 5 months. Although we can see a decrease in call volume every time a new version of the app is released, the number will soon bounce back, which indicates Chamberlain never actually fixed the bug. We would recommend Chamberlain to fix the bug as soon as possible. Otherwise, they will see a huge increase in call volume in the future.
- It seems like Chamberlain's users have **problems connecting to Wi-Fi** before April 2018, but Chamberlain fixed the issue, and now the calls related to network connection problem is decreasing.
- In terms of low-frequency issues, Chamberlain's users were having a difficult time installing their hardware (door control/openers) in the week ending 3/19/2017.Notice that this was the same week when a huge amount of Chamberlain's users had door problems. Maybe there is a hidden relationship between door problems and installation problems?

By definition, devices that cannot be connected to Wifi should not have anything to do with App versions. Therefore, we will not discuss the changes in call volume related to non-connectable devices here in our paper. However, we noticed that no matter the user has a Wifi connectable or non-connectable devices, the call volume always increase after June 2018. This pattern indicates **the sudden increase in overall call volume after June 2018 may not be related to app versions.** Looking up online, we found out that Chamberlain Group appointed a new Chief Operating Officer on Jun 27, 2018. We think a major shift in marketing strategy or a shift in how the call centers operates occured in June 2018, which led to the increasing call volume.

Section 2: Sentiment Analysis and App Reviews

Data Summary

Summary Statistics and Data Preprocessing

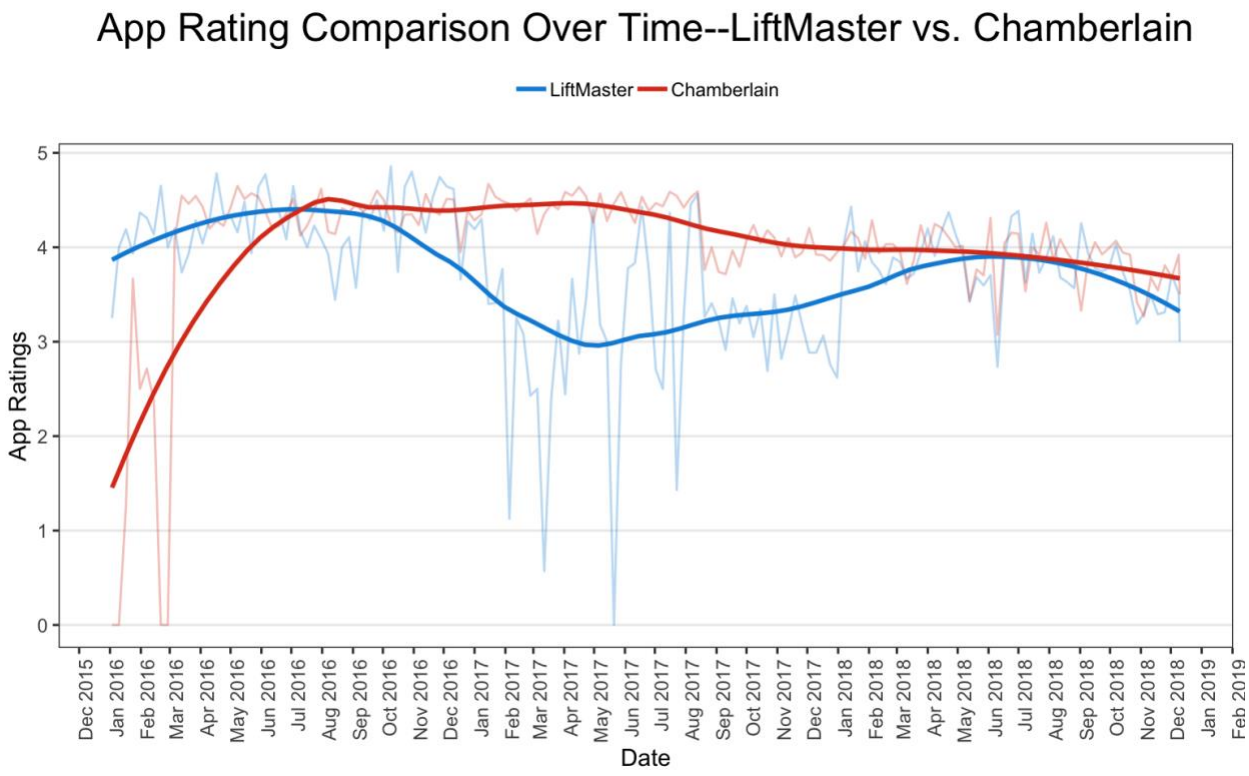
App Review Data

The app review data was provided by CGI. This dataset includes a review, its author, the app they used, the app version (if applicable), their rating of their experience (1 to 5), the date of the review, and an assigned review sentiment (negative, neutral, or positive). See Table 3 in the Appendix for a full listing of variables and summary statistics by variable.

The original dataset has 18,236 reviews and 16,350 distinct authors across six apps and 75 app versions. It covers the time period of January 1, 2016 through December 12, 2018. The assigned sentiment was created by a third party, and we chose not to use it because it could have been inaccurate. We chose instead to create our own "sentiment," as we will outline in the following section. Further summary statistics by app can be found in Table 4 in the Appendix. These results should be similar to those of the cleaned dataset.

We cleaned the data by first detecting the language used in the review and separating each language into its own data set. We chose to focus on English reviews because there were so few reviews in other languages that analysis would not be statistically significant. We then corrected misspellings and removed emojis, taking care to ensure that words not traditionally found in the English dictionary, such as “Liftmaster” were retained.

Below is the overall comparison of Chamberlain app rating vs. LiftMaster app rating over time. You can see that the Chamberlain app has been a consistent slight downward trend. This is natural for an application, and suggests there haven't been any periods of distinct turmoil. For LiftMaster, you will see a dip occuring in Mid-2017. This displays that there was a potential problem, and when eventually fixed, the app rating bounced back.



Our Assumptions

In our sentiment analysis, we wanted to understand how customers feel about myQ and the smart garage hub. We assumed that

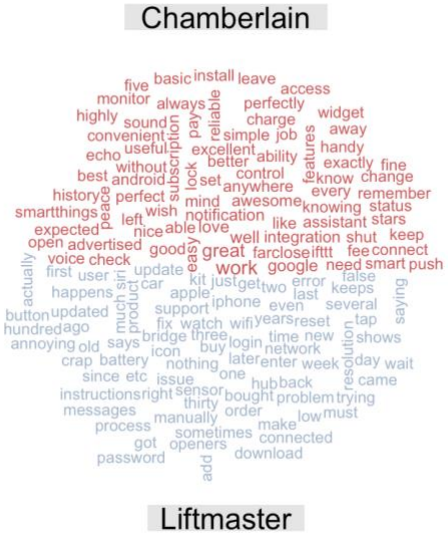
- customers are honest and sharing as close to the full story as possible.
- app reviews and social media posts get to the root of the problem, but they could be only surface level version of the true problems.

We conducted a qualitative interview with a current myQ customer to make sure our findings sound realistic. See Text 1 in the Appendix for notes from the interview.

Methods

Overview of the Process

We started with a Word Cloud analysis and Commonality/Dissimilarity Clouds for Android vs. iOS and LiftMaster vs. Chamberlain vs. Merlin. Please see the Markdown file, sections 2.3 and 2.4 to see the word clouds, as well as hypotheses we gathered during this exploratory analysis. Below is the word cloud for our Chamberlain vs. Liftmaster analysis. As you can see, some of the most pertinent words associated with Chamberlain app reviews are “install”, “perfectly”, and “reliable”. In contrast, some of the words associated with Liftmaster app reviews are “add”, “sometimes”, and problem. Analysis of these word clouds could be integral to decide what aspects of each you are succeeding in, and which need work.



We then moved into the Sentiment Analysis. In particular, we performed Emotion Analysis and Polarity Analysis on iOS vs. Android and Chamberlain vs. Liftmaster. We then compared the ratings users assigned to our polarity ratings.

Lastly, we determined what topics have been discussed in these reviews and how they have changed over time. We stratified once again by iOS vs. Android.

Methods Used

Emotion Analysis

Emotion Analysis is used to examine the intensity of the emotions users express in their reviews. Words are associated with anger, anticipation, disgust, fear, joy, sadness, surprise, and trust. We conducted separate analyses for iOS users and Android users, as well as for Chamberlain and LiftMaster products. We used NRC polarity, which counts the number of words in each emotion category, for each month in the data (36 months). NRC automatically

associates certain words with an emotion. We generated several radar charts for each year. Please see the Markdown file, section C1 to view them.

Polarity Analysis

Polarity is a rating on a scale from “good” to “bad” that is ranked by a bag of words analysis on the text written in each app review. Bag of words analysis is a method where all the words for a grouping, which in this case is per app release, are dumped individually into an algorithm that takes a count of each word and checks each word with a list of predefined words that represent “good” or “bad” emotions. We used “TF-IDF,” which takes into account the term frequency (TF), which is how often a word shows up within a single document, and inverse document frequency (IDF), which is how often a word shows up across several documents. For the specific formula used to calculate polarity, please see Section C2.1 in the Markdown file.

We conducted polarity analysis for iOS vs. Android and Chamberlain vs. LiftMaster by week and plotted it over time. The time series plots are in the Markdown file in Section C2. We then created a chart to see if user app ratings matched the polarity ratings, which can be seen in the Markdown file Section C 2.4.

Topics Over Time

We broke our data up by Android vs. iOS and into five different time periods. We averaged reviews by weekly topics. Using the Hierarchical LDA algorithm, we created charts with the most prevalent topics, ordered by the amount of information one specific word contributes to the topic. The LDA algorithm produced a certain number of topics for each subset of the data. LDA also assigns a “probability” to every single review. Using this probability measure, we filtered out the top 10 reviews that contributed the most to each of the topics. We then read the reviews and summarized what the topics were about.

Qualitative Research

We completed a user journey interview and then took the notes from that discussion to pick out specific words. We classified the words by emotion and polarity to compare to our final results from modeling. We had three different team members create these rankings in order to make them as impartial and accurate as possible. See Text 1 in the Appendix for notes from the user interview.

Results

Insights

Emotion Analysis

Chamberlain vs LiftMaster App

Below are observations generalized by year for the Chamberlain vs. LiftMaster apps. When both apps have similar trends, we speak generally about those trends.

- **2016:** Trust, anticipation and joy are the major themes in Jan - Feb 2016. From March 2016 to December 2016, fear and sadness gradually increased while anticipation gradually decreased. The number of users who are sad about the Chamberlain App reached its peak in December 2016.

- **2017:** From March 2017 to May 2017, sadness and fear fell down while anticipation gradually increased. However, sadness and fear reached another peak in August 2017. The number of users with negative responses about the app in that month is almost two times as the number of users who had negative responses in December 2016. It was not until November that sadness and fear started to decrease.
- **2018:** From November 2017 to February 2018, sadness and fear dropped down while trust and anticipation remained at a constant level. Starting from March 2018, fear and sadness increased again, step by step, and reached a new peak in November 2018. It is also interesting to note that the anticipation for LiftMaster App suddenly increased in October 2018. Could there have been a new version released in that month that users were excited about?

Based on the above findings, we conclude January and February are the safe months. In these two months, sadness and fear remain low. The last month of each of the last two quarters of a year (August and December) are the riskier months. Trust and anticipation stay at high levels for most of the months, so it seems like in general the users trust and like CGI's app. However, there are some recurring issues appearing once in a while. Chamberlain might want to focus on improving the user experience of their Chamberlain app and they should probably invest more in bug-fixes in August and December.

iOS vs. Android App

Below are observations generalized by year for the iOS vs. Android apps. When both apps have similar trends, we speak generally about those trends.

- **In general, users have been more satisfied with the iOS App than the Android App.**
- For the Android App, in 2016, trust and anticipation increased gradually while sadness and fear also increase. However, the rate at which trust and anticipation increased was greater than the rate at which sadness and fear increased.
- For the Android App, from January 2017 to July 2017, sadness and fear steadily decreased. Since number customers seemed to stay steady or increase in this time period, one possible reason behind this decrease is that Chamberlain fixed some of the problems related to its Android app and users were satisfied.
- **August 2017 is when everything changed: iOS users suddenly became a less happy about the iOS App. This trend can be seen on the radar chart where the red area exceeds the blue area for the first time. Sadness and fear for both apps also increased. Revisiting our TSC analysis, this is also the exact time when there was a sudden increase in the call volume related to users having problems setting up MyQ devices. This might be the possible reason for this sudden change.**
- After October 2017, sadness and fear dropped while anticipation gradually increased. This was also the time the call volume related to users having problems setting up myQ devices dropped to their previous levels before the increase.
- **Starting from January 2018, the problems related to the iOS app dropped while problems related to the Android apps came back. There was a sudden increase in disgust and anger expressed by iOS users in February 2018. We are unsure of the cause. There could have been an issue with the iOS app after the users upgraded**

their app to version 3.98. It seems like Chamberlain had already resolved the issue in version 3.100, because disgust and anger dropped immediately after February 2018.

- **From January to May 2018, we can see an increase in sadness and a decrease in anticipation for both apps. Sadness expressed by Android users reached a peak in July 2018. Referring to our TSC Analysis, we found out this is the time when users were having trouble setting up their MyQ App/Devices. This is also the time when an increasing amount of users had issues with their openers not responding to the MyQ app.**
- After July 2018, sadness in the Android App started dropping. However, sadness in the iOS app increased again. In September 2018, iOS users suddenly became a less happy about iOS App. This can be seen on the radar chart where the red area exceeds the blue area for the second time, just like what happened in the previous year. This increase in user disappointment could have also been due to a glitch in the app or users having a hard time setting up their MyQ devices.

Polarity Analysis

iOS vs. Android

Before October 2017, the polarity for Android and iOS app were fairly constant. Since October 2017, the polarity for the iOS app started to decrease while the polarity for the Android app remained constant. Referring to the "App Rating Comparison over Time" plot in the Markdown file, Section C2.2, we see that the polarity of the iOS app began to drop at the same time when the Review Rating started to drop. In addition, this is the same time when users became more dissatisfied with the iOS app than the Android app for the first time ever (refer to the radar chart in the Markdown File, Section C1.1). This is also the same time when an increasing number of users reported not knowing how to set up their MyQ accounts/devices (refer to our TSC Analysis). Looking up the date online, we found out that October 2017 is the exact time when Chamberlain launched the new version of the Chamberlain myQ® Smart Garage Hub. **Given this past behavior, when a brand new version of MyQ garage hub is launched, it would make sense to see a drop in the ratings and a drop in the polarity as well.** Users may need some time to get used to the new User Interface. On top of that, because the product is new, many issues could pop up within the first few months after it has been launched. This is probably why we can see a decrease in review ratings after October 2017.

Chamberlain vs. LiftMaster

Interestingly, there is no major difference between the polarity of the Chamberlain app and the polarity of the LiftMaster app. Although the Average Rating of the LiftMaster App (refer to our "App Comparison Over Time" plot in Section B2.4.2.3 of the Markdown file) dropped below the average rating of the Chamberlain app after October 2016, the polarity score did not capture this information. Instead, according to our plot, the polarity of the Chamberlain and LiftMaster apps remained at a fairly constant level. We do not know why this difference occurred, but it would be interesting to look into what the users wrote about the app during that time and see specifically what the issues were. Perhaps these reviews would reveal specific issues with the LiftMaster app that were not marked as significantly negative by our polarity model.

App Rating vs. Polarity Score

See the Section C-2.4 of the Markdown file. From the plot, we can tell there is a medium to strong relationship between app rating and polarity score. However, some outliers stood out. During our analysis, it stood out to us that users can actually go back to their reviews and change the star ratings after Chamberlain's technicians solved their problem. This will result in inconsistencies between polarity and app ratings.

Topics Over Time

Results are in Section D of the Markdown file. Below are insights broken up by time period. These time periods were created based on our emotion analysis and polarity analysis. If at one time an emotion increased and then decreased in frequency in the reviews, then it implies there exists an inflection point when user behavior shifted. For iOS and Android, we have four inflection points, which created five different periods.

- Period 1 is 2016. We can see a gradual increase in sadness and fear(refer to our prior analysis). Weekly average app rating was increasing at a slow pace and polarity remained constant.
- Period 2 is the first seven months of 2017. During this time, we see a steady decrease in sadness and fear, and the weekly average app rating increased at a much faster pace.
- Period 3 is the last 5 months of 2017. During this time, iOS users were less satisfied with the app compared to Android users. Sadness and fear drastically increased while the weekly app rating for iOS app fell down very quickly. The polarity of iOS app reviews also dropped.
- Period 4 is the the first six months of 2018. This is when the problems related to the iOS app dropped while problems related to the Android apps came back. Sadness continued to increase while anticipation dropped. Both the weekly average app rating and the polarity continued to drop.
- Period 5 is the last 6 months of 2018: This is when iOS users once again became more unhappy about the app. Sadness and fear started to drop while the weekly app rating for the iOS app started to grow.

Please refer to the table at the end of Section D in the Markdown file for a summary of topics by time period.

Qualitative Insights

After interviewing a customer and reading through many app reviews to summarize topics, we believe there are a few market segmentations:

1) Users who are completely satisfied with the current base application
2) Users who are dissatisfied because of lacking IoT capabilities
3) Users who are dissatisfied because of various failures in the app
4) Users who are dissatisfied because of the removal of the scheduling capability
5) Users who do not appreciate the current UI
6) Only one user can login at a time, not multiple accounts
7) Notifications issues - False positives and false negatives

Limitations

With any sentiment analysis, the model cannot always pick up sarcasm or subtext. We added in some specific lexicon (words that are searched for) related to garage doors openers into our AFINN lexicon to help the model pick up the context behind words. For instance, we assigned the word “open” to be positive in the polarity analysis. The word “open” is not positive in all circumstances however, so our model cannot perfectly pick up the sentiment every time.

In addition, there could have been limitations due to spelling errors in the app reviews. While we performed spell check, the model does not pick up typos that are actual words. For instance, some users wrote “garbage” instead of “garage.” This typo would not be corrected with the spell checker. This affects sentiment because “garbage” has a negative polarity and “garage” is neutral.

Conclusion

Insights

Our sentiment/topic analysis revealed several trends over time. The major issues include connecting myQ reliably to the garage door, connecting it to other devices, particularly in the smart home, clunky UI, slow app response, lack of support for additional features such as multiple users, auto-scheduling, or rearranging garage doors in the app, and annoyance with notifications.

Recommendations

Based on our analysis, we would like to recommend Chamberlain to make the following changes to their app in the near future:

- One of the biggest issues Chamberlain needs to address is the Notifications and Alerts in their MyQ App. Users have been consistently complaining that the app was sending out too many notifications. Also, users are not pleased with the sound of the alert. Some users even confused the alarm from their app with the alarm from their in-garage smoke detectors. If possible, users should be given other sound options for alerts. Chamberlain can allow the app to access users’ phones sounds to choose different sounds for the alerts. Apart from the sound of the alerts, users have been complaining about receiving false alarms. Some users even had to drive back from their office only to find out there was nothing wrong with their garage doors.

- Another trend that emerged in our analysis was outdated user interface and negative user experience with the app. In particular, many users either had difficulty navigating the app, thought parts of it were not pleasing to the eye, or had several features they wished were possible, such as changing of garage doors in the app. By looking at the topic models, CGI can start implementing these UI and UX changes to improve the customer experience. By running focus groups with each major app release, CGI could more quickly respond to future UI and UX problems.

- In addition, because August and December see unusual drops in trust and anticipation, CGI might want to invest more in improving user experience or keeping up-to-date on app updates in these time periods.

- For Wifi-connectable devices, the amount of users having difficulty setting up their MyQ devices or adding new devices to their MyQ accounts have been increasing over the past year (2018). We would suggest Chamberlain to offer their users more guidance on how to set up their MyQ devices. We noticed there are already a lot of tutorials illustrating how to set up MyQ devices/ accounts on Chamberlain's website. However, it seems like the users were having a difficult time finding these instructions online. It would be helpful to provide a url linking to the online tutorials within the app.

- Over the past few months, users of the Android app have been complaining about the lack of scheduling function and the lack of multi-user support in the app. Android users mentioned they would have to give their family members/ friends their MyQ account number and password in order for their family members/friends to access their garage while they were away, which is very inconvenient. In addition, Android users would like to have the ability to schedule the app so that their garage door may automatically close or open at a specific time. Back in 2016, the app used to have this scheduling function. But due to some unknown reasons, Chamberlain decided to disable the scheduling function in the app. Android users are looking forward to the return of the scheduling function.

- Over the past few months, users of the iOS app have been complaining about the app taking too long to respond and they have to pay over ten dollars per month to use third party home automation products such as Google Home with their MyQ app. From the reviews, we cannot identify why the app was taking a long time to respond or to connect to Wifi for some users. If this is a glitch with the app, Chamberlain should be able to fix it very soon. Since Chamberlain has already been working with third party home automation providers such as Honeywell (i.e. Chamberlain LiftMaster and Chamberlain app are now compatible with Honeywell Total Connect Remote Services), we believe it is only a matter of time until the company's apps are integrated with Google Home and Amazon Alexa.

Implementation

We will email CGI our R Markdown file and excel spreadsheets with our topic models on them. This will allow CGI to conduct their own analysis on future data that they collect. We hope that our model and Markdown file are flexible enough for CGI to adapt to future analysis. We believe our code will be a vital tool in helping CGI to uncover future trends and insights into the user experience at large. In particular with Amazon's recent announcement regarding dropping off packages inside the garage, we believe our models will help CGI quickly identify and respond to customer issues.

Contact

We here at the Outside the Garage Data Consulting LLC strive to solve any data-related problems our clients have. If there are any questions or concerns related to our analysis, please

reach out to David Black. He can be reached by phone at 224-622-5111 or by email at blackdk2@miamioh.edu.

Appendix

Meet The Team

Lena Rutherford
Project Manager

Ruoning Wang
Data Manager & Modeler

Andrew Stanonis
BI Analyst

David Black
Communications Coordinator

Table 1

Summary of App Release Dates

Release Year	Number of App Releases for iOS	Number of App Releases for Android
2013	8	6
2014	5	5
2015	7	6
2016	10	7
2017	11	6
2018	17	11

Table 2

All Variables from TSC Data

Number of Records: 109,061

Variable Names	Description	Details
Date/Time Opened	When call was placed	**Oldest:** 03-10-2017 **Most Recent:** 12-08-2018
Material Number	Material number with issue	66 distinct Material Numbers Top 5: **G888LM:** 13,723 **8550W:** 12,509 **8355W:** 11,429 **MYQ-G0301-D:** 9,468 **MYQ-G0201A:** 8,144
Material Name	Material name with issue	58 distinct Material Names Top 5: **LIFTMASTER MYQ CONTROL PANEL:** 12,723 **ELITE, 12V DC, BBU, BELT, DLL, STS, WI-FI GDO:** 12,509 **½ HP AC, BELT, DLL, FTB, WI-FI GDO, PREMIUM:** 11,430 **MyQ, SMART GARAGE, eCommerce:** 9,468

		GDO, EVO, BBU, Wi-Fi, BELT, DC,1.25: 8,336
Issue	Category of issue	13 distinct Issue categories Top 5: **Does not work as expected:** 30,677 **MyQ Setup:** 27,699 **Product Inquiry:** 17,053 **MyQ account is not working as expected:** 10,740 **Order/Return:** 10,589
Issue Detail	Description of issue	66 distinct categories of issue detail Top 5: **How to setup myQ:** 26,332 **I have a question about a product:** 16,782 **Can I place an order/return:** 9,419 **Door control/Wall button does not work:** 8,794 **Door does not close:** 3,959
Resolution	Description of how resolved issue	282 distinct categories of resolutions Top 5: **MyQ device - walk through adding device:** 14,138 **Accessory defective - Replace Accessory:** 7,444 **Provide compatibility:** 7,290 **MyQ account - walk through account setup:** 6,826 **MyQ serial number - walk through adding serial number:** 4,135
Internal Notes	Notes for internal staff	56,074NAs 43,678 distinct internal notes Top 5: **W:** 579 **B:** 309 **LM:** 271 **Please see attached photo from email from Name.**: 200 **w:** 173
Case Comments	Additional comments	107,679 NAs 1,210 distinct case comments Top 5: **Printed and mailed / /.:** 135 *** * Escalating to Product Quality for VOC.:** 28 **RGA for replacement LM Load date / / ETA for deliver / /:** 18 *** * Reassigned due to agent being out of office.:** 17 **Called customer - No answer - Msg left:** 16
Subject	Call center employee assigned subject of call	3 NAs 14,891 distinct subjects Top 5: **Does not work as expected:** 22,542 **MyQ Setup:** 21,363 **Product Inquiry:** 12,788 **Order/Return:** 7,735 **MyQ account is not working as expected:** 7,634

Table 3

Overall Summary of App Rating and Review Data

Number of Records: 18,236

Variable Names	Description	Details
Review Author	Name of person who wrote review	Maximum number of reviews for 1 author: 8 16,350 distinct authors 1,269 NAs
AppName	Name of app reviewed	CGI Android: 10,0002 CGI iOS: 2,187 LiftMaster Android: 3,385 LiftMaster IOS: 2,617 Merlin Android: 38 Merlin iOS: 7
App Version	Version of the app they used	NAs coded as "-": 13,425 CGI Android: All NAs CGI iOS: 34 app versions (3.100 - 3.98) LiftMaster Android: All NAs LiftMaster IOS: 36 app versions (3.100 - 3.98) Merlin Android: All NAs Merlin iOS: 5 app versions (3.105.3 - 3.96.1)
Review Rating (1-5)	How customer rated their experience with the app	Min: 1.000 1st Quartile: 3.000 Median: 5.000 Mean: 3.997 3rd Quartile: 5.000 Max: 5.000
Review Date	Date of review	Oldest Date: 01-01-2016 Most Recent Date: 12-10-2018
Review	The text review	Count: 18,236 reviews
Review Sentiment	An assigned sentiment to the review	Negative: 4,260 Neutral: 1,498 Positive: 11,476 Mixed: 1,002

Table 4

Summary of App Rating and Review Data by App

	CGI Android	CGI iOS
No. of Reviews:	10,002	2,187
No. of Distinct Reviewers:	8,839 (924 NAs)	2,094 (0 NAs)
Number of App Versions:	All NAs	34 app versions (3.100 - 3.98)
Summary of Review Ratings:	**Min:** 1.00 **1st Q:** 4.00 **Median:** 5.00 **Mean:** 4.202 **3rd Q:** 5.00 **Max:** 5.00	**Min:** 1.00 **1st Quartile:** 2.00 **Median:** 4.00 **Mean:** 3.62 **3rd Quartile:** 5.00 **Max:** 5.00

Summary of Review Dates:	**Oldest:** 01-12-2016 **Most Recent:** 12-10-2018	**Oldest Date:** 01-17-2016 **Most Recent Date:** 12-09-2018
Summary of Review Sentiments:	**Negative:** 1,761 **Neutral:** 794 **Positive:** 6,921 **Mixed:** 526	**Negative:** 735 **Neutral:** 211 **Positive:** 11,115 **Mixed:** 126

	Liftmaster Android	**Liftmaster iOS**
No. of Reviews:	3,385	2,617
No. of Distinct Reviewers:	3,011 (337 NAs)	2,489 (0 NAs)
Number of App Versions:	All NAs	36 app versions (3.100 - 3.98)
Summary of Review Ratings:	**Min:** 1.00 **1st Q:** 4.00 **Median:** 5.00 **Mean:** 4.219 **3rd Q:** 5.00 **Max:** 5.00	**Min:** 1.00 **1st Quartile:** 1.00 **Median:** 4.00 **Mean:** 3.246 **3rd Quartile:** 5.00 **Max:** 5.00
Summary of Review Dates:	**Oldest:** 01-01-2016 **Most Recent:** 12-10-2018	**Oldest Date:** 01-14-2016 **Most Recent Date:** 12-10-2018
Summary of Review Sentiments:	**Negative:** 579 **Neutral:** 260 **Positive:** 2,358 **Mixed:** 188	**Negative:** 1,171 **Neutral:** 230 **Positive:** 1,057 **Mixed:** 159

	Merlin Android	**Merlin iOS**
No. of Reviews:	38	7
No. of Distinct Reviewers:	30 (8 NAs)	7 (0 NAs)
Number of App Versions:	All NAs	5 app versions (3.105.3 - 3.96.1)
Summary of Review Ratings:	**Min:** 1.00 **1st Q:** 4.00 **Median:** 5.00 **Mean:** 4.053 **3rd Q:** 5.00 **Max:** 5.00	**Min:** 1.00 **1st Quartile:** 1.50 **Median:** 3.00 **Mean:** 2.286 **3rd Quartile:** 3.00 **Max:** 3.00
Summary of Review Dates:	**Oldest:** 12-11-2016 **Most Recent:** 11-26-2018	**Oldest Date:** 08-31-2017 **Most Recent Date:** 09-10-2018
Summary of Review Sentiments:	**Negative:** 7 **Neutral:** 3 **Positive:** 25 **Mixed:** 3	**Negative:** 7 **Neutral:** 0 **Positive:** 0 **Mixed:** 0

Text 1

Journey Map Notes

- Bought our house - had a LiftMaster garage opener
- Put in a Sears garage door opener about 8 years ago. Old one stopped working, wore out. Didn't have the power to pull the door open anymore. It was easy to go to Sears because he knew they sold garage door openers. Didn't do a lot of research. First place looked. Wanted one with complete package. Didn't include anything wireless. Found something that looked good and bought it. And knew Sears quality because his dad had a Sears garage door opener that was craftsmen quality, and he didn't want to spend a lot of money on it. Just wanted a basic one that could open our double garage door.
- Installed it himself. Took down the old motor that sits in the ceiling. New one comes with hardware, but had to figure out how to implement it and use it with your particular installation. Needed to figure out what parts to use, needed to cut things, needed to buy nuts or bolts at Home Depot. Needed to make a trip to Home Depot for extra parts. Took a day. Not too bad. Late morning to mid afternoon/evening. Read the instructions. Some wiring involved - wasn't wireless. Had to put the wires from the button on the door to the unit. Also installed outer keypad. That was a separate thing that it didn't come with. Don't remember for sure. Found a wireless keypad, something went wrong. Then replaced it with a non-craftsman opener (on there now). Works fine, connected to it fine. It acts up now, so he got a new one like it to replace it with.
- Started myQ app 2 years ago. Found out about it on Best Buy online. Was on a special offer. Was looking for something else and it caught his attention. Had Best Buy coupon dollars needed to use, might have been looking for a way to use the coupon bucks before they expired and found that. That's what he thinks happened. Bought the Chamberlain stuff that you attach to the Sears garage door opener - there are parts he had to install for it to work. 2 things - a unit in the ceiling and a wireless thing on the garage door that's a gravity switch that tells the other unit whether the door is open or closed. Followed the instructions. Was a pretty easy installation. No problems with wifi connection. Downloaded the app the same day, immediately. Initially worked just fine.
- Since then, when we change our wireless router (have to reconnect it), there have been periods of time where waited a while to reconnect the router. Had to switch out the router and buy a new one and didn't reconnect everything in the house right away - had to find the instructions to connect new router to the device again. Just needed to dig them out or look online. Ended up opening app on phone and reconfigure it from there. Had to be by the unit when do it and push a button or something. Not super simple - not like just doing something on my phone. Had to push another button on the box in the garage to get it to work.
- Reconnected okay, but issues more recently are that it's spotty. Sometimes it connects and works to the app, and sometimes it doesn't. And I don't know why. I think the wifi connectivity is not the problem; I think it has something to do with the app.
    - I don't have a garage button in the car and I was trying to either close or open the door from the car. Trying not pull out of the driveway and go to work. Try to connect it and it's going in circles, and a couple of times it didn't connect, so then I had to go inside to get a controller or try the keypad on the door and then go. In a rush to get out the door.

    - All the good things from before got washed away to make him feel like the product sucks and is unreliable. It's always a big question mark in his head whether it will work.
    - Not obnoxious enough to take the time to call customer service. Not going to spend a bunch of time talking to someone about it "Sometimes it works and sometimes it doesn't" would rather roll his dice on that.
    - Hasn't tried looking up solutions because forgets about it the second the door opens and closes. Because needs to move on with his day.
- I don't use the app a ton right now. I've used it a few times lately when I didn't have a button and it worked okay, so the problem seems intermittent. Come home and nobody's home and no button. Use it as a backup to get in the house.
- When we originally installed it, I had it set up so sent a notification every time opened or closed. I don't know how that got turned off, maybe in the process of updating the router. Had to install a new app somewhere along the way. And haven't had notifications since and haven't messed with it since - didn't want to spend any more time on it. Nice feature, but was just happy it worked. Might go back at some point in time to turn it back on. Gives him more of a sense of confidence that if he came home it would work. There was a problem with the app that made him reinstall it. It didn't go totally smooth. Had to go back into his old account and figure out his email and password - that was part of the pain of getting it reconfigured.
- If the garage door opener goes out again, and he needs a new one and wants this feature again, he might not buy a Chamberlain again. Do I want latest greatest features for $100 more? Never owned a Chamberlain garage door opener, but it put a big question in his head if he's having these problems with the app, might not trust the opener.
    - Wants the latest and greatest features = web app + web app operability
    - I think Chamberlain and Nest and another one find your keys for you integrated so could do garage door opener on same app as Nest - all on same portal. Wants to have only one portal/platform so fewer apps on his phone for his smart home. Wants to find list of garage doors that would work on that single platform
    - Quietness and smoother
    - We have a chain drive, and he thinks a belt drive is quieter, but didn't buy one in the past because he thought they were more expensive. That would be put in consideration.
    - If all those things cost more, is it worth more for quiet or inter-operability for application for homes?
- Got a new car recently. Has iHome inter-operability garage door opener in it, so I need to find out if that would work with my Chamberlain unit. Might work with my old Sears garage door opener. That may be the platform that is becoming standard for all of these iHome applications.