

Final Report

IS434 - Social Analytics and Applications ***Section G1 - Team 5***

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Contributions of each member

Chiang Kheng He: Sourcing of client, liaising with Freshio to understand business objectives, FB and Insta data collection, Power BI data visualisation EDA, survey management and analysis, report writing.

Choong Li Hsiang John: Contact with client, Insta EDA, final, proposal presentation slides, report writing

Luca Perotti: Insta data scraping, created jupyter notebook for Insta EDA, survey answer analysis, poster, report writing

Ong Zi Jian: Created network graph and analyse relationships. Also helped out with sentiment analysis and topic modelling work, report writing

Timothy Ngoi: Insta data scraping, sentiment analysis, poster design, proposal and final presentation slides

Yuen Cha Min: Web crawling of GoogleReview, Topic, Sentiment, Network Analysis, final and proposal presentation slides, poster, generating ideas for client proposal, report writing

1: Motivation, Objective or Hypothesis

Motivation for project

Freshio Gelato is a dessert cafe run by Uncle K. Tan and his wife, at Sunshine Plaza. Famous for its gelato, Italian paninis, waffles & croffles, Uncle K.T prides himself on Freshio's range of natural flavours that are handmade daily and makes a great effort to provide his customers with the best customer service. Given this local cafe's approachability and its proximity to SMU, its business nature as a mom-and-pop store, as well as the presence of a sizeable social media presence with 700+ Instagram followers and 750+ Google Reviews, we believed that our project would be able to make an impact on their business.

Just like any other business, Freshio hopes to grow its customer base. Through interviews with our correspondent, Alex, we realised that he had plans to expand the family business. Alex expressed concerns about the current business sustainability against their competitors and profitability amidst the expansion.

Objectives of the project

We agreed that the purpose of this project should primarily consolidate Freshio's customer base, by improving customer retention rates through increasing overall customer satisfaction. Thus, in order to help Freshio accommodate its growth plans, we identified 3 areas our project could focus on to help improve overall customer satisfaction and retention:

- Evaluate its marketing in comparison to its competitors
- Improve its social media presence
- Improve its customer flow and education

Hypotheses of project

Freshio is mainly present on three social media platforms; Google Reviews, Facebook and Instagram. They believe that Facebook has had the worst performance, with Instagram performing the best.

Selection of Competitors: When identifying direct competitors, Alex mentioned Goodlato Artisanal Low-Calorie Gelato and Creamier. Based on his prior mention of Messina as an inspiration, we decided to include Messina in the competitor analysis as well. However, given the franchise nature of Creamier and Messina, we did a brief evaluation to confirm whether the specific store is suitable for comparison with Freshio for this project.

We chose Creamier (Tiong Bahru) as the most relevant competitor, considering its proximity to Freshio's location in the central business district (3.8km from Tiong Bahru to 5.7km from Freshio in Toa Payoh by car). With reference to Table 1.1, as for Messina, we narrowed it down to Newtown, Darling Square and Parramatta based on their proximity to universities. before basing our final decision on their Facebook and Google Review statistics (as they lacked a dedicated Instagram page). In the end, Newtown was chosen for its similar number of reviews and Facebook statistics, as well as the 2nd best alignment with Freshio's start date.

Table 1.1: Comparison of Gelato Messina Stores to Freshio

	Client	Gelato Messina Stores		
	Freshio Gelato	Parramatta	Darling Square	Newtown
Google Reviews	726	423	107	807
Start Date	May 28, 2019	May 28, 2014	August 19, 2019	September 16, 2016
Facebook statistics	340 likes • 356 followers	2.5K likes • 2.6K followers	46 likes • 61 followers	604 likes • 623 followers

- **Hypothesis 1:**
Target Demographic Satisfaction: We hypothesise that the target demographic, comprising young adults and university students, expresses a high level of satisfaction with Freshio's unique niche offerings.
- **Hypothesis 2:**
Cost-Effectiveness of Instagram: We hypothesise that among Freshio's three social media platforms(Google, Facebook, Instagram). Instagram is the most cost-effective channel for engaging with and attracting customers.
- **Hypothesis 3:**

Competitive Performance: We hypothesise that Freshio demonstrates a strong competitive performance when compared to its primary competitors, namely: Goodlato Artisanal Low-Calorie Gelato, Creamier (Tiong Bahru), Gelato Messina (Newtown)

2: Datasets

Google Reviews

Description of the datasets: It provides a comprehensive overview of who and when commented on Google Map reviews of those comments in relation to the commenter's visit to the shop, the star ratings given by the commenters, and any responses from the shop if available.

Data Collection Tool: Instant Data Scraper

Interested Attributes: Number of Stars, Comment_on(eg. 1 week ago), Comments, Commentor, Community Member

Data Pre-processing

Python Tool Libraries: numpy, pandas, nltk.corpus, nltk.tokenize, nltk.stem

Tasks Performed on full data from google review:

- Conversion: text to lowercase
- Filtering : stemmings, contractions, stopwords
- Removal : special characters, punctuation, emoji, whitespaces, stopwords

Facebook

Description of the datasets: Data was collected within the month of October:

- Facebook page statistics on 18 Oct
- latest 30 posts on 22 Oct

Data Collection Tool: Python Selenium

Interested Attributes:

- Number of followers, reviews
- Python Selenium: Number of and type of reactions, likes, comments, post date

Instagram

Data Collection Tool: Phantombuster

Interested Attributes: Phantombuster: Profile details (likes, posts, followers) of each store and their top 100 followers

```
# Apply sentiment classification
df2['sentiment'] = df2['compound_sentiment'].apply(classify_sentiment)

# Print the updated DataFrame with sentiment analysis results
print(df2[['cleansed_comments', 'compound_sentiment', 'sentiment']])
```

	cleansed_comments	compound_sentiment
0	love old coupl manag restaur aunti welcom gave...	0.6369
1	super tasti icecream coconut lyche mango	0.5994
2	good hazelnut ice cream gener tast sampl	0.4404
3	small ice cream shop amaz gelato 16 flavour on...	0.6249
4	friendli servic	0.0000
..
721	must tri serv friendli coupl limit seat friend...	0.6369
722	chanc upon shop citi gate friendli uncl offer ...	0.6369
723	wait waffl mayb croissantit cruffl	0.0000
724	friendli hospit coupl serv us koreanstyl cafe ...	0.0000
725	baileysgelato freshiogelatoamericano4th may 2021	0.0000

	sentiment
0	positive
1	positive
2	positive
3	positive
4	neutral
..	...
721	positive
722	positive

according to pageRank, post details (likes, comments and content of direct comments) for the latest 30 posts

Additional data on Facebook and Instagram was gleaned from **Meta Business Suite** for the past:

- 90 days (17 Oct - 20 Jul) compared to (21 Apr - 19 Jul) 2023
- 28 days (18 Oct - 21 Sep) compared to (20 Sep - 24 Aug) 2023

Interested Attributes: Freshio's reach, engagement, follower demographic

3: Approach

Engagement Rate Formula

Instagram Engagement / Post = (# of likes, comment, shares) / (# of post)

Facebook Engagement / Post = (# of likes, reactions, comments) / (# of post)

Platform Engagement Rate = (Platform's Engagement / Post) / (# of Platform followers)

Google Review Sentiment Scoring and Classification

Python Libraries Tools: nltk.sentiment.vader, matplotlib.pyplot

Interested Fields/Attributes after pre-processing : cleansed_comments

Sentiment Scoring and Classification of cleansed comments

Step 1: Get Sentiment Scores: Input *cleansed_comments* that has been pre-processed→ Output new column created called "*sentiment_scores*" to get sentiment score of the cleansed_comments

Step 2: Get compound sentiment from sentiment scores: Input *sentiment_scores* of each cleansed_comments→ Output new column created called *compound_sentiment*

Step 3: Classification sentiment from compound sentiment where if *compound_score* >= 0.5 then return *positive* ,elseif *compound_score* <= -0.4 then return *negative*, else the compound will be *neutral*

Step 4: Create a column called 'sentiment' based on compound sentiment result in Step 3

Interested Fields/Attributes after pre-processing : cleansed_comments and community member

Sentiment Classification of Community Member and cleansed comments

Step 1: Map the cleansed_comments to community member is a local guide or nan where the commenter is not a local guide .

Step 2: Plot histogram for Sentiment Classification of cleansed_comments

Step 3: Plot histogram for Sentiment Classification of cleansed_comments and community member is a local guide

Step 4: Plot histogram for Sentiment Classification of cleansed_comments and community member is a nan

Topic Modelling

Python Libraries Tools for Top: pandas, sklearn, matplotlib, wordcloud, gensim, numpy

Interested Fields/Attributes after pre-processing : cleansed_comments

Creating Word Cloud of 5 topics to 3 topics

Step 1: Split the tokenized transformed list of text from *cleansed_comments* column called *tokenized_texts*

Step 2: creates a mapping of word IDs to words using *gensim.corpora Dictionary* from *tokenized_texts* to *dictionary* and also converts our *tokenized texts* into a bag-of-words format from *tokenized_texts* called it *corpus*

Step 3: Build Lda Model and trained corpus and set parameters *num_topics* to 5, *id2word* to the dictionary from Step 2 and *passes* to 15 to pass over the entire corpus 15 times

Step 4: Create the word cloud based the number of frequencies words appeared and set parameter interpolation to bilinear and create titles based topics

Step 5 : Repeat Step 1-4, change parameter (*num_topics* to 5, *id2word* to *dictionary* from Step 2 and *passes* to 15) of lda model

Top 10 Unigram and Bigram Phrases Based On Sentiment Group

Step 1: groups the *cleansed_comments* by their corresponding *sentiment* values, concatenates the *cleansed_comments*

within each group, and then stores the concatenated comments in a dictionary called *sentiment_groups*.

Step 2: Setting up TF-IDF vectorizer with parameters of *max_df set to 1.0, min_df set to 1, max_features set to 1000, stop_words to English, (for bigram: ngram_range=(2, 2))*

Step 3: Transform the *cleansed_comments* column with TF-IDF

Step 4: Create a dictionary called *res_grp* of top 10 phrases for each sentiment (positive, neutral, negative) and top phrases are determined based on their TF-IDF scores.

Step 5: Loop through *sentiment_groups* with keypair value (*sentiment, comments*) dictionary created in Step 1, to get *tfidf_matrix* that TF-IDF scores of terms in the *comments* and *feature_names* to retrieve the actual terms (or words) that correspond to the features in the TF-IDF matrix. Define *feature_index* to identify the non-zero columns in the *tfidf_matrix*, and define *tfidf_score* that pairs each word/phrase index with its TF-IDF score from *feature_index*. Using the *feature_names* and *tfidf_scores* defined earlier, retrieve the top phrases based on their scores by sorting in reverse in descending order into *top_phrases*

Step 6: Save the *top_phrases* into *res_grp* dictionary defined in Step 4

Step 7: Display the *res_grp* dictionary which has *sentiment* and *top_phrases_list* with for loop

4: Results

Facebook

Table 1.2: Comparison of competitors in terms of reviews engagement

	Freshio Gelato	Creamier	Goodlato	Messina
Date of Creation	May 28, 2019	September 27, 2017	September 8, 2022	September 16, 2016
No of Reviews	55	~44 (calculated)	2	228
Facebook Average Rating	4.7	3.8	NA	4.0
Days since creation	1604	2212	405	2588
Reviews/day	0.0343	0.0199	0.0049	0.0881
Actual Followers	358	~248 (calculated)	20	628

Issue: For Creamier, there was no dedicated Tiong Bahru page we could narrow down to.

Solution: With reference to Table 1.2



- To calculate the actual of followers for Creamier(TB):
 - Gelato Messina's Facebook page has 19 branches and approximately 136,000 followers, the average number of followers per branch is around 7,158 (calculated as 136,000 divided by 19). By comparing this figure to Messina's actual follower count, we derive a factor of 0.0877 (calculated as 628 divided by 7,158).
 - Using this factor, we estimate Creamier (TB)'s follower count to be approximately 248. This is calculated by taking Creamier(TB)'s number of followers per branch multiplied by the factor of 0.0877 (calculated as $(17,000 \div 6) * 0.0877 \approx 248$)
- To calculate the number of reviews of Creamier(TB):
 - Additionally, the average review-to-follower ratio across the other stores is 0.2056 (). Applying this ratio, we estimate that Creamier's (TB) review count is around 44, which is derived from dividing Creamier's estimated total reviews (1,288) by 6 (the number of branches) and then multiplying by the ratio of 0.2056.

Results: Based on this data, Messina (Newtown) has the highest frequency of reviews and the 2nd best mean ratings. With that said, Freshio is doing well for itself when compared to Creamier and Goodlato. Considering that Newtown is one of the many Messina branches, it is likely that the consolidation of brand exposure across the 6 branches had a compounding effect on increasing customer reachability. This would likely be the reason for its high daily review count.

This could be a worthwhile recommendation since Freshio wants to expand.

Posting Schedule and Effectiveness

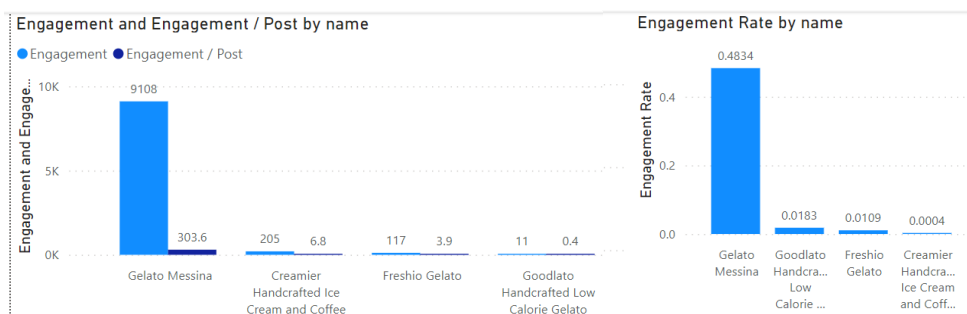


Results

- The median posting week was the 3rd week of the month
- The median posting day was Friday
- The Engagement / Post was highest towards the weekends

Analysis: Looking at the posting frequency of the stores, Freshio's output is the lowest and most spaced out, while Messina (Newtown) has the highest.

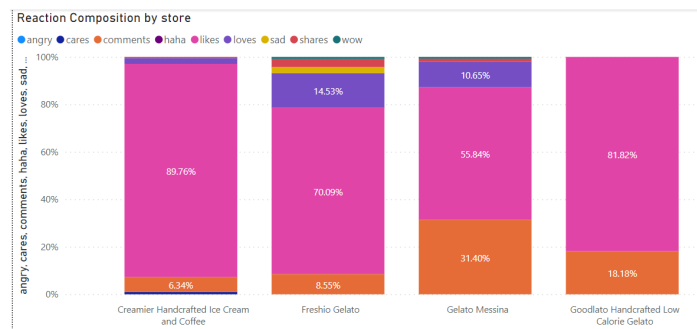
With Creamier's and Messina's high monthly posting frequency, there appears to be a correlation between the frequency of posts and the number of user engagements.



Results: At face value, Messina and Creamier have a higher engagement per post than Freshio. Considering that Creamier has 6 branches, it is admirable that Freshio was able to garner more than half of Creamier's number of reactions. Nevertheless, with only 3.57 engagements per post, it points to Freshio's lack of market presence compared to its competitors.

However, if we were to take into account their FB followers numbers, it appears that Goodlato and Freshio overtake Creamier in terms of Engagement Rate. Furthermore, Freshio's FB reaction compositions appear to be more varied than Creamier,

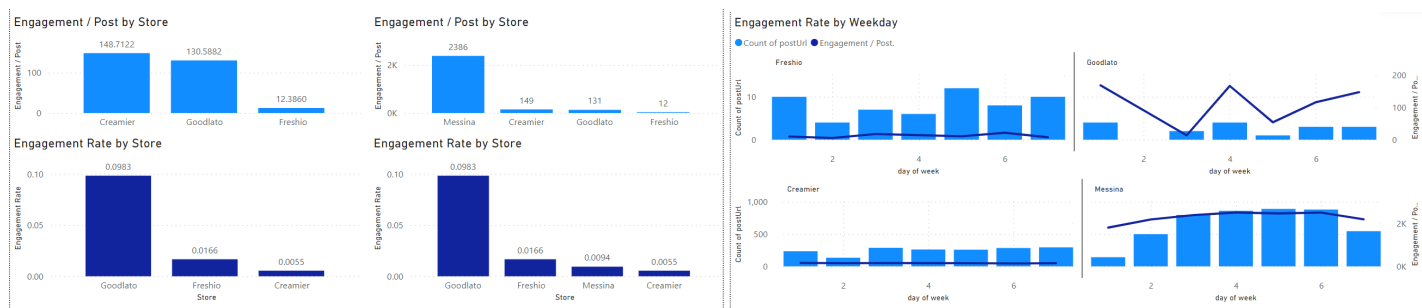
with a larger minority of "love" reactions similar to that of Messina. Interestingly, the only post to get 3 sad reactions was from Freshio, when it was closing its Serangoon outlet. **Based on this data, it seems that though Freshio lacks a market presence, it has a stronger customer engagement rate and loyalty, on par with Messina.**



Instagram

Table 1.3: Comparison of competitors in terms of account status

	Freshio Gelato	Creamier	Goodlato	Messina
Posts	57	1,768	17	4,645
Followers	745	27,208	1,328	254,416
Following	63	53	7	400

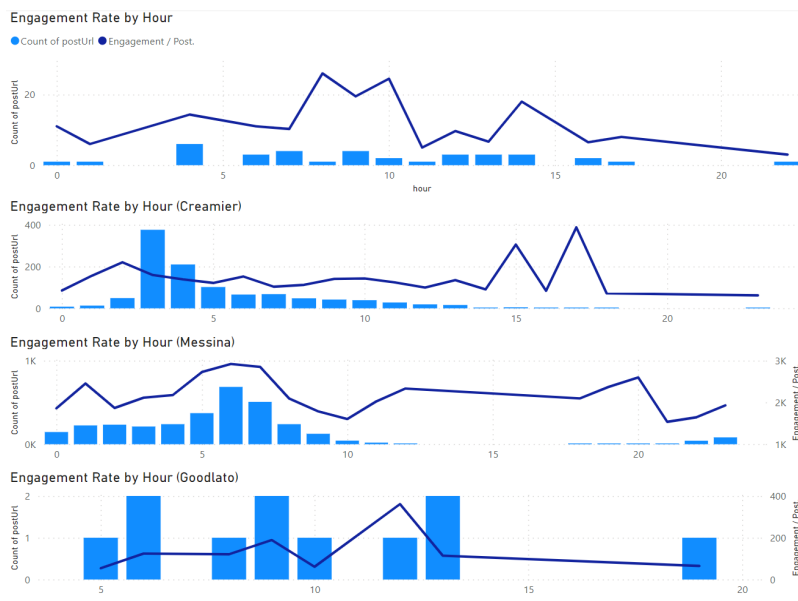


Results:

- The median posting week was the 3rd week of the month
- The median posting day was Thursday
- Engagement / Post was highest towards the weekends, between 10 am - 3 pm

At face value, Messina and Creamier again have a higher engagement per post than Freshio. However, taking into account their Instagram followers count, it once again shows that Goodlato and Freshio win in terms of Engagement Rate on Instagram.

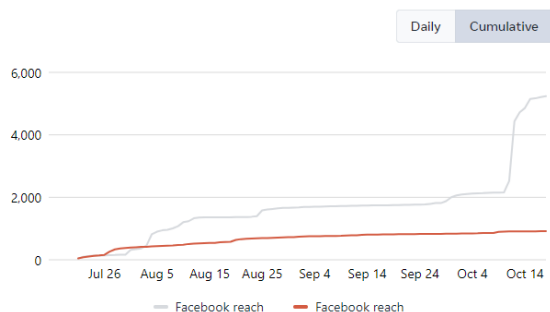
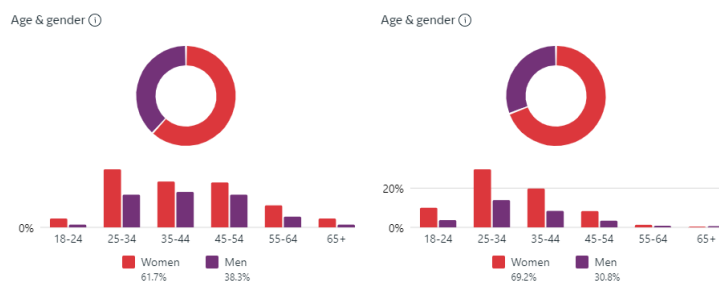
In terms of Engagement Rate, the posts posted later in the week had a slightly better overall engagement. When considering only Thursdays to Sundays, the posts tended to have higher engagements between 1000H - 1500H (especially when factoring in Messina is GM+11, 3 hours ahead of Singapore)



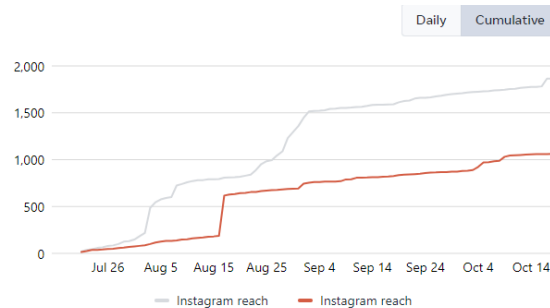
Meta

Based on the Meta data, its Facebook data shows that the majority of Freshio customers are females and in their 20-30s. This supports hypothesis 1 that Freshio's main customer base are mostly university students.

Comparison of past 90 days (20 Jul 2023-17 Oct 2023) compared to (24 Aug 2023- 20 Sep 2023) for Freshio



Facebook Reach: 917, down 82.5%



Instagram Reach: 1,061, down 43.1%

Table 1.4: Comparison of Freshio in terms of social account performance

	Facebook	Instagram
Posts	1, down 50% from 2	1, down 50% from 2
Median Post reach	67, down 77.4% from 296	1061, down 43.1% from 1.9K

Median Post Engagement	1, down 87.5% from 8	57, down 71.2% from 198
Stories	2, up from 0	4, down 60% from 10
Median Story reach	46	617, down 6.2% from 658
Median Story Engagement	8	18, up 38.5% from 13
New Followers	15, down 46.4% from 28	66, down 67% from 200

Results: According to Table 1.4, The higher median post reach, engagements and new followers gained by Instagram confirm that it is a more effective platform to engage with customers. However, Freshio's drop in posts and stories correlates with a decrease in reach and engagement. Thus, we believe a frequent/regular posting would be the next step in supporting Freshio's continued customer engagement and outreach.

Google Review

Table 1.5 Statistics of Google Reviews

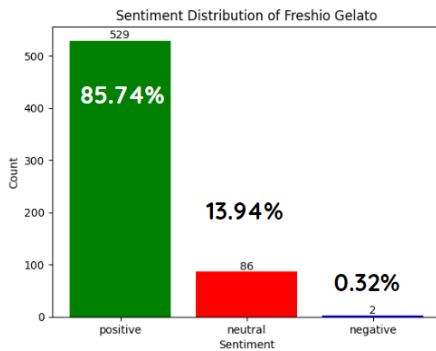
	Freshio Gelato	Creamier	Goodlato	Messina
No of Reviews	726	1090	90	807
No of local guides ¹	243 (33.50%)	571 (52.39%)	26 (28.89%)	594 (73.61%)
No of non-local guides	483 (66.50%)	519 (47.61%)	64 (71.11%)	213 (26.39%)
Average Rating	4.94	4.58	4.7	4.5
% of written reviews	84.16%	68.81%	92.22%	48.95%

Table 1.6 Overall customers' star ratings

¹ Local Guides is a global community of explorers who write reviews, share photos, answer questions, add or edit places, and check facts on Google Map based on google.

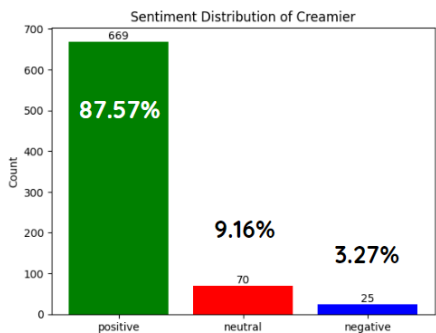
	Freshio Gelato		Creamier		Goodlato		Gelato Messina	
	Non-local	Local Guide	Non-local	Local Guide	Non-local	Local Guide	Non-local	Local Guide
1 star %	0.35	0.82	3.21	0.53	3.2	3.85	4.23	1.85
2 star %	0	1.23	0.51	1.23	1.56	3.85	2.48	1.85
3 star %	0.18	0.41	3.08	6.65	1.56	3.85	5.16	5.05
4 star %	0.53	4.93	16	25.57	4.69	7.69	17.37	21.55
5 star %	83.54	92.6	76.69	66	89.06	80.7	70.89	69.70

Sentiment of Freshio Gelato

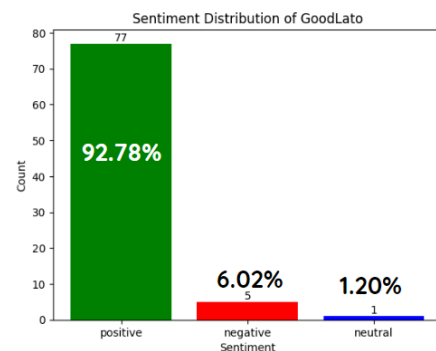


The sentiment analysis results indicate a predominantly positive sentiment, with only two instances displaying a negative tone. Out of a total of 617 reviews, 85.74% were classified as positive, while 13.94% were categorised as neutral. Notably, non-guide members exhibit a tendency to promptly convey their sentiments, with a significant number of them consistently scoring very high on the positive end of the spectrum. Similarly, local guides frequently provide responses that adhere to predefined templates, and they tend to offer fewer instances of negative feedback, more of an objective truth than personal emotions. This could be further supported by Table 1.6 where 97.53% (92.6%+4.93%) of local guides have given Freshio Gelato positive ratings of 4 or 5 stars . In contrast, non-local guides gave 84.07% (83.54%+ 0.53%) of 4 or 5 stars.

Sentiment of Creamier



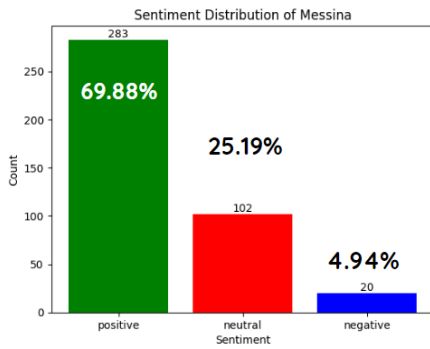
In the context of Creamier, a comprehensive sentiment analysis reveals a total count of 764 sentiments from written comments, categorised as follows: 87.57% instances of positive sentiment, 9.16% instances of neutral sentiment, and 3.27% instances of negative sentiment. A noteworthy observation is that Creamier has a higher frequency of negative sentiments when contrasted with positive and neutral ones.



Sentiment of GoodLato

For GoodLato there were a total of 83 written comments reviews evaluated, resulting in the following distribution: 93.78% of reviews were classified as positive, 6.02% of reviews were categorised as negative, and 1.20% of reviews were identified as neutral. From the chart, we can see that there is a predominantly positive sentiment expressed by the reviewers. It's noteworthy that Goodlato has the least reviews among the competitors.

Sentiment for Messina



In the evaluation of Messina's 405 written reviews, 69.88% were classified as positive, 25.19% as negative, and 4.94% as neutral. This distribution underscores a moderately positive sentiment among reviewers. However, when comparing Messina to its competitors, it displays a significantly higher negative sentiment, especially given that only 48.95% of its total reviews were written comments. According to Table 1.1. It's noteworthy that, despite Messina earning an average rating of 4.5 stars on Google, 69.88% of its reviews expressed positive sentiments. In contrast, Creamier, with a closely matching Google rating of 4.58 stars, boasts a higher positive sentiment at 87.57%.

Table 1.7 Sentiment analysis conclusion among its' contenders

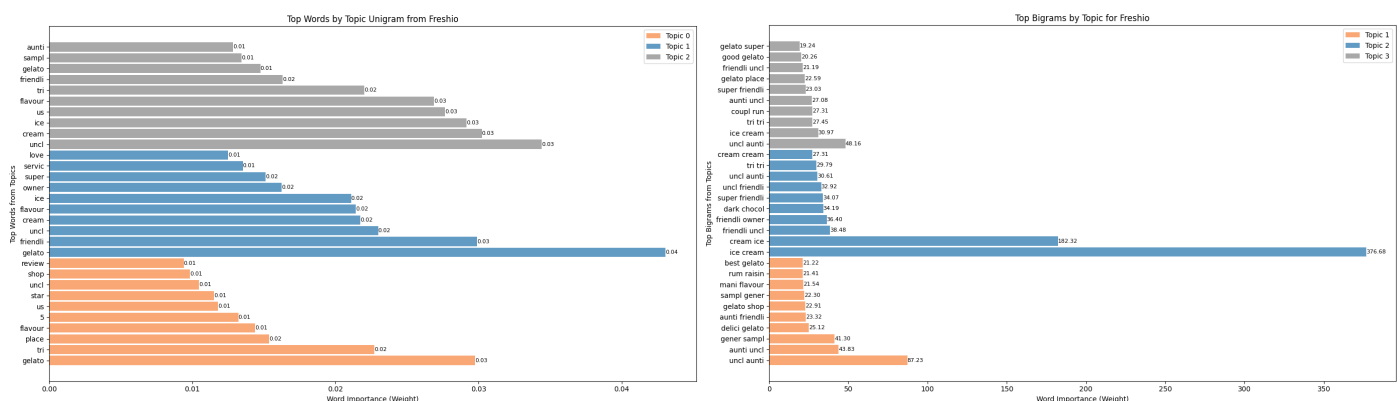
	Freshio	Creamier	Goodlato	Messina
% Classification Sentiment-Positive	85.74%	87.57%	92.78%	69.88%
% Classification Sentiment-Neutral	13.94%	9.16%	1.20%	25.19%
% Classification Sentiment-Negative	0.32%	3.27%	6.02%	4.94%

Overall, we see that Freshio did perform well as compared to the other gelato competitor brands. Freshio has far fewer negative reviews than the other 3 brands while having quite a significant amount of reviews, only differing from Creamier by 1.83%. When comparing Creamier and Freshio's sentiment scores, Creamier appears to exhibit a higher incidence of negative sentiments when compared to Freshio Gelato. This difference in sentiment distribution provides insights into the variations in sentiment expression and customer feedback between these two entities.

Goodlato has the highest percentage of positive reviews, followed by Freshio. Surprisingly, the franchised stores (Messina and Creamier) have a higher % of neutral and negative reviews and a lower % of written comments.

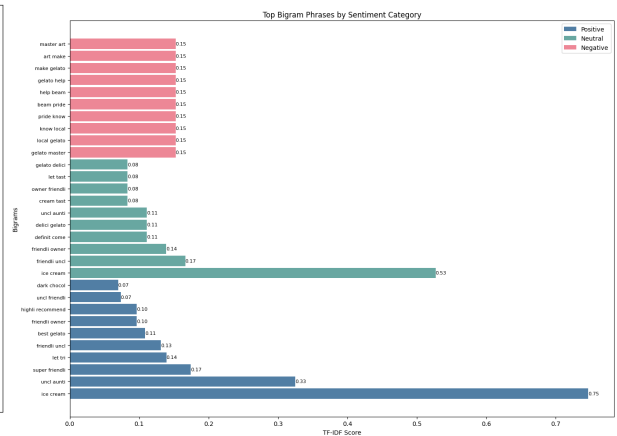
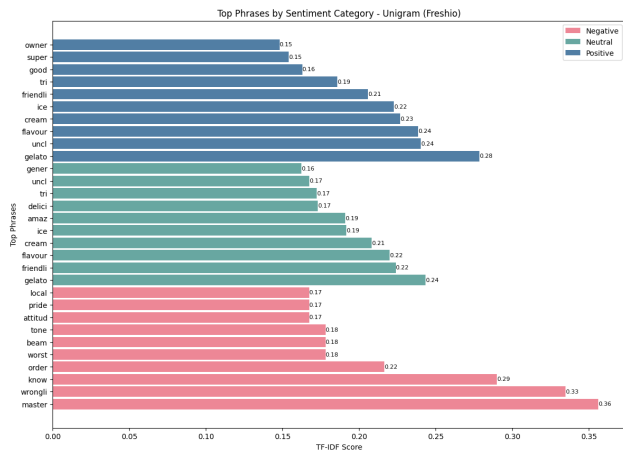
Google Review Comments: Topic Analysis for Freshio Gelato

Unigram and Bigram



The unigram analysis centres around the service experience. Terms like "friendly," "sample," and "service" indicate a customer-centric environment that values interaction and satisfaction. Unigram topic scores have a more even distribution, which helps in the generalisation of the topic. The main theme for Bigram is that the owners are friendly and they were given generous samples to try before committing to a flavour. Bigram topics are very similar to Unigram in terms of positivity, ice cream, and friendliness of the staff and the owners are often mentioned amongst the 3 topics.

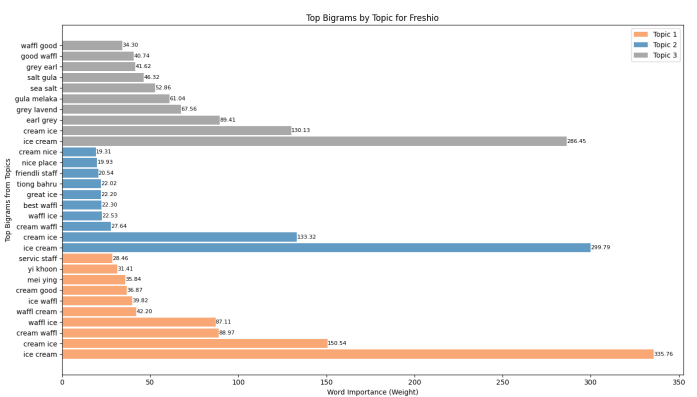
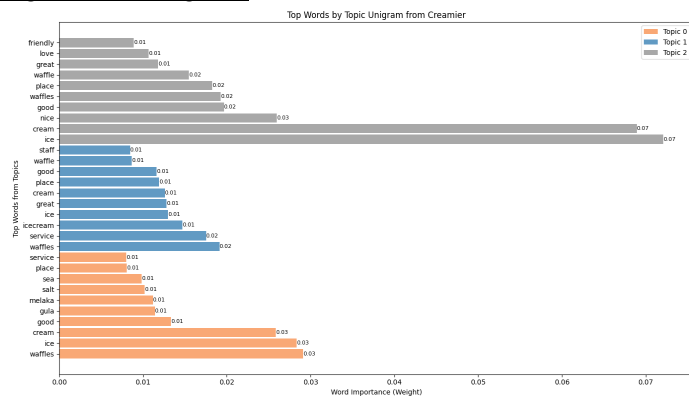
By Sentiment Category



When examining the Unigram and Bigram, there are significant mentions of the word topics such as ‘gelato’, ‘uncl’, ‘frendli’, across topics. The appeal seems to heavily be on the fact that the service quality is good and the friendly owners. The customer also appreciates having samples as it helps them choose a flavour that they like and is a hallmark of good service. Furthermore in terms of flavours, “dark chocolate” is the only positive flavour mentioned.

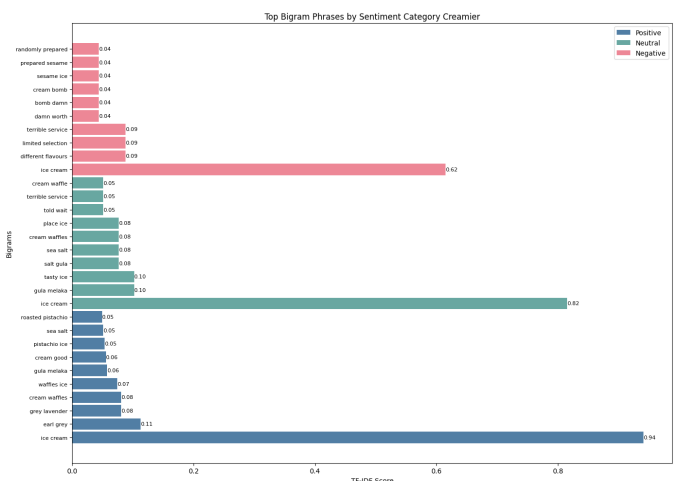
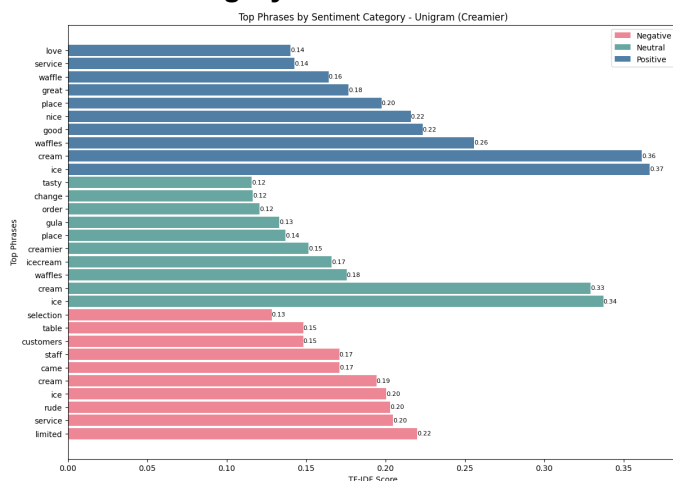
Topic Analysis for Creamier

Unigram and Bigram



The unigram shows that the ice cream and waffles are nice and patrons are very pleased with the flavours. The bigram adds more context with flavours like “sea salt”, “earl grey”, “lavender” and “gula melaka”. Heavier word frequency centred around their ice cream as observed in the chart above “ice cream” and “cream ice” appeared in the top 2 for each topic.

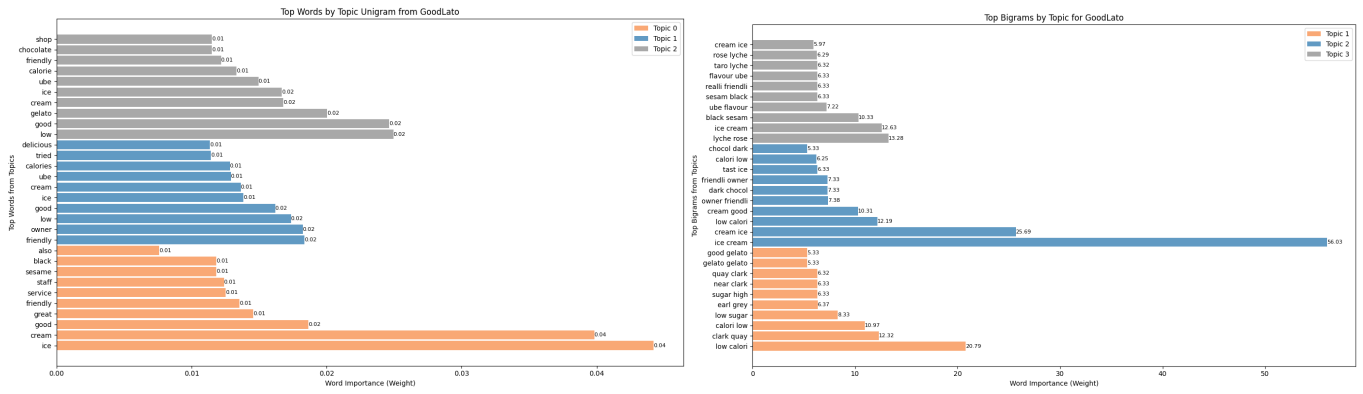
By Sentiment Category



The Bigram shows limited selection and terrible service but Creamier is known to sell good Earl Grey ice cream waffles and average gula melaka based on top 3 topics. The service is mentioned less and there are some negative topics like ‘terrible service’. Creamier seems to trump in the flavour department as there are many flavours mentioned, more than Freshio but falls short on their customer service.

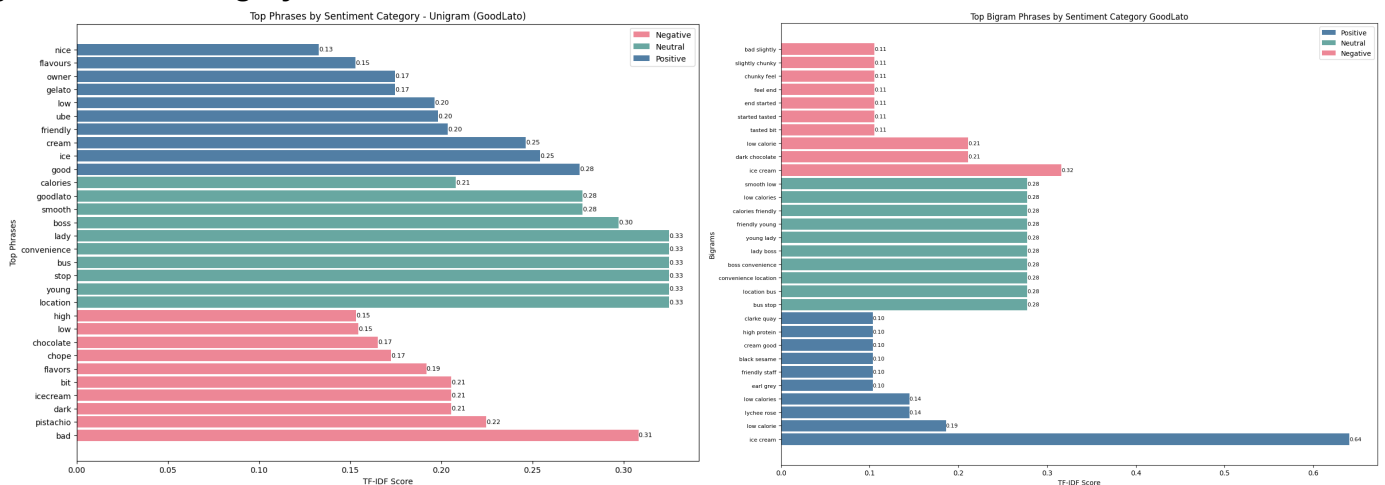
Topic Analysis for GoodLato

Unigram and Bigram



The main theme amongst both Unigram and Bigram is the friendly owner, “low calori” and quite a good selection of “ice cream” flavours. Their convenient location near “Clarke Quay” is mentioned as well. There are a large number of flavours mentioned in the bigrams, most of which are relatively unique flavours, which customers seem to be intrigued by.

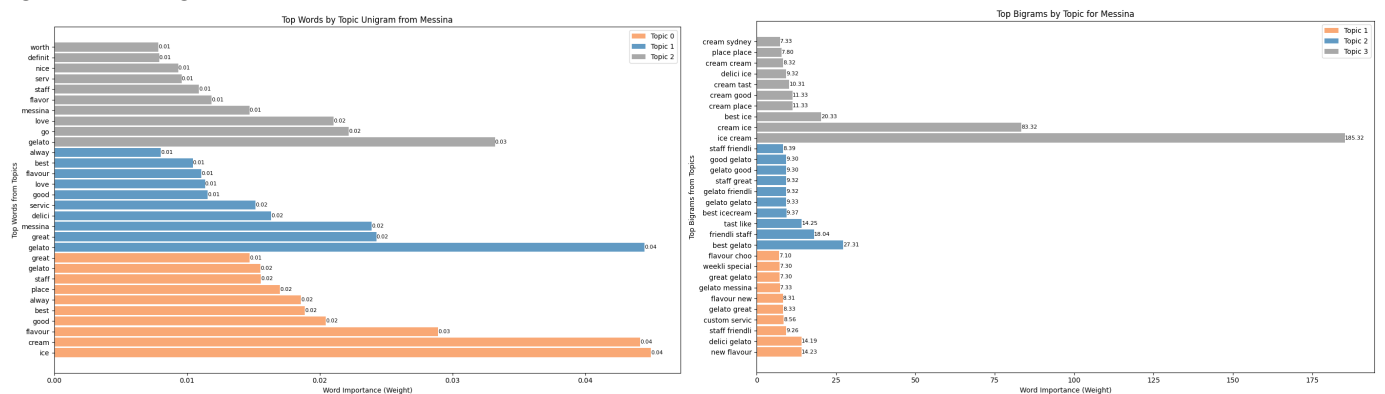
By Sentiment Category



The bigram mentioned words like ‘low caloric’ and multiple flavours across the 3 topics. The gelato flavours such as “dark chocolate” are linked to negative sentiments while “lychee rose” is linked to positive sentiments across the 3 topics. Goodlato also has a convenient location based on the top 3 topics.

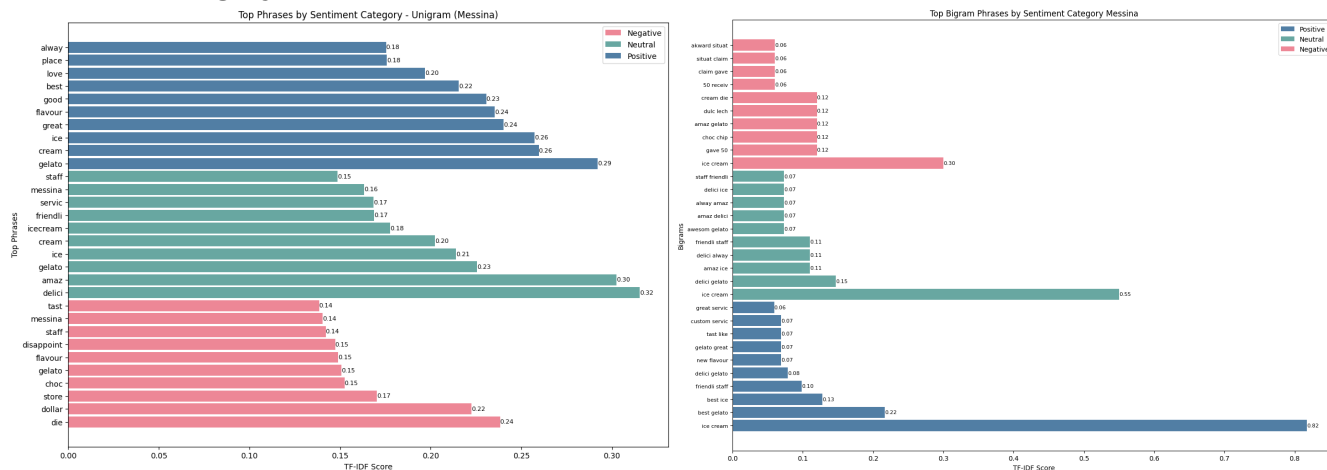
Topic Analysis for Messina

Unigram and Bigram



When examining both the unigram and bigram of messina the results seem to be quite similar as to that of Freshio's. Positive affirmations such as friendly staff and good ice cream are common in both these grams. We can conclude that the service and overall quality of the ice cream are high, resulting in a higher customer satisfaction, but the sentiment breakdown suggests otherwise.

By Sentiment Category



When looking at unigram, Messina is known for great ice cream and service. On the other hand, in Bigram, Messina is known for their best and delicious ice cream and friendly staff. This is similar to the sentiment category. One noteworthy thing is that the 'Chocolate Chips' and 'Dulce de Leche' ice cream seem to appear in a few negative reviews.

Competitor Analysis

Crown				
Category	Freshio	Creamier	Goodlato	Messina
Positive	Dark Chocolate	Earl Grey Grey Lavender Lavender (Roasted) Pistachio	Earl Grey Lychee Rose Black Sesame	NA
Neutral	NA	Gula Melaka Sea Salt	NA	NA
Negative	NA	Sesame	Dark Chocolate	Dulce Leche Chocolate Chips
Uncategorised	Rum Raisin	NA	Ube (Taro)	NA

General Competitors Comparison of Sentiment Analysis : In analysing Google review customer feedback for Freshio and Creamier, the sentiment analysis indicates that both establishments enjoy a generally positive reception when considering the volume of reviews, with Creamier having slightly more. The majority of feedback highlights satisfaction, with a favourable balance of positive comments. However, there is a noteworthy aspect within the service category; despite predominantly positive responses, a singular negative review stands out, attributed to an isolated service mistake. This suggests that while overall service satisfaction is high, there is room for improvement in handling exceptions and ensuring consistency in customer experience. When comparing with the survey results of service at Freshio, it is observed that the staff's friendliness, while largely appreciated, could be perceived differently by various patrons. The subjective nature of social interactions means that what is considered friendly and inviting by some may be seen as overly forward or intimidating by others, particularly for those who are introverted or prefer less interaction. This however, is a small issue as it only affects a small proportion of patrons who talk about service, but can be useful for further improvements of their services

Freshio Flavour Standing against its Competitors: Regarding the flavour aspect, comparative analysis suggests that while Freshio has garnered some commendable remarks, it trails behind Creamier and GoodLato in this category. The latter establishments seem to have a competitive edge with a stronger emphasis on flavour, as indicated by the frequency and tone of the positive feedback. Freshio does receive acknowledgement for its flavours but they are somewhat modest in comparison. This points towards an opportunity for Freshio to enhance its flavour profiles or highlight unique aspects of its offerings to elevate customer perception in this area.

Sentiment Analysis on Flavour : Creamier has the most number of flavours mentioned, with GoodLato as a close runner-up. It is worth mentioning that most of the flavours that came up in our analysis are quite unique, and with Creamier having the most unique flavours available in store it is not surprising that we see them come up top with most flavours mentioned. As for Freshio and Messina, the lack of mentions of specific flavours should not overshadow the fact that both these stores' ice cream is generally well-received by customers. When looking to get a good dark chocolate gelato, Freshio will be the

best choice.

Network Analysis

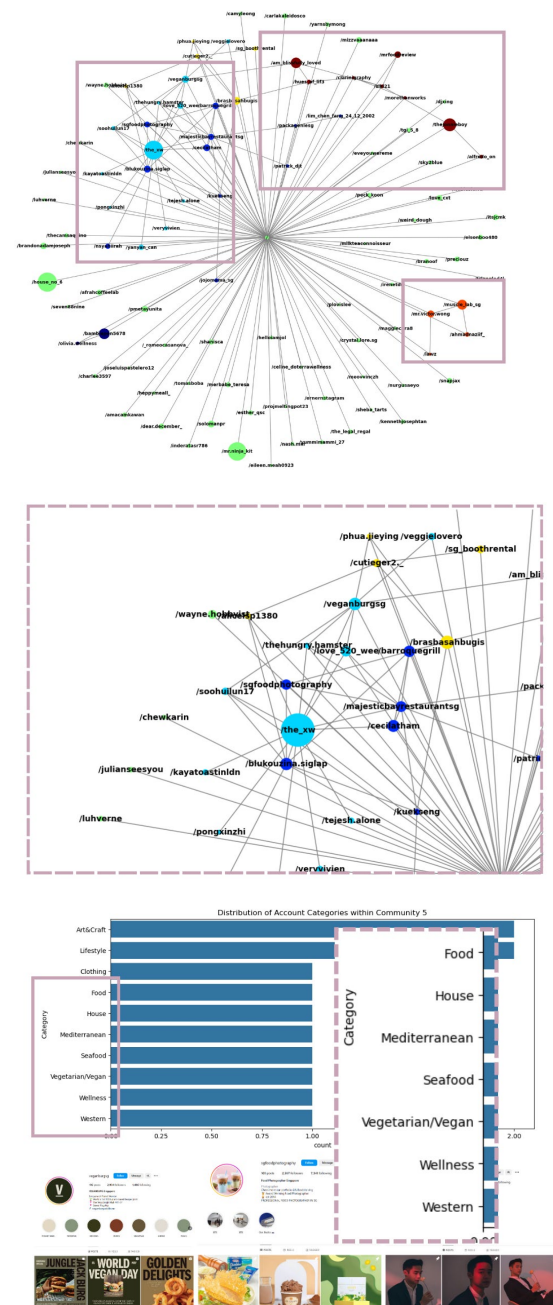
Note: The size of the nodes correlates directly with influence, indicating that larger nodes represent more influential nodes due to having higher followers.

Method: By retrieving the top 100 most influential nodes using PageRank Network Analysis we were able to detect a few communities that are clustered and overlapping. Notably, the account `"/the_xw"` stands out due to its vast number of connections, marking it as a significant food blogger within this network, evident in the tightly-coupled cluster of nodes. Other nodes like `"/mr.ninja_kit"` and `"house_no_6"` are also quite prominent in the network. However, the `"/mr.ninja_kit"` node lacks connections to other nodes, showing a low degree centrality. Conversely, `"/house_no_6"` exhibits zero betweenness centrality, indicating that no node pairs pass through it despite being an influential node. Despite this, there is an observable overlap of communities where food bloggers follow other food bloggers within the diagram.

Analysis:

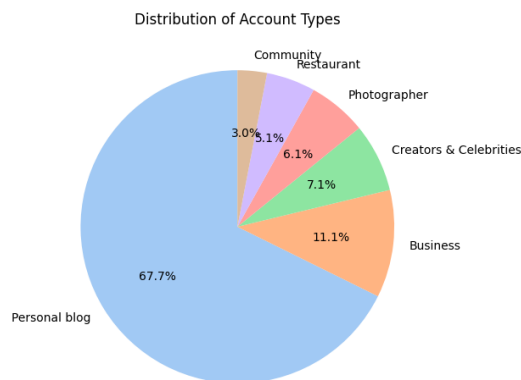
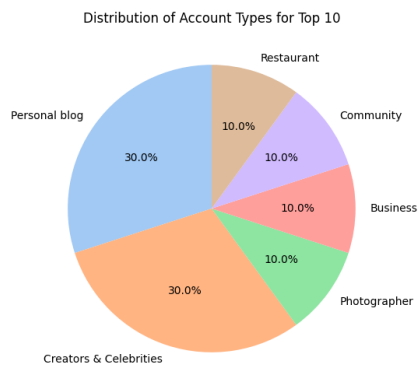
However, our PageRank results seem to show nodes with higher following as more important. Thus we have random high follower count accounts like “house_no_6” and “mr.ninja_kit”. Despite this, using the PageRank algorithm has assisted us in finding the influential nodes, thereby allowing us to detect communities. We can now identify the interconnectedness and overlapping communities beyond individual node popularity. These algorithms are fundamental in understanding the network's structure and pinpointing subgroups that are significant in their own right such as /veganburg which serves as a bridge to the other influential nodes.

After applying the community algorithm, we can see the highly interconnected community, centered by “/the_xw”. Some other accounts in the community are “/majesticbayrestaurantsg”, “/blukouzina.siglap”, “/veganburgsg”, “barroquegrill”, “sgfoodphotography”, and “thehungry.hamster”. These accounts, encompassing both food blogs and restaurant profiles, exhibit a high degree of centrality. From the community analysis, we can see that they are of different cuisines, like Seafood, Vegan, Western and Mediterranean. This suggests a robust community of food-related content creators and establishments, which could be indicative of collaborative or mutually supportive relationships. This makes sense as similar accounts tend to congregate. Most of the restaurants do not follow each other, but they would



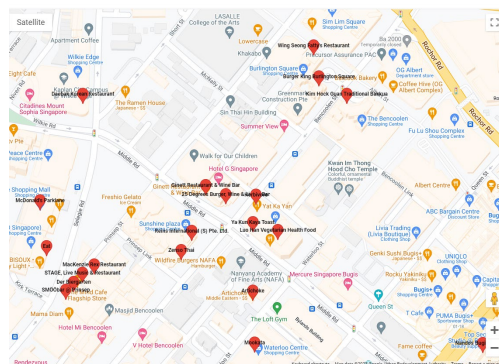
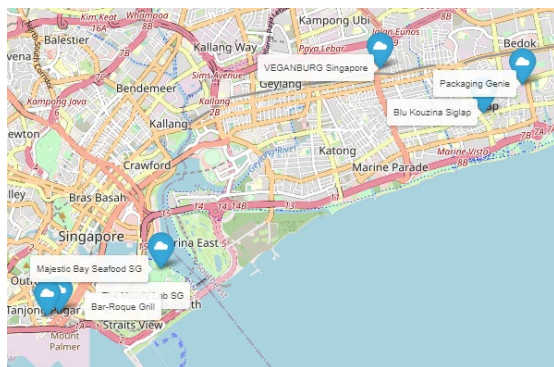
be connected by the food bloggers/writers.

Community in Freshio Pagerank



In our categorization process, we use the 'personal blog and lifestyle' label to denote accounts without a distinct theme. This classification often corresponds to personal user accounts. Unsurprisingly, the top 10 includes quite a number of content creators/celebrities. Content creators are labelled with 2 conditions if their account is set as the creator or they have sponsored content. These individuals are influential within their networks, however, they might not be the ones we should be targeting. Regarding our primary focus on food-related content, our analysis has highlighted an account known as the_xw, which commands a substantial following in this niche.

The account's significant influence within the food community suggests it is an ideal target for outreach efforts. Moreover, the extensive network of 'the_xw', including their followers and extended connections, represents a valuable opportunity. By engaging with this food community, there is a strong likelihood of reaching a wider audience that could resonate with Freshio's offerings. The ripple effect of targeting such influential nodes within the network could extend to the third, fourth, and subsequent layers of followers, potentially amplifying our visibility and impact among audiences relevant to Freshio.



When looking at the PageRank top 100 carefully, we saw that there were Instagram business accounts available for us with postal codes and upon inspection, those are the restaurants that are in the fifth community where 'the_xw' is the most influential node. When we plot them, we notice that they congregate in 2 major areas: in town and along Geylang/East Coast. This could be an opportunity to collaborate with the right restaurants who are near the area which can drive customers to Freshio. This led to us plotting the nearby restaurants within a 500m radius using Google Maps API for Freshio to consider for collaboration. If we were to recommend, we would say that food bloggers would be the top choice as they have a high degree centrality in the community. Collaboration with restaurants near the area would be good as they can funnel customers who had a meal to come to Freshio for dessert.

5: Discussion of findings

Recommendations

Based on the insights we have gotten from our social analytics and survey feedback, we have come up with a few recommendations for Freshio based on their ease of implementation and feasibility.

Long Term / Future Branches:

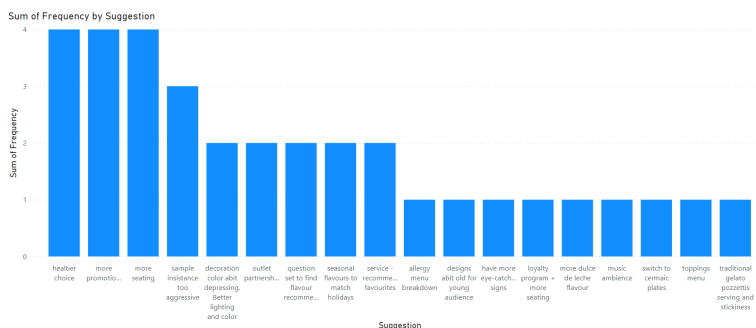
- Healthier Choice options (less sugar, gluten free) to appeal to a larger female majority.
- Flavours that match holiday / seasons for additional marketing and appeal.
- More seating to accommodate business growth.
- Modern and brighter colours / lighting to appeal to younger demographic.

Medium Term:

- Collaboration with Restaurants to tap into the restaurant/cafe crowd for bundling deals and upsell. By engaging with these businesses, patrons could finish a meal and come to Freshio for dessert.

Short Term:

- Promotions and Loyalty Programs to entice both new and regular customers to frequent Freshio.
- Ceramic Plates to complement the existing metal utensils for greater perceived quality.
- Utilise flavour changes for social media marketing (similar to how Messina promotes its flavours frequently).
- Increase accessibility of Freshio's offerings (toppings, flavours, etc) physically with in store menus and QR codes to e-menu to reduce customer education times (e-menus can be placed on the glass door entrance and tables).



6: Summary of the study

This social analytics project has found evidence to support all three hypotheses, as well as prompt future considerations to improve upon Freshio's success; however, the limited data prompts questions about data accuracy.

Limitations

The demographic data provided by Meta is comprised of only Facebook users, and given how Instagram is the more popular and prominent social media platform for Freshio's customers, its actual customer demographic may be furthered skewed towards the youth demographic.

It's worth noting that sentiment classification may exhibit skewness due to the rule-based nature of the NLTK Vader sentiment analysis tool. This tool does not consider the semantics of the text, which means it might misclassify sentences like "I am shocked at how nice it was," interpreting them as negative sentiments. Consequently, the analysis may tend to lean towards negative classifications.

The initial classification threshold for Freshio's negative sentiment was set at below -0.05. However, this threshold was adjusted to -0.4 after conducting a review of the individual "negative" reviews and their respective scores.

For Creamier, there is also a skew in sentiment distribution, similar to what was observed in the previous analysis. To address this skewness, we checked the negative reviews and adjusted the classification. The threshold for categorising sentiments as negative was revised to -0.15.

Scope for future work

Freshio's negative Review can be seen below. The second one is not a negative review per se and is probably incorrectly calculated by the library. The first one suggests that Freshio made a mistake with this customer by getting the order wrong and also portraying less than adequate service level and politeness. This is not a common occurrence but in the spirit of improvement, we would advise the owners to be mindful of their tone even when dealing with customers.

1. *This is a -5 establishment. Worst service ever. Cheat my money. Ordered for a cappuccino, I don't know they took my order wrongly and charged me wrongly, or what happened. Anyway I did pay lesser, but their attitude, tone and choice of ...*
2. *Wonderfully crafted premium gelato. Had rum and raisin which was generous in alcohol, and pistachio which was*

so smooth and had depth of flavor. Truly a master of the art of making gelato. I can't help but beam with pride knowing that we now have a local gelato master!

	Freshio Gelato	Goodlato	Creamier	Messina
Link in bio	www.freshiogelato.com	linktr.ee/goodlato	linktr.ee/CreamierHandcrafted	https://nomnie.com/messina
Type of URL	Website URL	Linktree	Linktree	Nomnie

Note: It is worth noting that for a brief period, Messina experimented with Meta's Threads². The usage of its main page reposts funnels users into its main FB page to enhance customer engagement. Considering the compounded exposure effect of both Creamier and Messina's pages. It would be difficult for Freshio to generate this amount of content on top of day-to-day operations at this point in time and has 1 branch outlet.

7: Testimonial

Link: https://drive.google.com/file/d/12qyTAi18_sGrJeVcV9uJVf24nXFdvAT5/view?usp=drive_link

² Threads.net is an online social media and social networking service operated by Meta Platforms. The app offers users the ability to post and share text, images, and videos, as well as interact with other users' posts through replies, reposts, and likes.

8: References

<https://sethlui.com/freshio-gelato-singapore/>

<https://eatbook.sg/freshio-gelato/>

Why Creamier TB was chosen due to Tiong Bahru outlet is closer to Freshio Gelato

[Distance from Freshio Gelato to Creamier\(Tiong Bahru\)](#)

[Distance from Freshio Gelato to Creamier\(Toa Poyah\)](#)

[Schools around Creamier\(Tiong Bahru\)](#)

[Schools around Messina Parramatta](#)

Why Messina Newtown was chosen due to similar in number of reviews

[Schools around Gelato Messina Parramatta](#)

[Schools around Gelato Messina Newtown](#)

Facebook pages of 3 Gelato Messina outlets

[Gelato Messina Parramatta](#)

[Gelato Messina Darling Square](#)

[Gelato Messina New Town](#)

Creamier Opening dates

<https://creamier.com.sg/2017/09/27/open-78-yong-siak-street/>

Threads in Instagram

<https://help.instagram.com/788669719351544>

Facebook profiles

<https://business.facebook.com/freshiogelato>

<https://business.facebook.com/creamier.singapore>

<https://business.facebook.com/100085170145656>

<https://business.facebook.com/gelatomessina>

Instagram profiles

<https://www.instagram.com/freshiogelato>

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<https://www.instagram.com/goodlato/>

<https://www.instagram.com/gelatomessina/>

Power BI Instagram EDA

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