ISSN 3032-1230
The Southeast Asian Journal of Advance Engineering and Technology *Original Research*
Vol. 2, No. 3, September 2025, pp.75-81

Utilization of Scraping Data for Analysis of the Suitability of Minimarket Locations Towards Local Regulations of Surabaya City

Denan Fajar Alamsyah[1], Rina Muthia Harahap [1], Diah Kirana Kresnawati [1]
[1]Geodetic Engineering, Pakuan University, Bogor

Corresponding Author:

Denan Fajar Alamsyah
Geodetic Engineering
Pakuan University
Depok, West Java

E-mail:

dnnafajar00@gmail.com

ABSTRACT

This study analyzes the suitability of minimarket locations in Surabaya City based on local government regulations, aiming to mitigate the economic impact on small and medium-sized enterprises (MSMEs) and traditional markets. The rapid growth of minimarkets necessitates spatial control to ensure their establishment aligns with regional planning. Using a spatial analysis approach, this research focuses on two key aspects: the distance of minimarkets from traditional markets and their location relative to road categories. The methodology involved data scraping from Google Maps to collect minimarket location data. The data was then processed using Geocoding to convert addresses into geographical coordinates. The primary analytical tool was buffering analysis in QGIS, which categorized minimarket locations as either compliant or non-compliant with two specific regulations. The analysis revealed that out of 461 validated minimarkets, 34% (158 minimarkets) were found to be non-compliant with the regulation regarding distance from traditional markets. Conversely, 66% (303 minimarkets) were compliant. When analyzed against road categories, the results showed that 59% (270 minimarkets) were located on appropriate roads (arterial, collector, or toll roads), while 41% (191 minimarkets) were non-compliant. The results underscore the importance of spatial analysis in urban planning and policy enforcement to promote a balanced retail environment.

Keywords: Minimarket, Scraping Data, Geocoding, Buffer.

Article history:

Received May 16, 2025
Revised Jul 28, 2025
Accepted Sep 1, 2025

1. Introduction

The trade sector is a crucial driver of economic growth in Indonesia, with Surabaya City serving as a prime example [1]. While traditional markets have historically been the central hub for commerce, a significant shift in consumer behavior has spurred the rapid proliferation of modern retail formats, such as minimarkets. These establishments offer the convenience of a self-service model and a contemporary shopping experience, which has led to their widespread popularity [2].

However, this uncontrolled expansion poses a serious challenge for urban planning. The core problem is the potential for minimarkets to negatively impact the economic viability of traditional markets and local small and medium-sized enterprises (SMEs), thereby disrupting the local economic and social balance. Despite existing

© The Author 2025. This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License (https://creativecommons.org/licenses/by/4.0/) that allows others to share and adapt the material for any purpose (even commercially), in any medium with an acknowledgement of the work's authorship and initial publication in this journal.

local regulations that govern minimarket locations, non-compliance is a frequent issue, particularly concerning the minimum distance from traditional markets and the permitted road classifications. Given the large geographical area and the high number of minimarkets, a manual survey approach is not efficient. Consequently, an innovative and efficient methodology is required to accurately analyze and map the spatial distribution of these businesses.

This research aims to address these challenges by leveraging modern geospatial techniques. The primary objective of this study is to determine the suitability of minimarket locations in Surabaya City in relation to the prevailing trade regulations. Specifically, the research will analyze two key spatial aspects: the distance of minimarkets from traditional markets and their location relative to the road network as defined by regional regulations.

Surveys at each minimarket location for data collection will take a relatively long time, so the data collection is carried out through the use of Data Scraping techniques on Google Maps to obtain large amounts of data widely and efficiently. Based on the description above, the researcher intends to determine the conditions of the suitability of the distribution of minimarkets in the city of Surabaya based on trade regulations.

2. Research method

The methodology of this study is grounded in the Surabaya City Regional Regulation No. 08 of 2014 concerning the Arrangement of Supermarkets and the Surabaya City Regional Regulation No. 01 of 2023 regarding Trade and Industry. The analysis focuses on two key aspects: the distance between minimarkets and traditional markets (with a minimum requirement of 500 meters) [3] and the minimarket's location relative to road categories (local, arterial, collector, and two-way toll roads) [4]. The minimarkets included in this study are Alfamart, Alfamidi, Circle K, Indomaret, Lawson, and Prima Freshmart.

For data collection, this research utilized both primary and secondary data. Minimarket location data were obtained using a data scraping method via the Instant Data Scraper extension on Google Maps. Meanwhile, traditional market data and foundational geospatial data (*shapefiles*) were sourced from government agencies. The collected data was then processed through Geocoding to convert the textual addresses of minimarkets and traditional markets into geographic coordinates using the Geocode by Awesome Table tool. All data were validated for accuracy using QGIS software and visualization on Google Earth.

The core of the spatial analysis was the buffering method, which is a technique for identifying the relationship between a point and its surrounding area. For the distance analysis between minimarkets and traditional markets, a 500-meter buffer was created around each traditional market. Minimarkets located within this buffer were categorized as non-compliant, while those outsides were considered compliant [5].

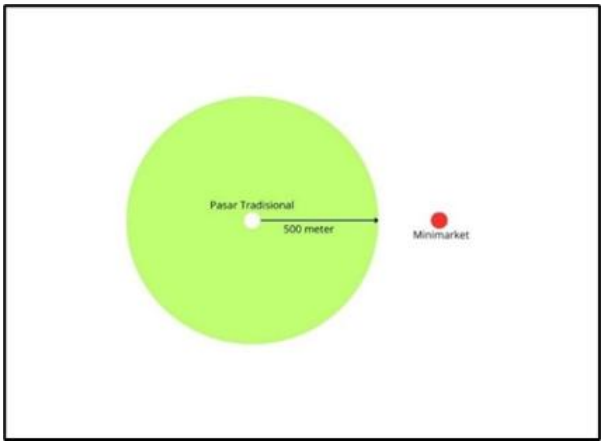

Figure 1. Buffer analysis between traditional markets and minimarkets with appropriate categories

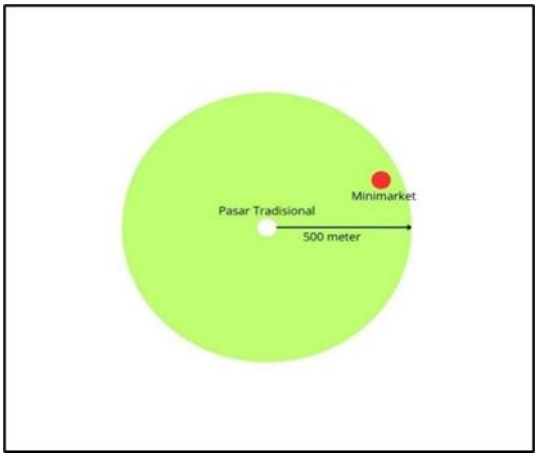

Figure 2. Buffer analysis between traditional markets and minimarkets with inappropriate categories

Initially, a nearest neighbor analysis was used for assessing minimarket locations based on road categories. However, this method proved to have a limitation, as it often incorrectly linked a minimarket to the nearest local road, even if a more suitable arterial or collector road was in close proximity. Consequently, the analytical approach was changed to the buffering method. A buffer radius of 25 meters, derived from the average distance between minimarkets and roads in the previous method, was established as a reference. As a result, minimarkets located within this buffer zone of an arterial, collector, or toll road were categorized as compliant, and vice versa.

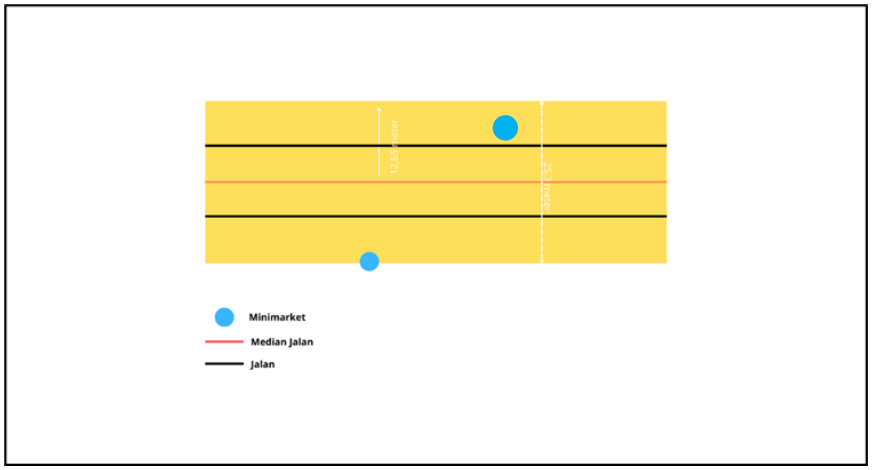

Figure 3. Analysis of minimarket location buffers based on roads with appropriate categories

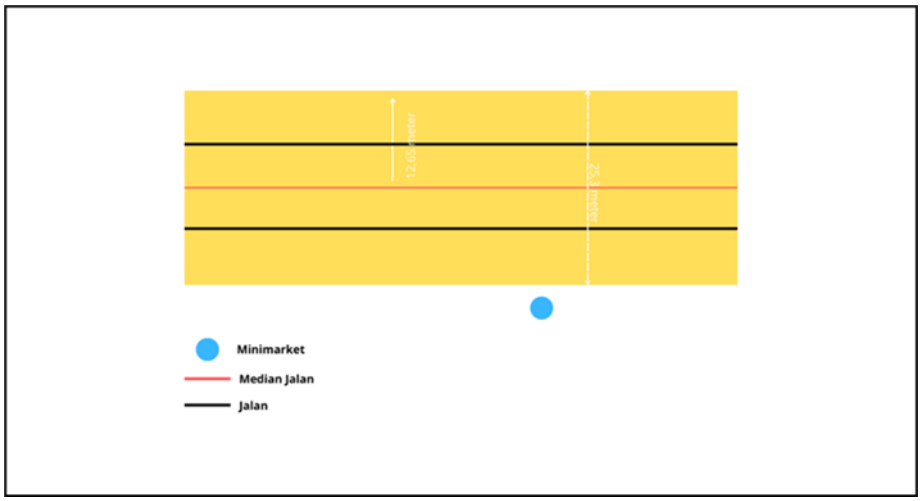

Figure 4. Analysis of minimarket location buffers based on roads with unsuitable categories

3. Results and discussion

Based on the research conducted, it is known that in the collection of minimarket data using the methods of data scraping and geocoding, 525 minimarkets were obtained, which were then validated, resulting in 461 minimarkets with the following details Table 1.

Table 1. Surabaya minimarket data

Minimarket	Total	Description	Qty
Alfamart	172	Appropriate	151
		Non-existent building	3
		The point is in the same location	13
		Ceased operations permanently	5
Alfamidi	73	Appropriate	63
		Non-existent building	2
		The point is in the same location	8
		Ceased operations permanently	0
Circle K	16	Appropriate	15
		Non-existent building	1
		The point is in the same location	0
		Ceased operations permanently	0
Indomaret	200	Appropriate	194
		Non-existent building	2
		The point is in the same location	3
		Ceased operations permanently	1
Lawson	27	Appropriate	2
		Non-existent building	25
		The point is in the same location	0
		Ceased operations permanently	0
Prima Freshmart	37	Appropriate	36
		Non-existent building	0
		The point is in the same location	0
		Ceased operations permanently	1

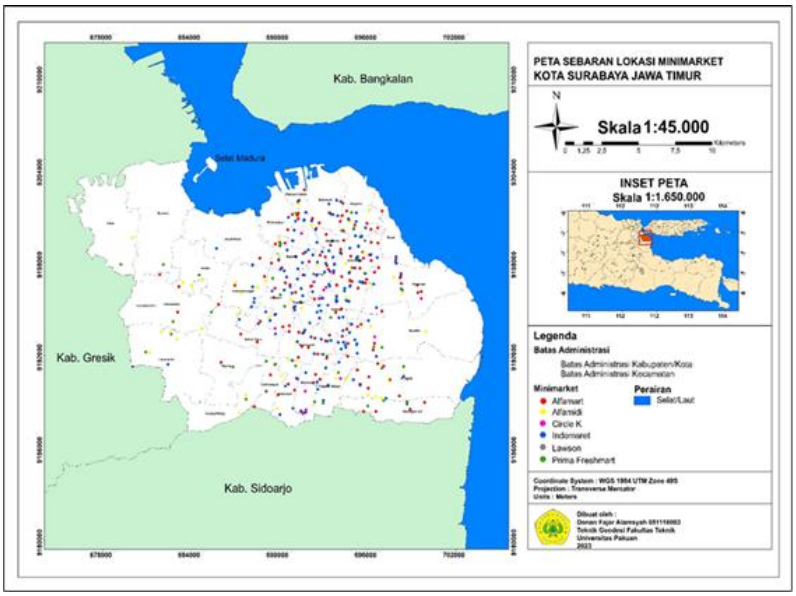

Figure 5. Distribution of minimarket locations in Surabaya City

In the collection of traditional market data obtained, there were 103 traditional markets with the main food commodity category spread across the city of Surabaya, which are presented in the form of a two-dimensional map as follows Figure 6.

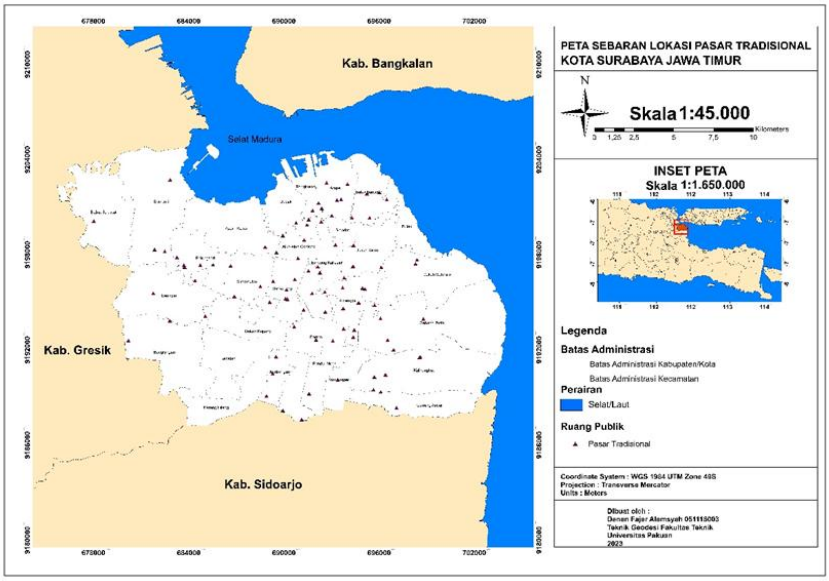

Figure 6. Distribution of traditional market locations in Surabaya City

The results of the analysis show that in the analysis of the distance of minimarkets to traditional markets, 66% of minimarkets are categorized as appropriate, while 34% of other minimarkets are categorized as inappropriate, with the following details Table 2.

Table 2. Details of the number of minimarket locations that are appropriate to traditional markets in Surabaya City

Minimarket	Quantity	The suitability of the location of the minimarket is reviewed from the distance of the minimarket to the market		Presentase (%).	
		Appropriate (>500 m).	Inappropriate (<500 m).	Appropriate (>500 m).	Inappropriate (<500 m).
Alfamart	151	91	60	20%	13%
Alfamidi	63	43	20	9%	4%
Circle K	15	11	4	2%	1%
Indomaret	194	135	59	29%	13%
Lawson	2	1	1	0%	0%
Prima Freshmart	36	22	14	5%	3%
Total	461	303	158	66%	34%

Then, based on the results of the analysis of minimarket locations against several road categories, it was found that as many as 59% of minimarkets were on roads with the appropriate category and around 41% of other minimarkets were categorized as not appropriate to the roads presented in the following Table 3.

Table 3. Details of the number of minimarket locations that are suitable for roads in the city of Surabaya.

Minimarket	Quantity	Category	The Suitability of the Minimarket Location Reviewed from the Road Status at the Location of the Minimarket Standing		Presentase (%)	
			Appropriate	Inappropriate	Appropriate	Inappropriate
Alfamart	151	Arteri Toll Local Colector	1 1 121 8	20	28%	4%
Alfamidi	63	Arteri Colektor Local Toll	0 3 45 0	15	10%	3%
Circle K	15	Artery Colector Lokal Toll	0 1 11 0	3	3%	1%
Indomaret	194	Arteri Colector Local Toll	3 16 30 1	144	11%	31%
Lawson	2	Arteri Colector Local Toll	0 0 1 0	1	0%	0%
Prima Freshmart	36	Arteri Toll Local Colector	0 0 28 0	8	6%	2%
Total	461		270	191	59%	41%

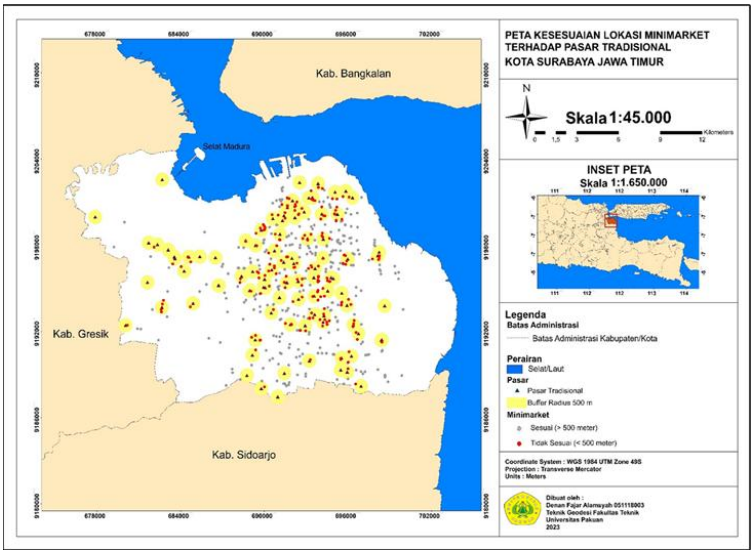

Figure 7. Map of suitability of minimarket locations to traditional markets in Surabaya City

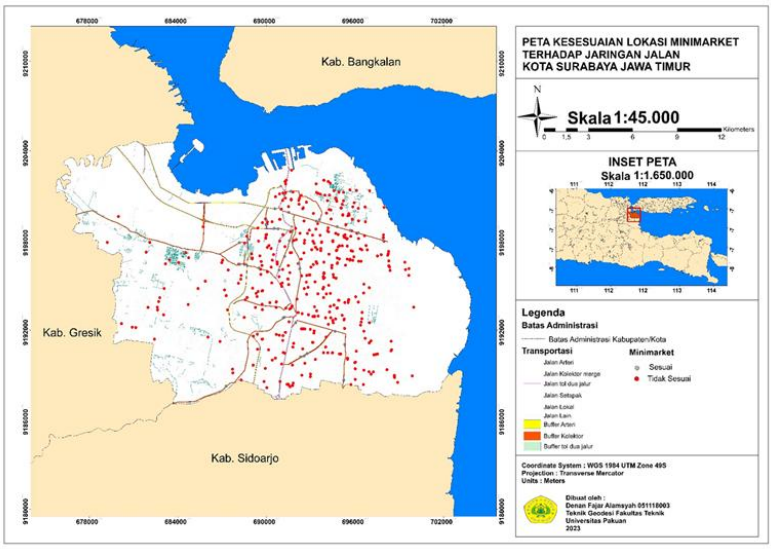

Figure 8. Map of suitability of minimarket locations to roads in Surabaya City

In the analysis of minimarket buffers based on roads, the reference value used is the average value of the distance between minimarkets and roads produced by the previous method, namely nearest neighbor analysis. The results of the analysis of the suitability of minimarket locations to traditional markets and road networks are presented in a two-dimensional map with a scale of 1:45,000 using A0 paper size as shown in Figure 7 and Figure 8. Cartographically on this scale, the information displayed in the form of symbols is clearly visible and can be understood by the reader.

4. Conclusions

Based on the findings and analysis, this study successfully demonstrates the effective application of spatial analysis and data scraping to evaluate the compliance of minimarket locations with Surabaya City's regional regulations. The main findings confirm a significant level of non-compliance. The analysis shows that 34% of the validated minimarkets did not adhere to the regulations concerning the distance from traditional markets. Additionally, 41% of minimarkets were located on roads that were not in compliance with the regulations. Overall, while the percentage of compliant minimarkets is higher, these results highlight the ongoing challenges in enforcing urban spatial planning policies.

References

[1] B. P. S. Kota Surabaya, "Pertumbuhan Ekonomi Kota Surabaya 2022," Surabaya, Mar. 2023. Accessed: Mar. 12, 2024. [Online]. Available: surabayakota.bps.go.id

[2] Muhammad Alwi, Abdul Hamid, and Shelly Midesia, "Analisis Perbandingan Prilaku Konsumen Dan Minat Berbelanja Pada Pasar Tradisional Dan Pasar Modern Di Kota Langsa," *JIM: Jurnal Ilmiah Mahasiswa*, pp. 39–62, May 2023, doi: 10.32505/jim.v5i1.4858.

[3] W. Surabaya, *PERATURAN DAERAH KOTA SURABAYA NOMOR 1 TAHUN 2023 TENTANG PERDAGANGAN DAN PERINDUSTRIAN*. Surabaya, 2023, pp. 1–83. Accessed: May 12, 2024. [Online]. Available: https://jdih.surabaya.go.id/

[4] W. Surabaya, *PERATURAN DAERAH KOTA SURABAYA NOMOR 8 TAHUN 2014 TENTANG PENATAAN TOKO SWALAYAN DI KOTA SURABAYA*. Surabaya, 2014, pp. 1–20. Accessed: Apr. 12, 2024. [Online]. Available: https://jdih.surabaya.go.id/

[5] R. M. Harahap and D. Ramdani, "Analysis of Minimarket Location Suitability in Bogor City Through the Utilization of Big Data Using Google Maps Scraping Data," Jul. 2022.