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Explore Music Data to Enhance Customer Satisfaction

Restaurant-like service areas have been adapting different technologies to enhance customer satisfaction for many years. In this LBR, we share our research idea about how to integrate music data and its analysis for this purpose. In the first part, we propose a voting system to carry your favorite song to the top of the list to be played next in your place. In the second part, we propose a recommendation system to find a place that suits your music requirements in your close proximity. Our preliminary survey results for the first part and the data analysis results for the second part shows that our approach has a promising potential for customer satisfaction.

Key words: Data Analysis, Spotify API, Customer Satisfaction

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Introduction

Technology spread rate increases every single day and we are now very familiar with its usage in cafes, restaurants, etc.. We get used to see digitized menus, tabletop e-waiter and checkout screens or tabletop gamepads. The way we play music has also changed in a similar way. Old cassettes have been replaced by CDs, which is later substituted by MP3s, then Youtube playlists and finally by Spotify.

Good music relieves stress, connects people and therefore, we believe that, has a great potential to enhance customer satisfaction and continuity. Being aware of the usage of Spotify technology, we propose an application using which people can find a place that matches their music needs in their close proximity, and vote for their favourite song to move it on top to be played next.

Literature Review

Improving customer satisfaction in service areas is one of the most popular research fields in tourism and hospitality. There are many researchers who focus on more traditional points, such as price, food quality, operational efficiency and physical conditions. On the other hand, some researchers investigate how to integrate emerging technologies. Although there are hundreds of valuable publications for both cases, we can mention only some of them here (e.g. Andaleeb and Conway, 2006, Ryu and Lee, 2017 or Barlan-Espino, 2017 for the traditional applications and Pantelidis, 2009, Koutroumanis, 2011 or Cavusoglu, 2019 for the latter), since they are beyond the scope of this LBR. For those who are interested in more comprehensive study, we can refer to Demicco et.al, 2015.

Methodology

Voting System

As mentioned before, our application has two parts. In the first part, we propose a voting system. Our application works as follows:

- Enter a restaurant, register by tracking its QR-code
- Open your application and see the currently active playlist of the restaurant
- Vote for the song you want to listen next

Meanwhile, we count for the votes and top-rated song is carried to the top of the list to be played next. For such an application, we need to handle both the front-end and back-end sides.

At the server side, we store the information about the votes (Song ID, Voter ID, Playlist ID etc.), count the votes while the client-side sends the votes to the server, send the clients new nominations when each voting session ends and also handle security issues like ignoring votes from already-voted clients (done via checking the voter ID).

At the client side, we view the votable songs and number of votes those songs get, view the full playlist, view currently playing song and the last voting's winner, and send vote packets to the server (those packets will carry information like song ID, voter ID, playlist ID).

Regarding technical details, we handle the login system credentials using Google Firebase and all the credentials are stored at their servers. The user interface is developed using cross-platform React-Native framework. The reason we prefer React-Native is its support in all platforms.

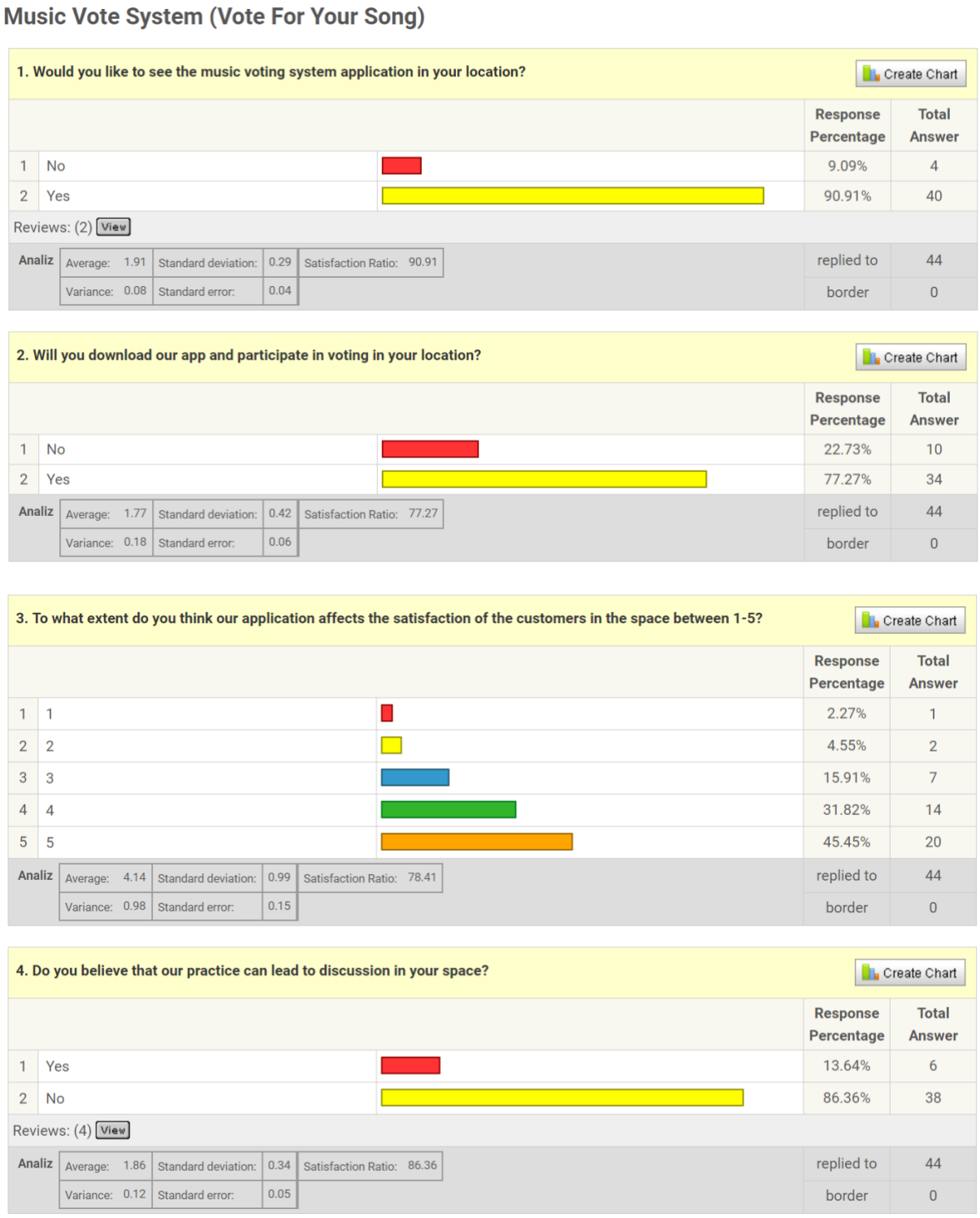
Recommendation System

In the second part, we propose a recommendation system. This time, the user selects one of her/his own Spotify playlists and our algorithm tries to find the best matching restaurant among all the registered places in our system in her/his close proximity (e.g. 5 km2). Our algorithm checks the affinity of the songs in our playlist with the songs in the active playlist of all registered restaurants. For this purpose, we use EchoNest's audio analysis data. This data includes acousticness, danceability, energy and similar features of each song. Our algorithm uses these features and find a mean average for each song for comparison purposes.

Findings

Voting System

In order to support our claim, we have started our work with an experimental study on a group of 44 people (to see our anonymous survey, please visit: https://www.smartsurvey.co.uk/s/KDR5C/). Our study group consists of frequent restaurant/café visitors. We have informed all respondents about our Spotify-based voting system and asked them four questions. The results of our survey can be found in Fig. 1. Our initial findings show that more than 90% of the respondents want to see our application in their location and 77% of them are interested in voting. On the other hand, satisfaction ratio of question 3 is more than 78% which shows that this app can enhance customer satisfaction. Finally, we wanted to ask the respondents whether our app can cause any unwanted behaviour in between customers. 86% of the attendees answered it "No". According to survey results, we believe that our application has a potential to be used in service areas.



Music Vote System (Vote For Your Song)

1. Would you like to see the music voting system application in your location? — Create Chart

		Response Percentage	Total Answer
1	No	9.09%	4
2	Yes	90.91%	40

Reviews: (2) View

Analiz						
Average: 1.91	Standard deviation: 0.29	Satisfaction Ratio: 90.91		replied to	44
Variance: 0.08	Standard error: 0.04			border	0

2. Will you download our app and participate in voting in your location? — Create Chart

		Response Percentage	Total Answer
1	No	22.73%	10
2	Yes	77.27%	34

Analiz						
Average: 1.77	Standard deviation: 0.42	Satisfaction Ratio: 77.27		replied to	44
Variance: 0.18	Standard error: 0.06			border	0

3. To what extent do you think our application affects the satisfaction of the customers in the space between 1-5? — Create Chart

		Response Percentage	Total Answer
1	1	2.27%	1
2	2	4.55%	2
3	3	15.91%	7
4	4	31.82%	14
5	5	45.45%	20

Analiz						
Average: 4.14	Standard deviation: 0.99	Satisfaction Ratio: 78.41		replied to	44
Variance: 0.98	Standard error: 0.15			border	0

4. Do you believe that our practice can lead to discussion in your space? — Create Chart

		Response Percentage	Total Answer
1	Yes	13.64%	6
2	No	86.36%	38

Reviews: (4) View

Analiz						
Average: 1.86	Standard deviation: 0.34	Satisfaction Ratio: 86.36		replied to	44
Variance: 0.12	Standard error: 0.05			border	0

Figure 1. Our survey results.

Recommendation System

We compared our method with popular K-Nearest Neighbors (KNN) algorithm. The accuracy rate of KNN is not always reliable because it uses only two most different features for comparisons. Instead of using only two most distinct audio features of the playlists, we decided to use every audio feature of songs to get more accurate comparison results. In this way, we compared two playlists with respect to each other by the average values of each audio features (Eqn. 1 and 2), obtained better matches for playlist genres and obtained more reliable results.

$$x = |i\text{-}i_1|+|j\text{-}j_1|+|k\text{-}k_1|+|l\text{-}l_1|+|m\text{-}m_1|+|n\text{-}n_1|+|o\text{-}o_1| \quad \text{Eqn. 1}$$

$$y = (7\text{-}x) * 100 / 7 \quad \text{Eqn. 2}$$

Value of '*y*' is the similarity percentage of selected playlist with respect to compared playlist. *i,j,k,l,m,n,* and *o* stand for mean of danceability, energy, speechiness, acousticness, instrumentalness, liveness and valence values of selected playlist, and their subscripted versions stand for the same values of compared playlist in order.

Conclusion

In this LBR, we have presented a mobile application with two parts. In the first part, we have shown the potential of using music voting system in restaurants/cafes to increase the customer satisfaction. In the second part, we have proposed a way to analyse Spotify music data to find the best matching place with your music interest. The results show that our application can be used by any restaurant easily and has a great potential to drive customer satisfaction positively. Although the development phase is almost finished and preliminary results show the customer potential, our project is still ongoing. The next phase is to register

many places in our system and to try our system with real customers to analyze its true potential.

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