Discussion paper

Modelling a grading scheme for peer-to-peer accommodation: Stars for Airbnb

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ABSTRACT

This study aims, firstly, to determine whether hotel categories worldwide can be inferred from features that are not taken into account by the institutions in charge of assigning such categories and, if so, to create a model to classify the properties offered by P2P accommodation platforms, similar to grading scheme categories for hotels, thus preventing opportunistic behaviours of information asymmetry and information overload. The characteristics of 33,000 hotels around the world and 18,000,000 reviews from Booking.com were collected automatically and, using the Support Vector Machine classification technique, we trained a model to assign a category to a given hotel. The results suggest that a hotel classification can usually be inferred by different criteria (number of reviews, price, score, and users' wish lists) that have nothing to do with the official criteria. Moreover, room prices are the most important feature for predicting the hotel category, followed by cleanliness and location.

1. Introduction

The sharing economy is defined as "an economic system based on sharing underused assets or services, for free or for a fee, directly from individuals" (Botsman and Rogers, 2011), and it is significantly changing consumption patterns (Byers et al., 2013). In tourism, the sharing economy is not a new phenomenon because this peer-to-peer (P2P) exchange has existed for a long time with, for example, the typical advertisement "For rent" hanging from beach apartments, with the owners directly offering short-term rentals or short stays to others, or with individuals waiting for backpackers to arrive at bus stations to offer them a room in their home to get extra income.

With the advance of the Internet, the tourist accommodation sector is experiencing a revolution (Cheng, 2016), with businesses such as Couchsurfing, HomeExchange, Airbnb, HomeAway or Roomorama acting as intermediaries to facilitate contact between host and guest in a simple, convenient and fast way, allowing hosts to earn extra income (Sigala, 2015).

One of the detected barriers to using P2P accommodation platforms is the lack of trust (Tussyadiah and Pesonen, 2016a), so overcoming this barrier is a challenge for these platforms and for people who offer their properties for use by others. This lack of trust is related to information asymmetry, which is generated in any market. This theory, developed by Akerlof (1970) in "The Market for Lemons" explains that the seller (i.e., host) knows exactly the true state of the service offered

(apartment, room, studio) and the purchaser (guest) does not know it and does not trust in it. Thus, poor services drive out good quality services from the market, leading to an adverse selection problem that ends up negatively affecting those who offer quality services but are drawn down by those who do not provide good service. There are different ways to avoid the adverse effects of information asymmetry such as transmitting credible information. An example of this is when sellers offer post-sales warranties, since only those sellers who are sure of their products would offer them (Stiglitz, 2002). In this sense, the more information available about their services and the more accurate it is, the more people will be willing to use such services (Harford, 2010).

Moreover, with the huge amount of information generated on the Internet for a single item, e.g., thousands of reviews for a single company or destination, an additional problem of information overload may occur, where users find it impossible to sift out useful or high-quality information or to read all opinions (Marine-Roig, 2017). As a consequence, they become overwhelmed. This issue is also a barrier to P2P consumption as it makes decision-making more difficult.

Thus, and given that hotel classification compensates for information asymmetry (Martin-Fuentes, 2016; Nicolau and Sellers, 2010; Öğüt and Onur Taş, 2012), it can help to reduce the problem of information overload. The aim of this study is to predict a hotel category by taking into consideration certain user-generated content (UGC) parameters and other factors in order to create a model to classify the properties

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offered by P2P accommodation platforms, similar to grading scheme categories of hotels, driven by the need to provide users with certain guarantees for such accommodation services, thereby allowing them to trust in them and preventing opportunistic behaviours of information asymmetry. This model is applied to Airbnb, the leading platform in the P2P accommodation sector, based on information extracted from 18,000,000 reviews on Booking.com written by guests staying at any of 33,000 hotels in outstanding international destinations.

In order to establish a model to classify accommodation on sharing economy platforms, the Support Vector Machine classification technique developed by Vapnik (2013) will be used. The technique is explained in detail in the existing literature, and although its application has been proven in fields such as medicine, engineering, biology, marketing and others, it has not been widely used in the field of tourism (Akin, 2015; Zheng and Ye, 2009), despite the good results reported.

2. Literature review

This section reviews the collaborative economy with special emphasis on the accommodation sector. The importance of hotel classification in order to avoid information asymmetry and information overload is also reviewed.

2.1. Sharing economy

The sharing economy is a phenomenon that can be considered a consequence of the global financial crisis that began in the late 2000 s (Buczynski, 2013). It has exploded in recent years thanks to the information and communication technologies (ICTs) that have enabled purchasers and sellers to get in touch with each other directly and conveniently.

Collaborative consumption, or the sharing economy, promotes the use of goods and services without having ownership of them. In the case of property, ownership is increasingly being replaced by use (Rifkin, 2000). Also called the peer-to-peer (P2P) economy, in collaborative consumption, individuals participate in sharing activities by renting, lending, trading, bartering or swapping goods, services, transportation solutions, space or money (Möhlmann, 2015).

In tourism, P2P platforms have experienced tremendous growth. This applies not only to platforms related to the accommodation sector, but also to those related to the catering, transport and tour-guide sectors (Cheng, 2016). The factors that have led to an increase in the use of these new forms of accommodation are economic, because they are potentially cheaper for travellers than other kinds of accommodation (Guttentag, 2015; Tussyadiah and Pesonen, 2016b), social, especially because they allow travellers to be in touch with the local community, and others such as authenticity and sustainability (Botsman and Rogers, 2011; Sigala, 2015; Tussyadiah and Pesonen, 2016b), because excessive consumption and unnecessary purchases of products that subsequently will not be used can be avoided by sharing goods (Bulchand Gidumal and Melián González, 2016).

Tussyadiah and Pesonen (2016a), in an exploratory study with American and Finnish travellers, found that, among Americans, trust is a barrier to using P2P accommodation (not only trust in hosts but also in technology and transaction safety) and conclude that a significant challenge for P2P accommodation companies is the need to create a mechanism of trust among customers, for example, by including reputation scoring or other consumer protection measures such as safe and secure transaction systems.

In this respect, as Ert et al. (2016) claim, P2P product platforms involve economic risks only, while sharing a home involves additional risks. Moreover, "risks are higher for transactions involving products whose attributes can be evaluated only after purchase and use" (Ba and Pavlou, 2002: 12). Therefore, sharing economy platforms base the way they operate and also their trust system on P2P communication through UGC (Tussyadiah and Zach, 2017). Barriers to creating and consuming

UGC have been lowered dramatically (Ayeh et al., 2013). Personal thoughts and opinions posted by users are easily accessible to the global community (Dellarocas, 2003) and potentially affect travellers' decisions in terms of creating ideas and reducing alternatives (Barreda and Bilgihan, 2013). Indeed, many studies have demonstrated the influence that UGC in general and online travel reviews in particular have on travel-related decisions through the electronic Word-of-Mouth (eWOM) effect (Schuckert et al., 2015). Social media is a particularly powerful and credible source of information among users, and especially among digital natives.

Consumers' opinions have been found to generate more confidence than communications from a company (Gretzel and Yoo, 2008; Vermeulen and Seegers, 2009). Although some users are afraid of biased information and false comments (Blomberg-Nygard and Anderson, 2016; Hensel and Deis, 2010), the reality is that most users trust social media reviews (Pirolli, 2016), and this is demonstrated by their travel-related behaviour, searching for online advice or information before making reservations (Blomberg-Nygard and Anderson, 2016; Kim et al., 2011). Thus, online opinions are essential not only for a sharing economy service, but also for the traditional hotel sector (Guttentag, 2015), and should be included in future classification systems to be consistent with customer needs (Blomberg-Nygard and Anderson, 2016). Moreover, online reviews are useful for promoting properties – especially the less-known ones – (Vermeulen and Seegers, 2009) and for taming the possible adverse effects of asymmetric information (Ba and Pavlou, 2002; Park and Nicolau, 2015).

2.2. Information asymmetry, information overload and star-rating classification system

In a market where one of the parties involved in a buying/selling transaction does not have the same information as the other about a product or service, so-called information asymmetry occurs, which could cause the market to fail (Akerlof, 1970).

There are different mechanisms to avoid opportunistic behaviours of information asymmetry, such as guarantees of certain claims that only those sellers who are confident in the quality of their products would offer, or certification by external auditors to ensure the quality of the product or service (Stiglitz, 2002).

Hotel customers rely on recommendations by friends and family to solve their informational disadvantage because tourism services cannot be tried or tested before purchase (Fernández-Barcala et al., 2010). To some extent, this has been replaced by the role of the travel agent, who acts as an intermediary in a market characterised by such asymmetry (Clerides et al., 2005; Jeacle and Carter, 2011).

Information asymmetry in the hospitality industry can also be countered using other elements such as price, customer review ratings, number of recommendations and average display rank (Cezar and Öğüt, 2016; Martin-Fuentes, 2016; Neirotti et al., 2016; Öğüt and Onur Taş, 2012). Moreover, star-rating classification systems established by third party institutions serve as a tool to mitigate asymmetric information (Martin-Fuentes 2016; Nicolau and Sellers 2010; Núñez-Serrano et al., 2014) and provide guidelines for reducing the hotel booking risk (Neirotti et al., 2016).

In addition to the problem of information asymmetry, sharing economy establishments may face the problem of information overload caused by UGC, which is key to the way they operate and also to the trust system. In travel and hospitality, online travel reviews have increased exponentially and there is usually a huge number of reviews available for the same product or service (De Ascaniis and Gretzel, 2012). However, increased amounts of information can be both a blessing and a curse (O'Connor, 2010). Although UGC information provides users with unbiased, unsolicited and cost-effective data on products and services, information overload may actually prevent consumers from getting a comprehensive idea or high-quality information and, moreover, can complicate the decision-making process