

# A Social Network Analysis of the Parking-Related Civil Complaints in Busan City

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**Abstract:** The purpose of this study is to analyze the parking-related civil complaints data that was registered in 2015 for Busan City in South Korea by using a social network analysis (SNA) method. Out of the approximately 2,000 civil complaints that were registered during 2015 in Busan City, 412 complaints were traffic-related and were chosen as the research sample. After extracting parking-related keywords from this sample, we conducted a degree centrality analysis using an SNA method. Parking difficulties, illegal parking, conflicts between residents, insufficient availability of parking spaces, and public parking lots appeared to be the most common problems expressed in the civil complaints that related to parking according to the results of the degree centrality analysis. In particular, parking difficulties due to the insufficient availability of parking spaces and other issues caused by illegal parking appeared as keywords among the civil complaints. This study has the following limitations and suggestions for future studies. Among the total civil complaints data gathered in 2015, 412 of the civil complaints were related to traffic, among which only 10% were parking-related. Therefore, cautions are in order when interpreting the results of our study due to the smaller sample size. The analysis of civil complaints data conducted in this study should be used to assist government organizations and relevant companies when they are making decisions related to parking.

**Key-Words:** Social Network Analysis, Busan City, Parking-Related Civil Complaints, Parking difficulties, Public parking lots, SNA

## 1 Introduction

Following the dramatic increase in traffic, parking problems have become one of the most frequently observed social conflicts. During urban planning, parking spaces are often designed with a consideration of only the minimum requirements. The cost or rent required for the parking spaces is not accounted for in many cases. It is challenging to offer sufficient parking that can accommodate the number of cars since that number grows every year. Parking problems due to the increased number of cars has become a serious social issue. Media in the United States, such as Streetline, Inc., have argued that the issue of parking is one of the urban problems that cannot be solved [1]. To address this problem, the central government as well as local governments have implemented a variety of policies in regards to the availability and use of parking lots. However, parking spaces are quantitatively not enough to solve the parking problems in residential areas, which often result in illegal parking as of now. Parking lots that were built in the past are not meeting current needs because of the ineffective flow of traffic and their small size. To solve these problems, citizens have registered their complaints to each local government by filing a civil report, and the corresponding local government processes the appeal and addresses the problem, hopefully. However, the problem is being solved only in a

fragmented manner because the fundamental cause of the problem is not being addressed. Because of this inadequate response, the number of civil complaints keeps growing year after year [2]. Recently, a social network analysis (SNA) method has been utilized as a new research scheme in the field of data analysis [3]. The SNA method is aimed at understanding the relationship of data by visualizing the network structure of the data since it is related in a variety of ways. The relationships between the data are examined by searching for the node or keyword for a critical location [4]. This study expands the concept of civil complaint analysis to the concept of policy analysis using an SNA method in order to provide fundamental data to inform government policy. This is accomplished by using a research sample of civil complaints data, which was gathered by Busan City during the year of 2015.

## 2 Research Method and Analysis

The population in Busan City had been consistently decreasing until 2015 when there was a slight increase. Since that time, the number of households has been following a continuous upward trend. Looking at the number of cars per population or per household in Busan City, the number of registered cars per population has consistently increased even when the population was gradually decreasing.

Since the number of households and the number of registered cars per household has increased so significantly, more and more households are in need of parking spaces. According to the civil complaint data from Busan City, there has been an increase in the demand for more parking.

To analyze the parking problems in Busan City, we used the civil complaint data from the bulletin board entitled "We ask for Busan City," which is provided as a link on the official webpage of Busan City. On this bulletin board, citizens can freely write a post about their civil complaints. Among the approximately ten thousand posts of civil complaints, we examined only the posts that were made public. There were 2,000 civil complaint posts made public during the year of 2015, and we found that 412 were traffic-related civil complaints. These complaints were the sample used for analysis in this study.

Three researchers developed the keyword network using parking-related keywords and analyzed the characteristics of the data using an SNA method. We also used the NetMiner4.2 program to conduct degree centrality analysis in order to better understand the role and knowledge structure of the keywords.

Degree centrality analysis is a method of extracting keywords that have high centrality in order to visualize the keywords in relation to one another. The analysis method provides an overview of which keywords have high centrality inside the network in order to offer a more comprehensive understanding about the relative importance of each keyword. A high degree centrality for a certain keyword means that the keyword is frequently used. In the results of the degree centrality analysis, illegal parking, parking difficulties, public parking lots, and conflict between residents were located at the center because of their significantly high centrality. Other than these, other keywords of civil complaints included parking lot facilities linked to crimes, consideration for socially vulnerable people, and parking information services. Figure 1 and Figure 2 show the results for the degree centrality analysis conducted on the keywords.

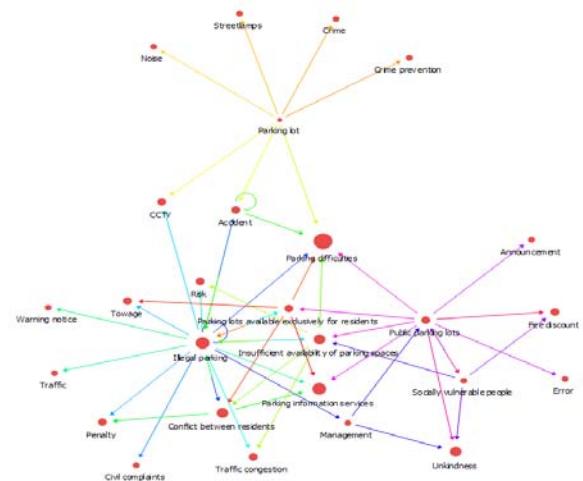


Fig. 1. Degree centrality of the keywords related to parking-related civil complaints, which were registered in 2015

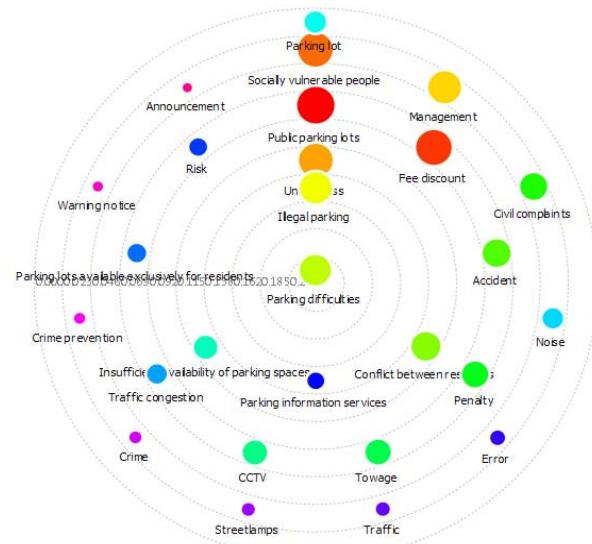


Fig. 2. Concentric map of the degree centrality of the keywords related to parking-related civil complaints, which were registered in 2015

Parking difficulties, illegal parking, conflicts between residents, insufficient availability of parking spaces, and public parking lots are closely linked to each other, which is demonstrated by their high centrality. Illegal parking was linked to civil complaints about penalties, warning notices, and towing due to parking regulation. Illegal parking was also linked to traffic difficulties that resulted from illegal parking and stopping, traffic congestion, and other risks. On the one hand, citizens were requesting increased parking regulation because of the inconvenience caused by illegal parking. On the other hand, citizens also

raised questions about the justice of parking regulation. Ultimately, the former occupied a larger share of the complaints.

Management problems, unkindness of service workers, a lack of consideration for socially vulnerable people, and system errors were the main civil complaints in regards to public parking lots. There were several civil complaints about the ineffective management of parking information services and the inaccuracy of information regarding public parking lots, as well as the relatively worse condition of the facilities as compared to the privately owned parking lots. This data also indicated a potential for increased demand for Smart parking systems as well. Civil complaints related to crime prevention also appeared as a problem in regards to the parking facilities.

Lee (2017) reported that the problem of illegal parking in residential areas in Busan City because the city cannot meet the increased parking demands has spilt over into the neighboring residential areas [5]. According to his study, the speed of traffic that passes through the residential area is slower as a result of the cars that are illegally parked on the side of the road. The overall illegal parking problem is causing serious consequences such as an increase in the likelihood of being involved in a negligent accident. This finding implies that the civil complaints that were posted on the electronic civil complaints board during 2015 have not been properly addressed since the problem still is evident.

### 3. Conclusion

Civil complaint analysis can be used to improve the administrative response to the diverse needs of their citizens and the overall quality of the public services provided by offering an objective evaluation of the public services, which accounts for the viewpoints of the citizens as well as the socio-economic situation. A civil complaint analysis can provide valuable data, which can be used to inform better decision making as it relates to the delivery of high-quality public services, by extracting and integrating significant information. In this study, we conducted an SNA on the parking-related civil complaints, which were posted on the bulletin board of Busan City webpage in 2015, and provided fundamental data that can inform political decisions in regards to policy that addresses parking concerns.

The study results can be summarized as follows. The most frequent complaints related to parking included parking difficulties, illegal parking, conflicts between residents, insufficient availability of parking spaces, and public parking lots. In particular, parking difficulties resulted from the lack

of available parking spaces and the issues that result from this insufficiency, such as illegal parking, appeared as keywords within the civil complaints. The results from this study were consistent with the findings from a previous study of the parking problems in Busan City that was conducted by Jeong (2017) [6]. They also align with the results of a parking-related survey that was conducted by the Busan Development Institute (2017) [7]. This implies that civil complaints, which were registered in 2015, were not properly addressed since the same problems exist in the years that followed. Parking policy should be created to address the issues identified by this analysis of the electronic civil complaints registered in Busan City.

Limitations of this study do exist. As of 2015, there were 412 civil complaints related to traffic, and only 10% of the 412 civil complaints related to traffic were also related to parking. Hence, some cautions are in order when interpreting the result of our study because of the small sample size. Data collected across several years would be necessary to investigate whether or not a trend existed within the complaints data related to parking. With a larger sample size that spanned several years, any corresponding policy trends could also be examined.

For future studies, here are a few suggestions. Future studies that use time series data would be able to provide a more objective reference point when selecting potential future priorities for policy implementation. Also, a quantitative prediction of value based on the civil complaints data would assist government organizations and other relevant companies when they are making decisions relating to parking.

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