

**Title:** *Examining Tourist Satisfaction in Juneau, Alaska using TripAdvisor: A Sentiment Analysis Approach*

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**Keywords:** natural language processing, content analysis, tourism data analytics, aspect based sentiment analysis, broad based sentiment analysis

## Abstract

As a result of travel activities, overtourism and overcrowding has become a major global issue. Juneau, Alaska stands out as one of the most overcrowded regions in the U.S. due to its cruise ship hub and vast trails. The number of tourists visiting Juneau annually has risen from 200,000 to greater than 1.3 million in the last 30 years. Since there is no specific measurement or standard to measure and evaluate tourist experiences in crowded regions, this study proposes a novel mixed method approach – drawing on components of broad-based sentiment analysis (which is algorithmic based analysis), and aspect-based sentiment analysis (which is manual thematic analysis). This methodology is used to evaluate the preferences and feelings of tourists in online reviews from TripAdvisor for the top 10 destinations from 2016-2019. By investigating the top 10 attractions in Juneau, the results present 3 major topics frequently discussed by tourists. Examples of some variables related to overtourism include crowding, global warming, long lines, and congested hiking trails. The results also show that while tourists have predominantly positive experiences in Juneau, they report a lot of negative commentary around the variables linked to overtourism. By bridging overtourism, sentiment analysis, and TripAdvisor reviews in Juneau, this study contributes to the field of tourist experiences and crowd management.

## Introduction

### *Research Questions*

This study aims to evaluate 2 major research questions: 1) How can broad-based and aspect-based sentiment analysis be used to investigate the attitudes and perceptions of tourists across the top 10 destinations in Juneau, Alaska? 2) To what extent are tourists' perceptions of Juneau linked to overtourism?

## Literature Review

### *User-Generated Content (UGC) in Tourism studies*

1. <https://www.sciencedirect.com/science/article/pii/S2666957925000096>

### *Overtourism*

Overtourism lacks a standardized definition, having first entered academic literature as a recognizable term in the mid-2010s after gaining media popularity (Capocchi, et al., 2019). Researchers have observed the consequences of excessive tourism or crowding for decades, but lacked a unifying framework through which to analyze the phenomenon until recently. In 2018, the World Tourism Organization (UNWTO) defined the term as the “impact of tourism on a destination” that “excessively influences perceived quality of life of citizens and/or quality of visitors' experiences in a negative way” (UNWTO, 2018). This definition has not been used consistently in the literature, and only a few recent studies have begun developing methods to specifically measure overtourism. Frameworks such as carrying capacity,

social exchange theory, or the limits of acceptable change have been borrowed from related disciplines (tourism and recreation studies, revenue management, etc) and applied to overtourism research.

There are many approaches to analyzing overtourism, situating the phenomenon in economic, political, sociocultural, ecological, or sustainability contexts.

- Sæþórsdóttir, et al (2020) characterize overtourism as a sustainability issue, in which natural and sociocultural resources are depleted faster than they are renewed. Milano, et al. (2019) similarly characterize overtourism not as just a volume issue, but also a resource exploitation issue characterized by rising discontent between tourists and host communities.
- Goodwin (2020) approaches overtourism as an issue of governance by describing it as a tragedy of the commons, in which publicly or commonly owned resources (such as parks, museums, and natural attractions) are not cared for by the individuals they benefit. Similarly, the UNWTO suggests that overtourism is primarily a function of ineffective management rather than unsustainable industry growth (UNWTO).
- Capocchi et al. (2019) consider overtourism to be characterized by a combination of three factors: (1) rapid growth of tourism, especially in emerging economies, (2) the concentration of tourists in specific destinations, which causes crowding, capacity, and environmental concerns, and (3) the governance of resources and the tourism industry.
- Others discuss the sociocultural context, in which excessive tourism changes the character of a destination, resulting in loss of authenticity (for tourists) and accompanying irritation or “overtourism dystopia” (for residents) (Goodwin, 2017; Panayiotopoulos & Pisano).
- Perkumiene and Pranskuniene (2019) frame overtourism as a tension between residents’ rights to their city and associated amenities and tourists’ freedom of movement and rights to mobility. Overtourism arises from a discrepancy between the weighting of these rights: that tourists moving for entertainment and consumption purposes have similar rights to a place as the local residents. They do not address what would be an acceptable level of crowding by a destination’s own residents. For example, a densely populated city might see its own residents engage with “tourist” activities; is this an example of crowding that does not impact the quality of an experience?
- Saarinen (2014, quoted in James, et al., 2020) describes three traditions in approaching the sustainability of tourism: resource-based (e.g. carrying capacity), activity-based (limits of growth, capacity to adapt), and community-based (stakeholder perceptions and priorities). Contemporary overcrowding literature largely assumes an impact-based approach, measuring social, economic, ecological, or other impacts.

#### *What causes overtourism?*

- Aall & Koens (2019) argue that the poor regulation and management have created a fragmented tourism industry of diverse actors without common frameworks and standards.
- Aall and Koens (2019) frame overtourism as the consequence of an increase in mobility demand (more families/individuals with disposable income) and an increase in mobility supply (low-cost airlines, pre-packaged travel experiences).
- Seraphin & Ivanov (2020) concur that overtourism is caused by a combination of low prices at multiple stages of tourism and a failure of a destinations’ revenue management strategy.
- Marketing and the unpredictable virality of destinations on social media also contribute to overtourism (Min Lee, et al. 2020; Aldao & Mihalic, 2020).
- Seraphin et al. (2019) suggest that tourism is rooted in a tourist’s dissatisfaction with life and a subsequent urge to improve one’s happiness through new experiences.

- Aldao and Mihalic (2020) identify tourism as driven by a combination of push (escaping the mundane, discovering the self, relaxation, prestige, challenge, bond-building, and meeting new people) and pull (novelty, education) factors. In Arctic destinations, weather and adventure play a large role in attracting tourists, and less so the prospect of meeting new people.

*What are the consequences of overtourism? What are resident and tourist perceptions of these consequences?*

- Martín Martín, et al. (2018) identify three categories of negative impacts of tourism (ecological, sociocultural, economic) and two types of positive impacts (socioeconomic and sociocultural), seeming not to make a distinction between impacts for tourists versus for residents.
- In Barcelona, Martín Martín, et al. (2018) found that residents held little negative sentiment towards tourists themselves, but had significant issues with the regulation of the industry and capacity of infrastructure. Accordingly, residents were more concerned with negative economic impacts, such as cost of living, than negative social impacts. The authors conclude that clear and strong public policies to limit socioeconomic consequences of rapid tourism growth are necessary. They also found that youth and low-income residents are the most susceptible to the negative socioeconomic impacts of overtourism, particularly displacement due to a lack of affordable housing. Residents belonging to these demographic categories were more likely to have negative attitudes towards tourism. The authors also raise a question about whether residents overestimate the negative impacts of tourism. In many European destinations, organized opposition movements have arisen in response to the perceived negative impact of tourism.
- Szromek, et al. (2020) found that entrepreneurs and businesspeople in Krakow were consistently more positive towards tourism than non-entrepreneurial residents across factors (culture, economy, urban services, etc). They found that high levels of tourism had slight negative impacts on perceptions of transport, parking, and noise, but no distinct impact on perceptions of quality of life, culture, or local pride.
- Sæþórsdóttir et al. (2020, "From") found that Icelandic residents who experience negatives impacts of tourism, such as inflation, limited career options, increased traffic, and marginalization, do not blame tourists, but rather policymakers, the tourism industry, and local government for the lack of infrastructure development to meet needs.
- Zemła and Szromek (2021) observe that residents are heterogeneous in their experience of both positive and negative effects of overtourism. It is clear that negative consequences are concentrated in the destination centers and impact residents living in the outskirts of cities significantly less. Negative impacts of tourism are generally limited to the walkable area around the center. They also found that long-term residents of a destination are more likely to have negative opinions of tourists and tourism.
- Min Lee et al. (2020) find that visitors who feel a sense of relational attachment or emotional bonding to the place they are visiting are unlikely to cause damage to a local community. In these cases, locals are more welcoming of tourists.
- Deery et al (2012) explore the complexity of measuring social consequences of tourism. Few studies that measure social impacts consider how perceptions, attitudes, reactions, or opinions translate into behaviors or real-world impacts. If we do not measure these factors, how can we make conclusions about impacts on quality of life, the dependent variable? Their review of existing research identifies mixed results in analysis of different variables influencing host perceptions of the impacts of tourism (incl. economic dependence on tourism, level of contact with tourists, use of facilities by tourists, and more). They also highlight that there is insufficient

research on why certain impacts are rated positively or negatively by residents, and call for further studies to understand the roots of concerns about tourism by examining the values and intrinsic characteristics among residents.

- Andereck et al (2005) found that residents with a personal stake in the tourism industry perceive more positive impacts than those who don't, but residents with or without a personal stake perceive negative impacts at similar rates.

*What strategies have been employed to address overtourism?*

- Regulation for degrowth
  - Sæþórsdóttir et al. (2020, "From") note that solutions to overtourism largely focus on market-based solutions and reject deliberate degrowth as a solution.
  - Avond et al. (2019) similarly observe that in pursuing its own growth, the tourism industry plants the seed of its own destruction. It is impossible for the industry to continually grow in a destination because additional growth bears such significant costs to its own functioning, regardless of the revenue it generates.
  - Aall and Koens (2019) suggest that the UNWTO-proposed three pillars of sustainable tourism: economic, social, and environmental are at odds with calls for industry degrowth. They also criticize the lack of internalized costs of transport to and from a destination, with most research focusing on the consequences of tourism once visitors have already arrived.
- Seraphin, et al., (2019) suggest that "trexity," the strategy aimed at deterring tourists or denying access, is not a sustainable solution because it does not consider the root cause of overtourism, which is the same as the root cause of tourism in general: people's dissatisfaction with life and urge to have new experiences. Seraphin, et al., see the DMO's role as a gatekeeper between internal and external stakeholders.
- Seraphin & Ivanov (2020) suggest that revenue management tools can be used to better regulate tourism. They argue that tourism corporations are relying predominantly on price-competitiveness to attract tourists, rather than quality of experience. But because tourism demand vastly surpasses supply, corporations can raise prices and the quality of their offered experiences in order to curb the number of tourists visiting a destination.
- Seraphin & Ivanov (2020) offer a few strategies to curb overtourism: destinations can issue fewer visas, limit numbers of flights, limit numbers and sizes of cruise ships, limit parking places, freeze issue of new construction permits for accommodation, and set minimal rental periods on vacation homes. Local governments can use revenue management tools to regulate overtourism by imposing airport and seaport taxes, toll fees on roads and highways, parking fees, and ticket fees to publicly owned destinations.

*Who are key stakeholders?*

- Industry: cruise ship operators, local tourism operators, local businesses
- Residents: directly involved in tourism business, indirectly involved, uninvolved
- Tourists: cruise-ship, other overnight tourists
- James, et al (2020) argue that the power imbalance between local residents and global cruise operators impede the ability of local stakeholders to develop sustainable tourism plans in Arctic destinations.

### *The connection between overtourism and overcrowding*

- Research on crowding (which is not always directly linked to tourism), generally considers the carrying capacity of a destination by comparing perception or sentiment to the numbers of visitors. The number of articles published on overcrowding in tourism has increased significantly since 2000 (Dogru-Dastan, 2020).
- Cruise tourism is a space in which crowding may become a pronounced issue.
  - Few studies link overtourism with cruise tourism, though this can present a significant problem for destinations who experience moments of mass tourism that can overwhelm social, economic, urban, and ecological systems (Capocchi, et al., 2019).
  - Kizielewicz (2020) identifies that cruise tourism does not always bring significant revenue to port cities despite the mass number of tourists because experiences and services are often packaged and pre-sold to tourists via the cruise companies. James, et al (2020) arrive at the same conclusion: cruise tourists spend less than land-based or overnight tourists, and sometimes even disrupt the experience of land-based tourists.
  - Baumann (2021) identifies additional challenges: cruise ships often arrive and depart ports at similar times, causing congestion at seaports. Because visitors are limited in the amount of hours they can spend in a destination, they often do not travel outside of the immediate port area or the most popular attractions. Accessible local transport is therefore a key tool in enabling tourists to explore destinations and relieve congestion around seaports.
  - Arctic destinations, which are relatively small compared to other cruise destinations, are especially vulnerable to environmental impacts and can easily reach carrying capacity (in restaurants, tourist attractions, stores, etc.) (James, et al. 2020).
  - Local and industry perceptions of the sustainability of cruise tourism largely depend on the stage of tourism development (when destinations have not yet reached capacity, sustainability is less of a priority than industry growth) (James, et al, 2020).

### *Evaluating the impact of overcrowding from past studies*

- Sæþórsdóttir et al. (2019) position crowding as both a negative experience for tourists (on satisfaction and quality of experience) and residents (increased congestion, traffic, limited urban services, long waits, and increased prices).
- Local consequences can also be understood in the frame of ecological (damage to vegetation, disturbance of ecosystems, pollution) and urban (noise, inflation, decline in availability of residential housing) impacts (Sæþórsdóttir et al., 2020). Overcrowding is framed as a sociocultural and normative issue, characterized by community perceptions or expectations (Sæþórsdóttir et al., 2020).
  - Sæþórsdóttir et al.s' (2019) research on seasonality in Iceland demonstrates that tourists' negative perceptions of crowding may be a function of their expectations. For example, crowding was experienced by visitors in both summer and winter at the same destinations, but identified negatively more often in the winter. The authors posit that the types of experiences sought in different seasons may vary, and expectations of crowding therefore do as well.
- Despite reports of overtourism, Sæþórsdóttir et al. (2020, "From") found that most tourists were happy with their experiences and did not notice crowding.
- Sanz-Blas & Schlesinger (2019) define crowding as "a situation in which the presence of other people restricts individuals' range of choices or hinders one's ability to pursue goals and perform

certain activities.” They reflect that existing research presents mixed results on the effect of crowding on behavior or perception. Many factors, including personal characteristics, economic factors, and situational variables influence perception of crowding. There are also inconclusive findings in literature on how the perception of crowding influences a tourist’s satisfaction with their experience. There are studies that have suggested there is a significant negative effect, a weak or non-existent correlation, or a correlation in certain circumstances and in the presence of particular variables. Generally, if the level of crowding does not exceed expectations, there are no negative perceptions (in agreement with Saebersdottir). Additionally, they find that in certain circumstances, crowding can contribute positively to a tourist’s experience. They distinguish between human (congestion of people) and spatial (level of ease in moving freely) crowding.

- Research on crowding in nature-based destinations has produced mixed results about the impact of crowding on visitor experiences. Steward and Cole (2001) found that although many visitors may express negative attitudes about encountering others, the effect on the quality of their experience is negligible. Additionally, many factors influence perception of crowding, including personal preference, motivations for tourism, and expectations.
- Ryan and Cessford (2003) found that the impact of factors such as crowding may be secondary to tourist choices and preferences. For example, tourists may choose to engage in certain activities, thereby accepting the level of crowding associated with it. In these cases, crowding may not have a significant negative impact on tourist experiences.
- Tourism mobility contributes to overcrowding and concentration of visitors in particular areas (Milano et al 2019).
- A study in Munich found that residents generally did not take issue with the spatial or temporal distribution of tourists, nor with tourist behavior, but rather with the perception of there being too many tourists in number (Jakisch, et al, 2019).

*What past work has been done to analyze tourist experiences using Text Classification?*

1. <https://www.mdpi.com/2571-905X/7/4/90#>

*Why focus on Juneau specifically?*

## **2. Methodology**

### *Study Context*

According to several studies, Juneau, Alaska is an important destination for overcrowding because its popularity as a cruise ship stop, combined with its remote location and limited infrastructure, means that a large number of visitors can overwhelm its 32,000-person population on peak days. Overtourism in Juneau leads to challenges with public space crowding, transportation, and environmental strain (<https://dl.acm.org/doi/full/10.1145/3745238.3745403>). To evaluate the relationship between crowding and tourism this study thus picked out the top 10 destinations (based on TripAdvisor rankings) in Juneau. While simplistic in nature, Table 1 displays all 10 destinations ranked from the highest number of reviews to the lowest number of reviews.

Rank	Destination
1	Mendenhall Visitor Center
2	Mendenhall Glacier
3	Mount Roberts Tramway
4	Nuggets Falls
5	Tracy Arm Fjord
6	Goldbelt Tram
7	Alaska State Museum
8	Sawyer Glacier
9	National Shrine of St. Therese
10	Juneau Lighthouse Tours

**Table 1. Top 10 Destinations in Juneau (from TripAdvisor)**

#### *Data Collection and Data Treatment*

Nearly 3000 reviews were manually and systematically scraped from 2016-2019, including the rating, text review, date of entry, and tourist location. The scraping of these reviews were ethical and did not violate any data ethics constraints.

Prior to the implementation of Sentiment Analysis, the online reviews were pre-processed. A list of stopwords were prepared to eliminate non-informative text (emojis, irrelevant punctuation). The remaining corpus was transferred to lowercase using NLTK, a popular library for preprocessing text in Python.

#### *Two Sentiment Analysis Methods*

This study adopts a mixed-method approach, involving a broad-based sentiment analysis and a qualitative content analysis (which is essentially a manual aspect-based sentiment analysis). The choice of mixed methods was designed to leverage the strengths of both broad-based and aspect-based approaches, ensuring a comprehensive analysis of the data. The broad-based component uses TextBlob (a lexicon-based Python library for conducting sentiment analysis tasks) to provide general patterns in tourist sentiment and highlight areas needing further study. The aspect-based component enriches the broad-based data, highlighting the major themes necessary to contextualize the broad-based outcomes.

### *Broad-Based Sentiment Analysis - Method 1*

The first sentiment analysis served to determine the relationship between crowding and tourist preferences. The reviews within the dataset were evaluated using TextBlob's sentiment analysis algorithm, and the reviews containing references to "crowds" were tagged as such. The assigned sentiment of each review was compared to the ratings left by the tourists to determine the accuracy of the algorithm. To measure accuracy, the ratings were treated as "ground-truth" labels: 5,4 stars = positive, 3 stars = neutral, and 2,1 stars = negative. We also checked the percentage of reviews that had a reference to "crowds" as well as positive sentiment. Using this data, it was evident that while tourists face a struggle dealing with the long lines, the trip to Juneau was still memorable and positive. This culminated in a distribution of reviews that had both high and low ratings with references to the crowding. The code for this Python program as well as the Excel file with the tagging completed is available in the supplementary material section.

### *Aspect-Based Sentiment Analysis - Method 2*

In the second analysis, the online reviews were analyzed using aspect-based sentiment analysis. Manual analysis was leveraged because the dataset is complex in structure, making human annotation superior to an algorithm. Multiple researchers manually read through all 3000+ online reviews. For each review, researchers coded the reviews with recurring themes (using abbreviations) as well as the perceived corresponding sentiment (positive, negative, neutral). For example, when the review talked about crowding causing long lines, the reviewer would chart crowds and long lines as 2 separate categories along with the *perceived* sentiment. Then, all the results were compiled and synthesized, yielding 3 categories of variables affecting the perceptions and attitudes of tourists in Juneau. To test for the reliability of the manual coding across all researchers, the Inter-coder Reliability statistic was implemented. This ensured that the labeling was not subjective and did not contain bias across each researcher. The results of the aspect-based analysis can be summarized in Table 1 below.

## **3. Results**

Table 1 provides detailed descriptions of the 5 identified topics generated from aspect-based sentiment analysis. The naming of the topic was based around the keywords manually highlighted by researchers. Additional topics/themes not concretely related to overtourism were added to the table in order to cultivate a comprehensive list of the drivers affecting tourist experiences.

Figures 1 - 5 provide the distribution of broad-based and aspect-based sentiment analysis from 2016-2019. After the manual and TextBlob analysis, the data was transformed into bar charts using Tableau software.

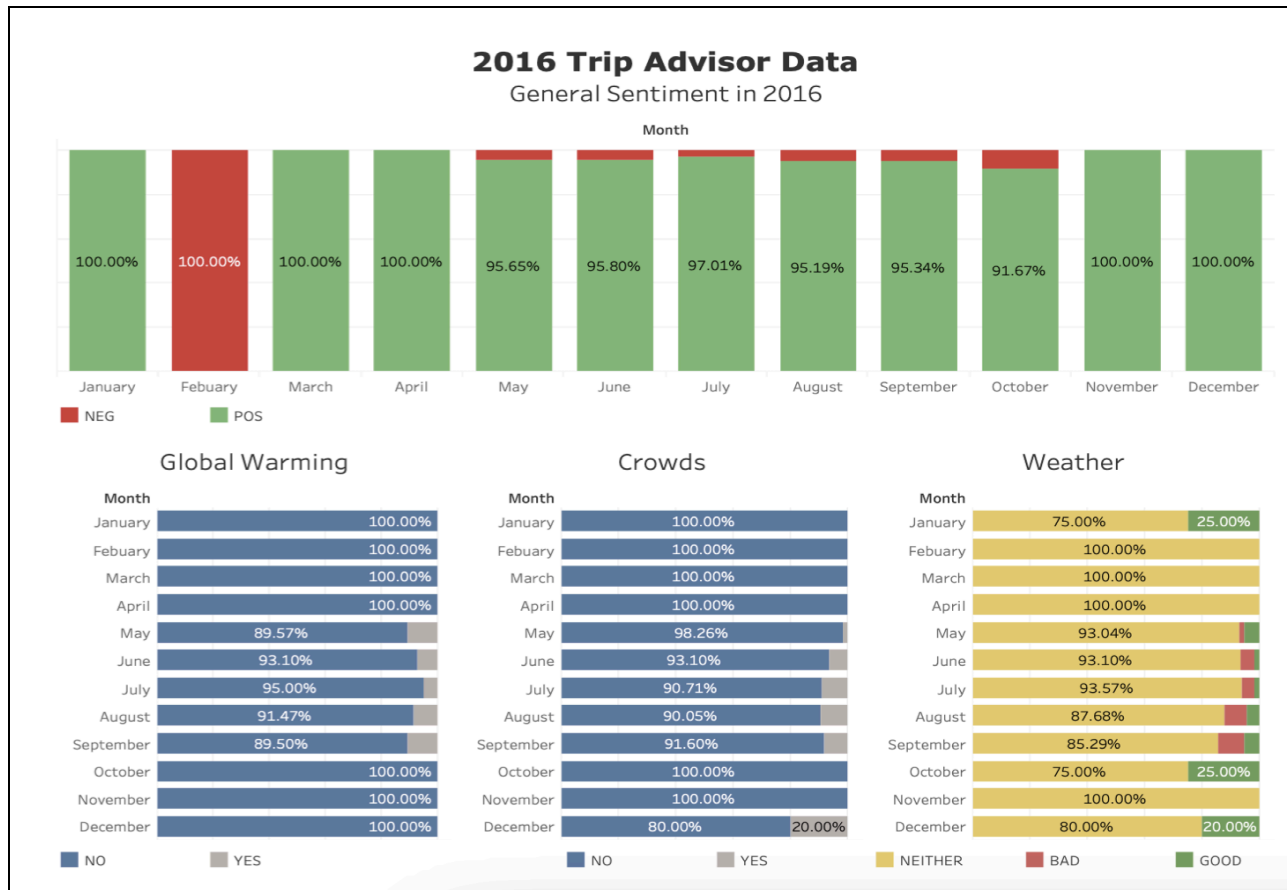
<b><i>Identified Topic</i></b>	<b><i>Definition</i></b>	<b><i>Keywords/Phrases</i></b>
Weather conditions	Tourists' reference of rain, overcast conditions, and general atmospheric state when exploring Juneau	<ul style="list-style-type: none"> <li>● Cold</li> <li>● Cloudy</li> <li>● Rainy</li> <li>● Hot</li> <li>● Windy</li> <li>● Muddy</li> </ul>



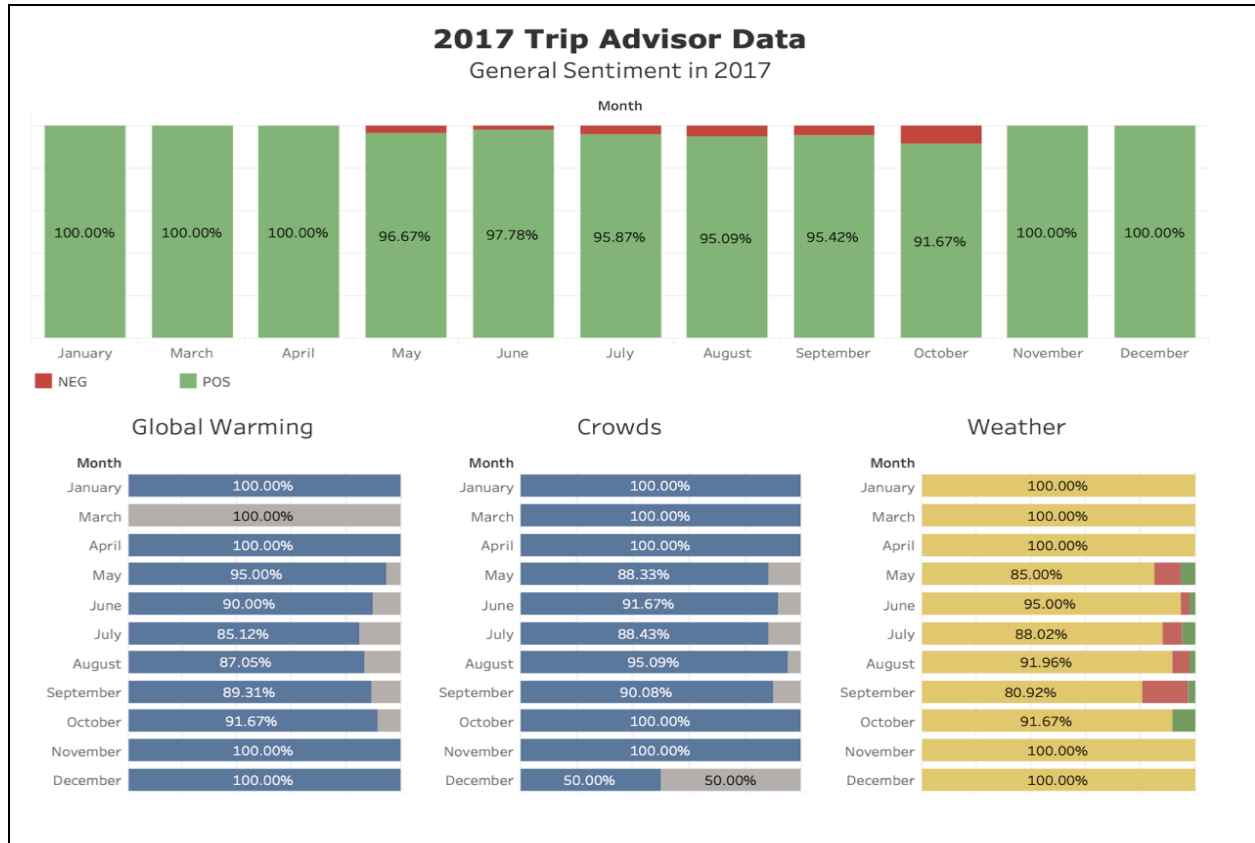
		<ul style="list-style-type: none"> <li>• Foggy</li> <li>• Stormy</li> <li>• Humid</li> </ul>
Global warming	Tourists' reference of how climate change is impacting the natural environment in Juneau	<ul style="list-style-type: none"> <li>• [Glacier] impressive even in receding</li> <li>• As [the] glaciers recede</li> <li>• Learn about glaciers and how our climate is changing</li> <li>• Showing how the glacier has changed over the years</li> <li>• The glacier is melting</li> <li>• Like most...glaciers it is retreating</li> <li>• Glacier</li> <li>• Glacier is getting so small</li> </ul>
Crowds	Tourists' reference of how the long lines (especially from cruises) is impacting their ability to explore different tourist sites	<ul style="list-style-type: none"> <li>• Crowded</li> <li>• Busy</li> <li>• Packed</li> <li>• Too many people</li> <li>• Mad rush</li> <li>• Bit full of tourists / full of tourists</li> <li>• Jammed with people</li> <li>• Lots of people</li> <li>• Don't come to avoid cruisers</li> <li>• Don't expect to be alone with your thoughts</li> <li>• Maximum number of cruise ships were in</li> <li>• Thousands of people</li> <li>• With the volume of people</li> <li>• Despite the number of people</li> <li>• Don't expect to be alone with your thoughts on this stretch of the trail</li> <li>• Having with people</li> <li>• Worth a wait in line</li> <li>• Ships overwhelm most Alaskan towns</li> <li>• Heaving with people</li> <li>• Hordes of folks</li> <li>• Hordes of people</li> <li>• Too many tourists</li> <li>• After fighting your way through numerous tourists</li> <li>• With the amount of other people</li> </ul>
Time to visit	Tourists' impression of when is the best time to	<ul style="list-style-type: none"> <li>• hours</li> <li>• Week</li> </ul>

	visit Juneau (specific months, specific times during the day)	<ul style="list-style-type: none"> <li>• Time</li> <li>• Queue,</li> <li>• Days,</li> <li>• night time,</li> <li>• schedule,</li> <li>• early,</li> <li>• summer,</li> <li>• weather</li> </ul>
Emotional experience	Tourists' reference to emotions experienced throughout their visit to Juneau	<ul style="list-style-type: none"> <li>• Disappointing,</li> <li>• amazing,</li> <li>• remarkable,</li> <li>• unique,</li> <li>• worth,</li> <li>• awesome,</li> <li>• breathtaking,</li> <li>• boring,</li> <li>• surprising,</li> <li>• fun</li> </ul>

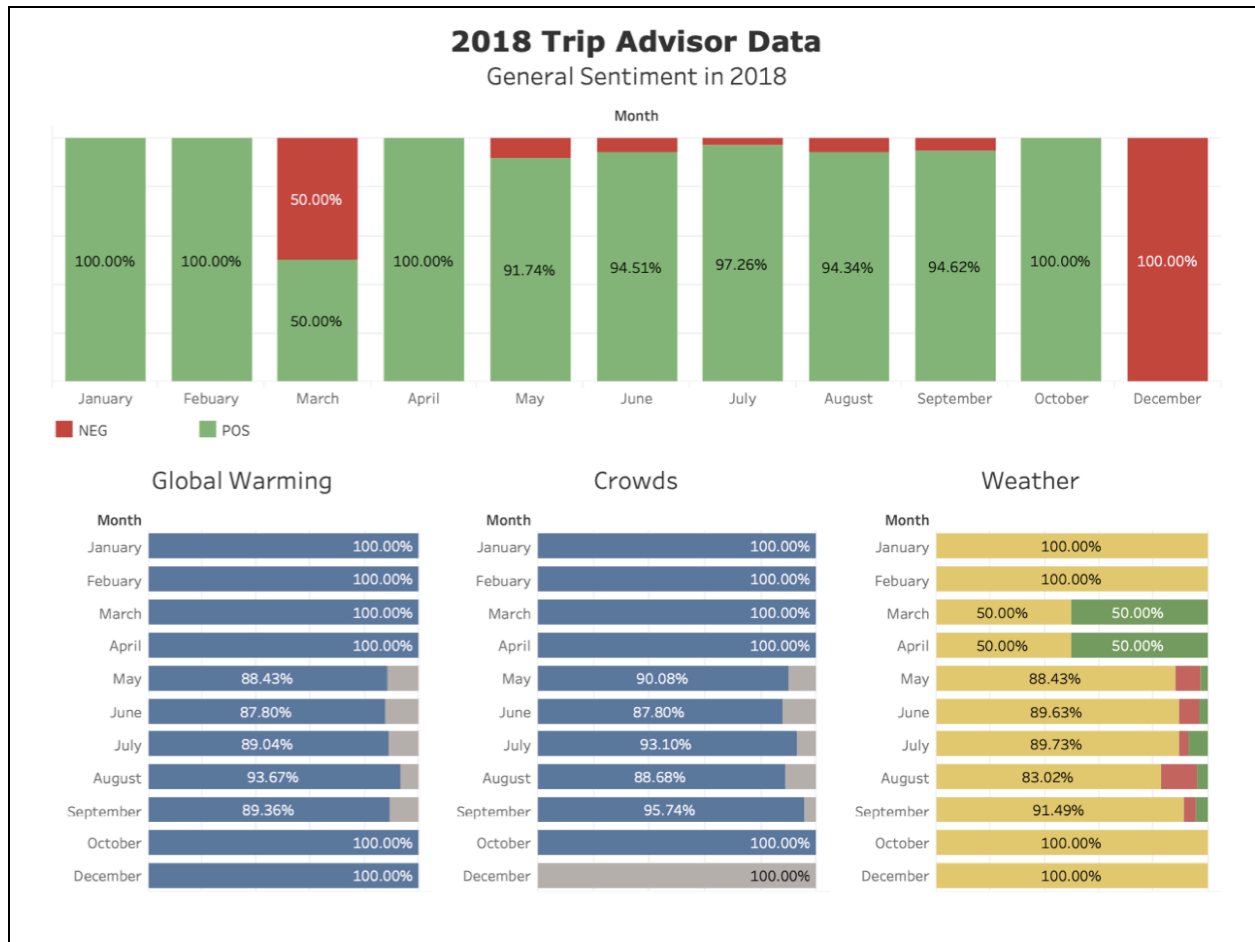
**Table 1. Summary of Identified Variables from Aspect Based Sentiment Analysis**



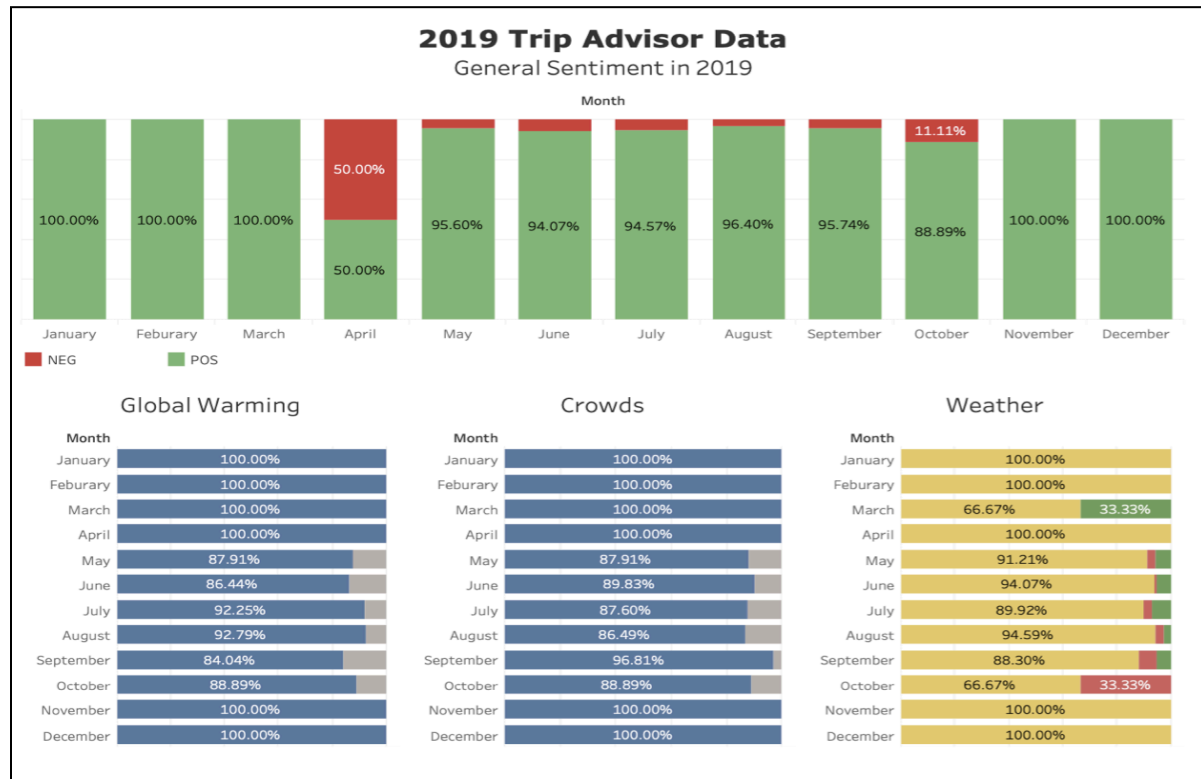
**Figure 1. Sentiment Distribution (Aspect & Broad) of 2016 Trip Advisor Data**



**Figure 2. Sentiment Distribution (Aspect & Broad) of 2017 Trip Advisor Data**



**Figure 3. Sentiment Distribution (Aspect & Broad) of 2018 Trip Advisor Data**



**Figure 4. Sentiment Distribution (Aspect & Broad) of 2019 TripAdvisor Data**

## 4. Conclusion

### *General Discussion*

### *Theoretical Contributions and Practical Implications*

### *Limitations and Recommendations for Future Research*

There are several limitations of this study which can be leveraged for future research. Firstly, this study is based on the online reviews from TripAdvisor. Future studies should consider other popular platforms such as Meta, Instagram, Twitter, Yelp, or Google. Additionally, this study considers text-based data in the form of reviews. Future studies should consider other types of data, such as images, audio, and video. Another limitation is that this research only investigates visitors' experiences in the top attractions in Juneau, leading to a high degree of uncertainty in the generalizability of results. Future studies should be done that examine other crowded attractions across the globe, such as Bergen. Lastly, this study did not use an algorithm to conduct aspect-based sentiment analysis. Future studies should leverage state-of-the-art language models (e.g., GPT-3, BERT, RoBERTa) to conduct aspect-based sentiment analysis for increased efficiency.

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