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Solo Consumption – A machine learning approach

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Abstract

This study aims at conceptualizing the solo tourism consumption journey. We use a semi-supervised machine learning approach and analyze more than 27,000 tweets. The seed sets extraction, seed and topic confidence and model fit evaluations will provide us with the dimension of solo tourism conceptualization.The results will reveal how consumers perceive solo tourism consumption. This study provides scholars and managers with an evidence-based solo consumption conceptualization, as well as with a marketing, psychological, and operation tool to manage the solo consumer segment.

Keywords: *Solo tourism; semi-supervised Latent Dirichlet Allocation (LDA); machine learning approach; tweets*

1. Introduction

Despite the emergence of solo consumption during the pandeminc, it is currently an under-researched area lacking a comprehensive and systematic examination (Leith, 2020; Otegui-Carles, Araújo-Vila, & Fraiz-Brea, 2022). Research has to date analyzed solo tourism in an inconsistent way, which is why it warrants an updated and thorough investigation (Yang, Nimri, & Lai 2022). This paper aims to provide a holistic and all-inclusive view of the solo tourism consumption byt using twitter data (Otegui-Carles, Araújo-Vila, & Fraiz-Brea, 2022).

Our study contributes in multiple ways to both consumer research and management. First, the study helps identify the key elements of a concise solo tourism construct. Second, this study allows us to assess the existing solo consumption research's disintegrated state and develop a more comprehensive illustration of it. Third, this research uses a semi-supervised machine learning approach to analyze user-generated contents and validate the solo consumption framework. Fourth, we provide managers and marketers with a valuable tool for comprehending the triggers of solo consumption and the desired experiences.

2. Literature review

Solo tourism is a state of being alone during a trip (Yang et al., 2022). Specifically, solo tourism is the activity of tourists traveling to destinations alone and for various reasons (Jonas, 2022). Solitary consumers are therefore those who choose to travel on their own (Bianchi, 2022) or individuals dining alone at restaurants (Choi et al., 2022). They are described on the basis of different factors, such as their personal needs, desires, motivations, preferences, and travel behavior (Leith, 2020).

Due to the COVID-19 pandemic, tourists perceive solo tourism as a secure travel option, and a recovery action for the tourism and hospitality industry (Jonas, 2022). Owing to its complexity, there is no unified agreement on or an all-inclusive understanding of the solitary consumption in existing research. Consequently, a consensual, comprehensive conceptualization of solo tourism consumption is required (Otegui-Carles, Araújo-Vila, & Fraiz-Brea, 2022).

3. Methodology

Since the purpose of our study is to scrutinize the meaning of solo tourism through solo tourists' viewpoints, we used the Twitter API (application programming interface) and the hashtags #solotravel and #solotourism to collect all related tweets in English published between August 2019 and August 2022. In total, we collected 43,290 unprocessed tweets. We will employ a semi-supervised LDA and the keyATM package to investigate and

empirically validate the solo tourism dimensions. Two steps will be employed. In step 1 we extract seed sets (Watanabe & Zhou, 2022) and step 2 we work on the Seeded-LDA model training (Benoit et al., 2018). Moreover, based on seed sets extraction, seed and topic confidence and model fit evaluations will provide us with exact dimension of solo tourism conceptualization. Appendix 1 depitcs the algorithm.

4. Conclusion

Our study will advance both, solo consumption theory and managerial practice. Our work will deliver a more detailed and overall conceptualization of the solo consumption concept. In particular, this research will provide a valuable tool for managers and marketers to comprehend the triggers of solo consumption and the desired experiences that tourists who engage in these activities are looking for. Highlighting the solo tourism experience's different stages allows managers to determine if, and if so how, they can integrate the solo tourism segment into their marketing strategy. We therefore provide managers with guidance on how to design and market solo offers and activities effectively. Last, we will use an innovative method, a semisupervised machine learing approach to reach the goals of the study.

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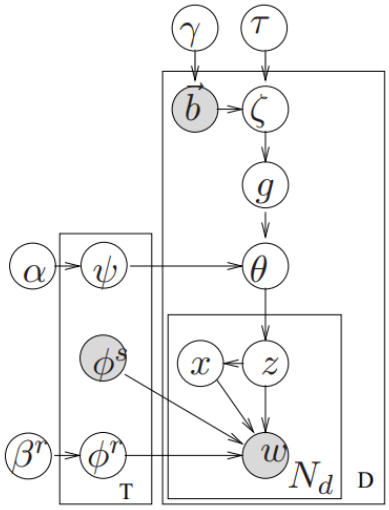
Appendix 1. Seeded LDA model and algorithm



1. For each k=1$\cdots$T,
   (a) Choose regular topic $\phi_k^r \sim \text{Dir}(\beta_r)$.
   (b) Choose *seed* topic $\phi_k^s \sim \text{Dir}(\beta_s)$.
   (c) Choose $\pi_k \sim \text{Beta}(1, 1)$.
2. For each seed set $s = 1 \cdots$ S,
   (a) Choose group-topic distribution $\psi_s \sim \text{Dir}(\alpha)$.
3. For each document d,
   (a) Choose a binary vector $\vec{b}$ of length S.
   (b) Choose a document-group distribution $\zeta^d \sim \text{Dir}(\tau\vec{b})$.
   (c) Choose a group variable $g \sim \text{Mult}(\zeta^d)$.
   (d) Choose $\theta_d \sim \text{Dir}(\psi_g)$. // of length T
   (e) For each token $i = 1 \cdots N_d$:
      i. Select a topic $z_i \sim \text{Mult}(\theta_d)$.
      ii. Select an indicator $x_i \sim \text{Bern}(\pi_{z_i})$.
      iii. if x_i is 0
         - Select a word $w_i \sim \text{Mult}(\phi_{z_i}^r)$.
      iv. if x_i is 1
         - Select a word $w_i \sim \text{Mult}(\phi_{z_i}^s)$.