



Jurnal Pendidikan Geografi:

Kajian, Teori, dan Praktik dalam Bidang Pendidikan dan Ilmu Geografi, 27(2), 2022, 151-162

ISSN: 0853-9251 (Print): 2527-628X (Online)

DOI: 10.17977/um017v27i22022p151-162

# Houses of worship distribution pattern in Surakarta City and its influencing factors

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Paper received: 13-08-2021; revised: 11-10-2021; accepted: 08-03-2022

## Abstract

The purpose of this study is to determine the pattern of worship places distribution in Surakarta City and its influencing factors. This study used observation and field survey methods. The data analysis was carried out using the Average Nearest Neighbor (ANN) with a total of 145 points of worship, while the selected factors consisted of demographic factors and road networks. These two factors were chosen because the construction of places of worship was more influenced by the number of residents and the ease of accessibility to these places of worship. The results of this study indicate that the mosque has a clustered pattern, while churches, pagodas, and temples have the same dispersed pattern. Demographic factors carry no sufficient effects on the existence of places of worship because they are not proportional to the population density and number of places of worship. These results are expected to support demographic learning of the religion adopted by the population. The road network factor at places of worship is more influenced by collector roads because of its ease of accessibility compared to arterial roads.

**Keywords:** distribution pattern; places of worship; ANN

## 1. Introduction

A house of worship or place of worship is a religious facility that holds an essential role for its followers as it enhances their spirituality with God and bolsters their spiritual activities (Hakim, 2012). Worship sometimes requires a specific place because it is essential in every religious teaching to parade their devotion to their God (Nugroho, 2020). Additionally, a worship place also functions as a place to propagate religious teaching and conduct worship (Basyiroh, Awaluddin, & Nugraha, 2018). Thus, a worship facility also has a role in the education process, guiding humans to have better religious practices (Septian & Lelah, 2020). Indonesia facilitates and liberates each of its citizens to practice worship following their own belief, as mandated in the UUD 1945 (Indonesia's constitutional law) article 29 paragraph 2, stating that the State guarantees all persons the freedom of worship, each according to his/her own religion or belief (Republik Indonesia, 1959). Therefore, a place of worship is essential and fundamental for every religious believer as a public facility that is guaranteed by the nation.

Surakarta is a city located in Central Java that offers numerous authentic tourist places and cultures since the city slogan is *The Spirit of Java*. This city has a relatively complex history and background since it is tightly correlated with the *Keraton Kasunanan Surakarta* or the Surakarta Kasunanan Palace. Its diverse population has placed Surakarta as a multiethnic city. Accordingly, Surakarta has numerous different places of worship, with particular patterns,

such as the worship places among the ethnic groups (Heldayani, Ritohardoyo, & Widiyastuti, 2015). This diversity has attracted travelers from various places, affecting the city's layout, economy, and society (Hartawan, 2021). However, the scattered location of worship places brings challenges for the travelers to find a worship place, so they have to find information related to the worship place's location first (Ikasari & Irawan, 2019). Surakarta has various tourist sites, including places of worship. Therefore, the places of worship's existence in every corner of the city is essential (Negara, Rahardian, & Widiastira, 2020).

A place of worship is vital as it facilitates the religious followers to conduct their worship, such as a mosque for Muslims, a church for Christian, a temple for Hindus, a pagoda for Buddhists, and so forth (Fernando, Arwan, & Kharisma, 2019). A sufficient number of accessible places of worship is required to fulfill society's social needs. The data from the Central Bureau of Statistics of Surakarta in 2021 reveals an increasing number of residents, specifically in its rural areas, due to the migration flow from other areas (Haylan, 2019). Consequently, the capacity of each place of worship should be reconsidered since it may not be sufficient to accommodate the religious followers. The worship place's strategic location, accessibility, facility, and infrastructure are the supporting factors of worship activities. Therefore, identification of a worship place's distribution pattern is vital to see if it has fulfilled the needs of the society and its accessibility.

In the current globalization era, the rapidly accelerated technology development has expedited human work, such as the Geography Information System (GIS) (Prasetyo, 2019). The development of the Geography Information System is initiated from the construction of a map with an entire or partial illustration of the earth's surface, both the sea and land (Aziz & Pujiono, 2006). Information dissemination carries various benefits, such as the availability of spatial data (region) or non-spatial data (related to the existence of a region). The spatial data represents the earth's surface if it is processed in such a way and presented based on the users' needs (Nursuci, 2013). The mapping of worship places can utilize the Geography Information System to attain relevant detailed information (Alamsyah & Wagino, 2018). One of the Geography Information Systems popular software is ArcGIS. ArcGIS is an application for spatial data management with geo-referenced that generates view, table, chart, project, script, and layout (Animsa & Rachmad, 2015).

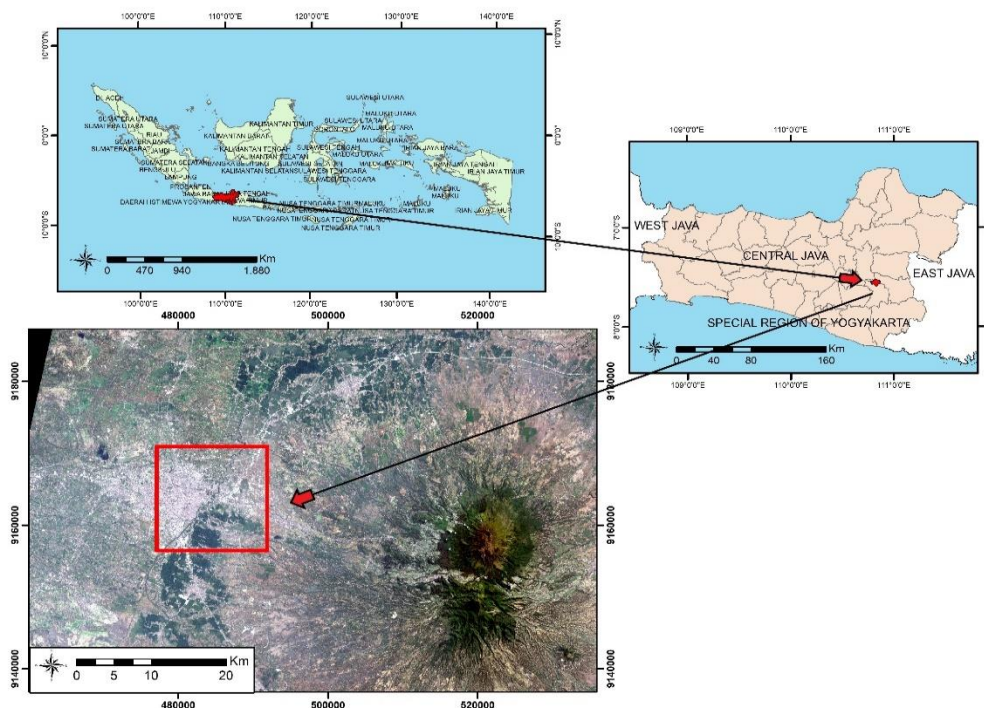
From the above description, an information system that illustrates and presents data of worship places in Surakarta is required to visualize the spreading of the worship places. Besides, the map visualization also simplifies the distribution pattern description using Geography Information System. The detail of data in the Geography Information System is affected by the size of the smallest mapping unit within the database. Besides, the details depend on the map's scale and the geographic reference base, known as the base map (Budiyanto, 2002). In this study, the Geography Information System is highly applicable for the identification of worship places dissemination, focusing on their geographic location (Satria, Afwani, & Anjarwani, 2021).

Studies on places of worship dissemination have been rarely carried out, particularly in Surakarta. Therefore, this study identifies the pattern of worship places dissemination and the influential factors for that dissemination in Surakarta. This study aims to find the worship places' distribution pattern and the factors affecting the distribution of worship places in Surakarta.

## 2. Method

This study was carried out in Surakarta, Central Java, Indonesia. The data was collected through observation and documentation methods. This observation was carried out to find the location of each worship place in Surakarta, as well as their coordinate data using GPS essential on Android smartphones. The research location is illustrated in Figure 1.

To determine the distribution pattern or distribution of worship places, the obtained data were analyzed using average nearest neighbor analysis with ArcGIS 10.3 software. This average nearest neighbor analysis used the results of the nearest neighbor parameter calculation (Arisca & Agustini, 2020). Further, the obtained coordinate points from the field survey using GPS Essential application were input to the ArcGIS 10.3 to be processed and analyzed. This Average Nearest Neighbor was an analysis of statistical data to conclude whether the distribution pattern was dispersed, random, or cluster (Pitaloka & Prakoso, 2016). Analysis Nearest Neighbor assessed the distance of each central feature and the position of its nearest neighbor. Then, the average distance of all nearest neighbors was calculated. If the obtained average distance was less than the average hypothetical random distribution distance, the analyzed objects were considered clustered. In contrast, if the average distance is more significant than the hypothetical random distribution, then the objects were considered dispersed. Subsequently, this analysis required data on the distance of an area from its nearest neighboring areas (Hidayat, 2016). The data were analyzed using descriptive analysis with a spatial approach (Hardati, 2015).



**Figure 1. Map of Research Location**

The factors of worship place distribution pattern were demography and road network. The data analysis was carried out after data from each influencing factor were obtained (Rozak & Ariastita, 2013). For the road network analysis, we used the buffer method with ArchMap

10.3 (Mukhlis & Musyawarah, 2019). Buffer analysis identified the relationship or commonly known as proximity factor analysis, between a point and its surrounding areas (Aqli, 2014). Meanwhile, the demographic analysis factor consisted of size, structure, and total population (Natoen, AR, Satriawan, & Periansya, 2018). In this study, we analyzed the data based on the population density, using the number of population in each district, through the Geographic Information System on ArcGIS 10.3. We used Formula (1) in analyzing the required number of worship places.

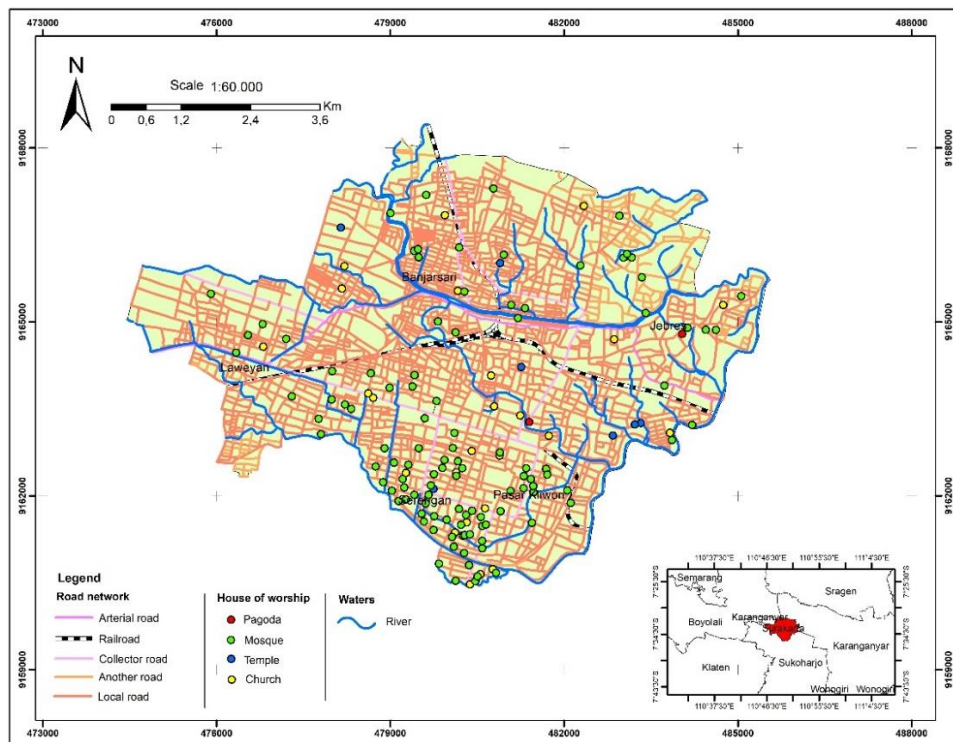
$$\text{Number of worship places} = \frac{\text{Population based on religion}}{90} \quad (1)$$

According to the local policy, the minimum number of a citizen using a place of worship was 90 (Kementerian Agama RI, 2006; Kementerian Dalam Negeri RI, 2009).

### 3. Results and Discussion

#### 3.1. Distribution of Places of Worship

Surakarta is one of the 29 cities or regencies in Central Java, Indonesia. This area covers five districts, namely the districts of Jebres, Banjarsari, Pasar Kliwon, Serengan, and Laweyan, with a total area of 44.04 km<sup>2</sup>. This city adjoins with Karanganyar and Boyolali Regencies in the north, Karanganyar and Sukoharjo Regencies in the east and west, as well as Sukoharjo Regency in the south. Surakarta number of the population is 522.364 people, with an 11.861 per km<sup>2</sup> population density. Our observation results show that Surakarta has four worship places, namely a mosque, church, pagoda, and temple. Those places of worship are distributed in five districts, namely Jebres, Banjarsari, Pasar Kliwon, Serengan, and Laweyan districts. The locations of those worship places are shown in Figure 2.

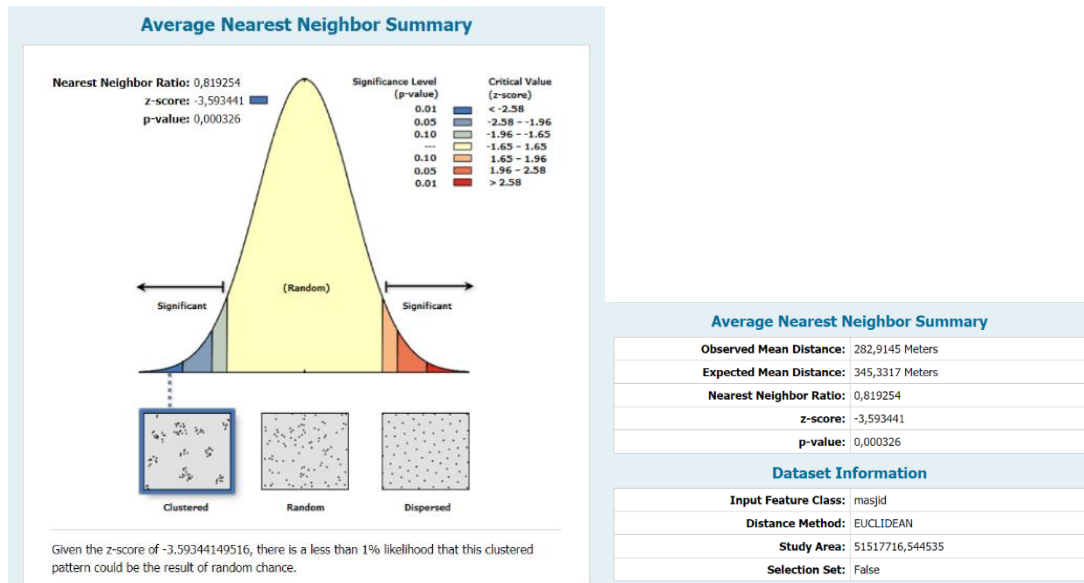


**Figure 2. Map of Worship Places Distribution in Surakarta**

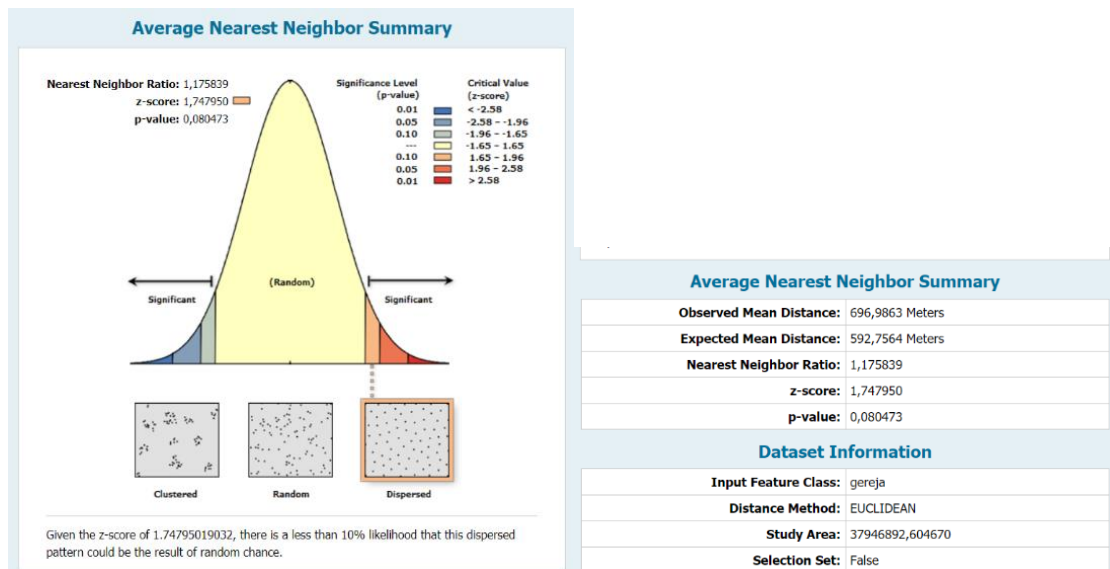
Mosques are the most dominant places of worship in Surakarta since the majority of the population is Muslim. The total number of mosques in Surakarta is 109, with a different number of a mosque in every district. Meanwhile, the number of pagodas, churches, and temples is two, 27, and seven, respectively.

### 3.2. Analysis of Worship Places Distribution Pattern in Surakarta

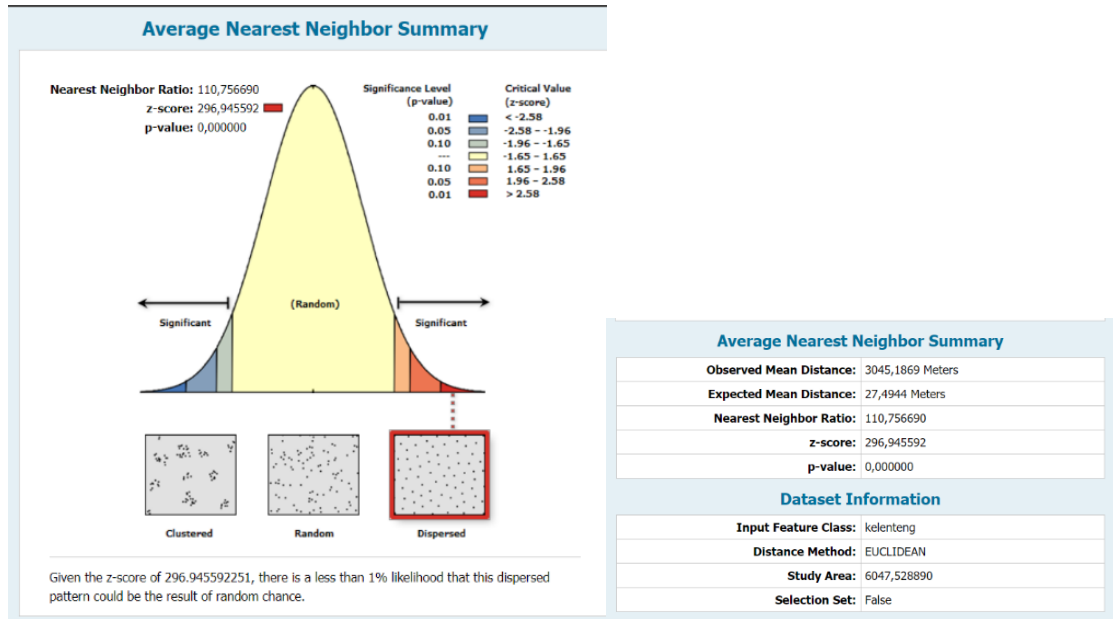
The results of *Average Nearest Neighbor* showing the distribution of mosques, churches, pagodas, and temples are illustrated in Figures 3, 4, 5, and 6.



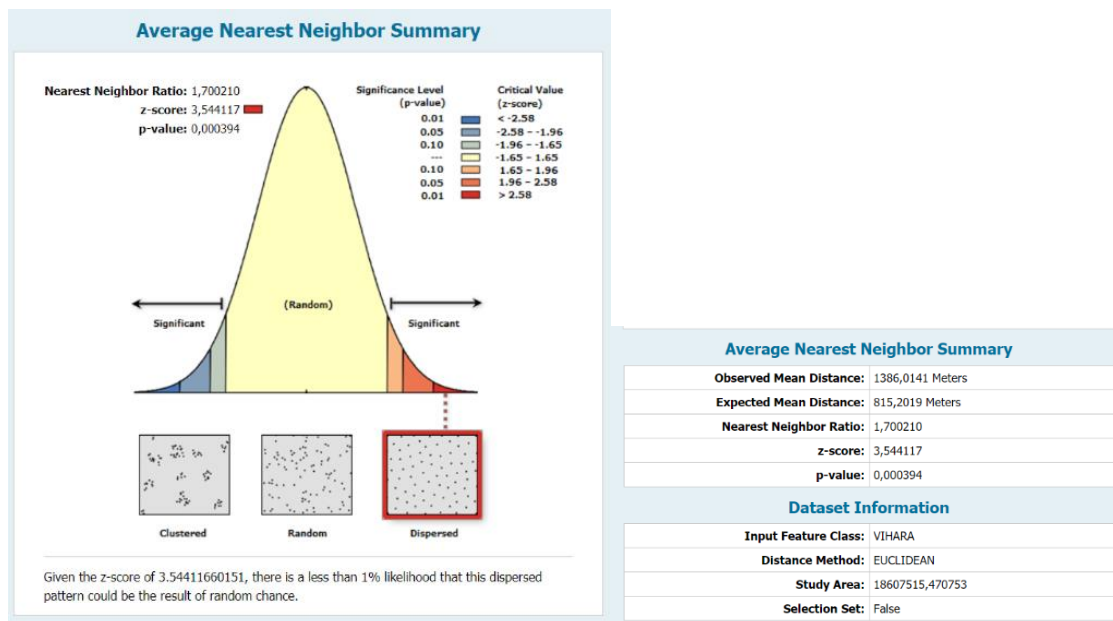
**Figure 3. Results of Mosque Distribution Pattern Analysis in Surakarta**



**Figure 4. Results of Church Distribution Pattern Analysis in Surakarta**



**Figure 5. Results of Pagoda Distribution Pattern Analysis in Surakarta**



**Figure 6. Results of Temple Distribution Pattern Analysis in Surakarta**

The analysis results suggest that the mosque distribution pattern is clustered. As shown in Figure 2, the points showing the mosque locations are divided into some groups, while the majority of them are located in the districts of Serengan and Pasar Kliwon. Meanwhile, its nearest neighbor ratio index was 0.819254, lower than one, signifying its clustered pattern. The obtained z-score was -3.193441, with an average distance between mosques of 282.9145 meters. This grouping of the mosque is affected by the history of Islam dispersion in Surakarta. For instance, the Darussalam Mosque in Serengan District was constructed in the 1960s when there were many nomads from Banjar, Indonesia. Meanwhile, one of the historical and glorious mosques named Masjid Agung Surakarta was located in Pasar Kliwon District. This mosque is one of the popular tourist sites visited by many tourists from other cities. The popularity of

Masjid Agung Surakarta is also correlated with the presence of Kesunanan Surakarta Hadiningrat Palace. This palace is the forerunner of the construction of numerous mosques for the resident of Surakarta and the tourist. Thus, these two districts have clustered mosque patterns.

In addition, the churches have a dispersed distribution pattern with a Nearest Neighbor Ratio of 1.175839 and a z-score of 1.747950. The more than one average index ratio implies the dispersed distribution pattern. Meanwhile, the average distance between churches was 696.9863 meters. Similarly, the pagodas also have a dispersed distribution pattern with the nearest neighboring ratio of 110.756690 and z score of 296.945592, with the average distance between pagodas of 3,045.1869 meters. This great distance among pagodas in Surakarta is induced by the low number of pagodas compared to the area of Surakarta City. The presence of pagodas in the two districts of Surakarta is also affected by various factors, such as the economy and ethnicity factors. One of those pagodas is located near the trading center of Hardjonagoro Central Market. This central market is one of the relatively massive centers of economy and trading, as well as the central area in Surakarta. As many Chinese people are traders, businessmen, or entrepreneurs, many of them can be easily spotted around this central market. Therefore, the pagoda was constructed in this area due to many Chinese people are lived in this area. This pagoda is estimated to be 300 years old and is acknowledged as the oldest Buddhist pagoda in Surakarta. Additionally, this pagoda also functions as a tourist place due to its alluring history and building. Additionally, another pagoda is located in a state university in Surakarta, namely Universitas Sebelas Maret. Similarly, the construction of this pagoda was also affected by the diverse religions of the university's students. Lastly, temples in Surakarta have a dispersed distribution pattern. Its nearest neighbor ratio was 1.700210, and its z-score was 3.544117, with an average distance between temples of 1,386.0141 meters.

### **3.3. Analysis of Worship Places Distribution Based on Demography Data of Population Density**

The population is one of the vital factors in determining the sustainable development progress in an area. The number of population is a factor used in deciding the worship places distribution pattern, focusing on special analysis based on geography, relevant to the population, distribution, and environment (Riadhi, Aidid, & Ahmar, 2020). Population density is correlated with settlement formation that is affected by the socio-cultural system (Kustianingrum, Embunpagi, Azizah, & Indraswari, 2015). Additionally, the social and cultural aspects also affect the people's religion in an area, influencing the places of worship distribution pattern.

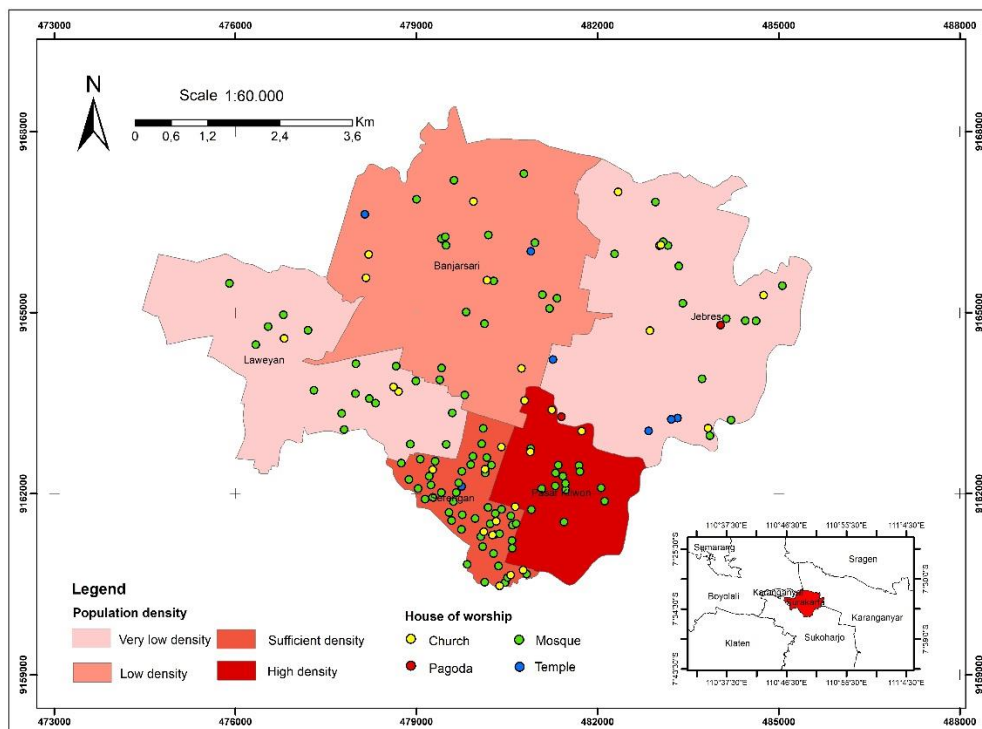
The results of worship places analysis based on population density in Surakarta are illustrated in Figure 7. The population density factor was selected since in an area with a dense population, the available infrastructure and facilities should fulfill the society's needs, such as their needs to conduct worship. The needs of places of worship become urgent, particularly during the religious holidays, creating crowds in the worship places. Therefore, the number of worship places should be adjusted following the population density. Our survey results show that the densest population area is the Pasar Kliwon district, as symbolized by the dark red color in Figure 7. This area has 78,517 people with a population density of 16,289.83 km<sup>2</sup>. The second most populous district is Serengan, with a population of 47,778 people and a population density of 14,977,43 km<sup>2</sup>. However, the population density in Surakarta carries no effect on the

number of houses of worship. For instance, in the most populous district, Pasar Kliwon, there are only 19 places of worship, while in the second most populous district, Serengan, there are 53 places of worship. The number of worship places in each district of Surakarta is shown in Table 1.

**Table 1. Number of Worship Places in Surakarta City**

No	District	Number of Worship Place
1	Laweyan	20
2	Serengan	53
3	Pasar Kliwon	19
4	Jebres	24
5	Banjarsari	24

The construction of a place of worship is regulated in a Joint Regulation of the Minister of Religion and the Minister of Home Affairs No. 9 the Year 2006 and No. 8 the Year 2006 (Kementerian Agama RI, 2006; Kementerian Dalam Negeri RI, 2009), as well as in the Regulation of Minister of Home Affairs No. 9 the Year 2009 on the guidelines for submission of facilities, infrastructure, and housing and settlement utilities in the region, article 13 paragraph 1 (Kementerian Dalam Negeri RI, 2009). The construction of a house of worship should fulfill the special requirement, such as a minimum of 90 congregations, validated by the local official. Our analysis results also indicate that the current distribution pattern of houses of worship in Surakarta is not sufficient to accommodate its population. A similar result is also reported in a study by Widananto et al. (2016), revealing that the average capacity of the houses of worship cannot accommodate the number of religious believers in its surrounding. In several locations, the mosques cannot accommodate all of the Muslim population. Meanwhile, the pagodas have a higher average capacity to accommodate religious followers.



**Figure 7. Map of Population Density Analysis Results**

In addition, the results of the observation are shown in Table 2. Meanwhile, the analysis results of population numbers based on their religion and required places of worship are presented in Table 3.

**Table 2. Number of Population Based on Their Religion**

No	Place of worship	Number of population based on their religion and place of worship
1	Mosque	456,107
2	Church	120,403
3	Temple	1,317
4	Pagoda	160

**Source: BPS Kota Surakarta (2021)**

**Table 3. Calculation Results for Number of Worship Houses**

No	Religion	Place of worship	Number of populations	Results	Number of worship places
1	Islam	Mosque	456.107	5.067,8	5.068
2	Christian/ Catholic	Church	120.403	1.337,8	1.338
3	Buddha	Temple	1.317	14,6	15
4	Confucianism	Pagoda	160	1,7	2

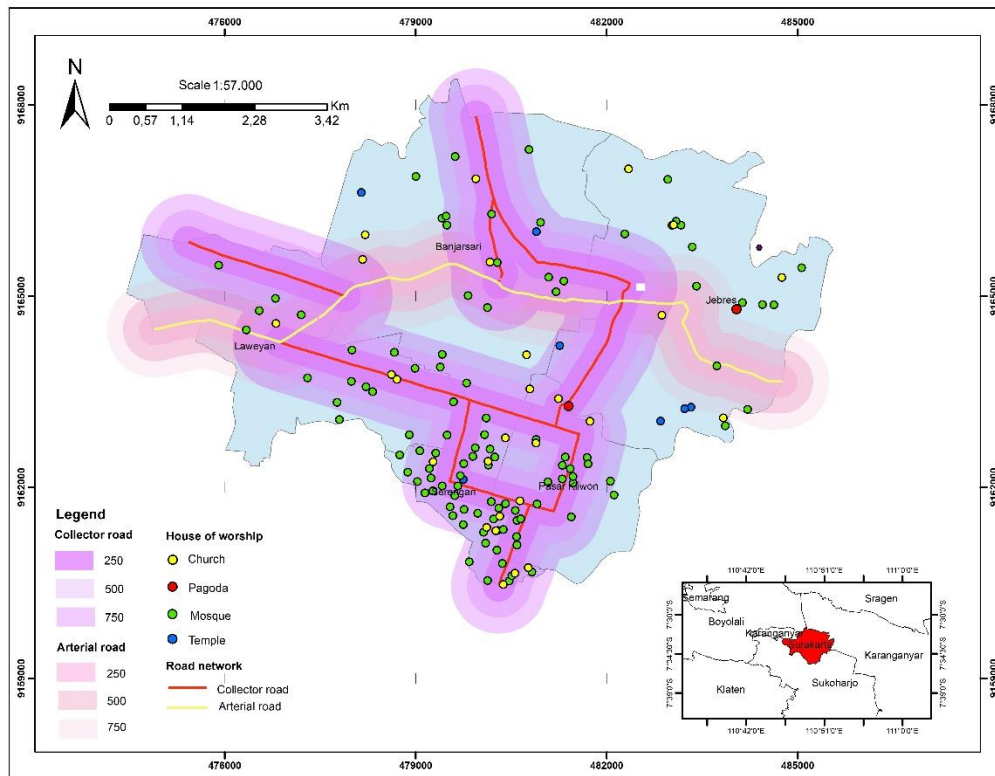
Our analysis results show that, ideally, Surakarta City should have 5.068 mosques, 1.338 churches, 15 temples, and two pagodas spread in all districts. However, our findings show that recently, Surakarta only has 109 mosques, 72 churches, and eight temples. This number of worship houses is still far from the ideal number and is not sufficient to accommodate Surakarta's population. According to the Central Bureau of Statistic Surakarta in 2021 (BPS Kota Surakarta, 2021), the number of mosques, churches, and temples has 575, 118, and four differences, respectively.

### **3.4. Analysis of Houses of Worship Based on Road Network**

The ease of accessibility and the reachable road of the houses of worship affect the society's enthusiasm to conduct worship. The combination of these two aspects is the most excellent combination in the road network factor than the other characteristics (Saskara, Putra, & Wirawan, 2020). In 2021, Surakarta's road network is dominated by small roads in narrow alleys. Accordingly, many houses of worship have minimum space for a parking lot. Besides, most of the worship places' buildings are small and incapable of accommodating many people, so they are not comparable to the number of populations. The distribution of places of worship is illustrated in Figure 8.

We used the collector and arterial roads types of road networks in this analysis. These two types of roads were selected since they were the most passed road, with excellent condition, wide roads, and many strategic points. The effects of these roads on the construction of worship houses were investigated. The arterial and collector roads have differences, such as in their function, driving speed, as well as the width, and capacity of the roads. The arterial road functions to serve transportation for long-distance travel with a speed of around >60 km/hour. The width of the arterial road should be more than eight meters, with a relatively bigger capacity than the average traffic volume, and should not be disrupted by local activities. Meanwhile, the collector road serves vehicles with medium distance with an average speed of

around >40 km/hour. The width of this road is seven meters, with a road capacity more than or equal to the average traffic volume. Similar to an arterial road, the collector road should not be disrupted by the local activities.



**Figure 8. Map of Worship Places Analysis Results on the Road Network in Surakarta**

Each of the road networks was buffered to identify its effects on the road network. Some houses of worship were affected by a buffer at a 250 m distance. The number of worship places that is reachable on the collector road is 51, while on the arterial road are four places of worship. Further, another buffer of 500 m was completed and resulted in 80 and 14 places of worship affected on collector and arterial roads, respectively. In 750 m buffer, all houses of worship in the districts of Pasar Kliwon and Serengan were affected by both collector and arterial roads, leaving only 21 unaffected places of worship. Generally, there is no specific requirement for the selection of buffer distances of 250 m, 500 m, or 750 m. These three distances were selected to see how far the houses of worship could be reached by the highway riders. However, the collector road is observed to carry greater effects on the houses of worship's location since it is the primary road in Surakarta, offering high accessibility and ease of access.

#### **4. Conclusion**

According to the average nearest neighbor analysis result, we conclude that mosques have clustered patterns, while churches, temples, and pagodas have the same dispersed patterns. The population density factor carries no sufficient effect on the number of worship places, in which the most populous district of Pasar Kliwon only has 19 houses of worship, while district Serengan, the second most populous district, has 53 places of worship. Meanwhile, most of the worship house distribution follows the collector road network pattern with a 750 m buffer. The ease of accessibility and high mobility on that road affect the

construction of most houses of worship on this road. Therefore, this paper can be a reference for the future development of Surakarta City and as demography learning material relevant to the distribution pattern with ANN analysis.

## References

- Alamsyah, N., & Wagino, W. (2018). Sistem Informasi Geografis lokasi tempat ibadah di Denpasar berbasis mobile. *Jurnal Ilmiah Technologia*, 9(2), 133-138.
- Animsa, D. R., & Rachmad, A. (2015). Aplikasi pemetaan kantor dinas di Kabupaten Bangkalan Madura berbasis android. *Jurnal Sistem Informasi*, 2(2), 24.
- Aqli, W. (2014). Analisa buffer dalam Sistem Informasi Geografis untuk perencanaan ruang kawasan. *Jurnal Inersia*, 6(2), 195.
- Arisca, W. D., & Agustini, E. P. (2020). Pola persebaran sekolah SMA dan SMK di Kabupaten Ogan Komerin Ulu, Ogan Ilir, Penukal Abab Lematang Ilir, dan Pramulih menggunakan Metode Average Nearest Neighbor. *Jurnal Bina Komputer*, 2(2), 99-121.
- Aziz, M., & Pujiono, S. (2006). *Sistem Informasi Geografis berbasis desktop dan web*. Yogyakarta: Gava Media.
- Basyiroh, N. N., Awaluddin, M., & Nugraha, A. L. (2018). Analisis persebaran dan kebutuhan tempat ibadah berdasarkan jumlah penduduk berbasis SIG (studi kasus: 4 kelurahan di Kecamatan Banyumanik). *Jurnal Geodesi Undip*, 7(4), 27-36.
- BPS Kota Surakarta. (2021). *Kota Surakarta dalam angka 2021*.
- Budiyanto, E. (2002). *Sistem Informasi Geografis menggunakan ArcView*. Jakarta: Andi.
- Fernando, J., Arwan, A., & Kharisma, A. P. (2019). Pengembangan aplikasi informasi tempat ibadah berbasis android (studi kasus: Masjid, Gereja, Pura, Wihara dan Kelenteng di Kota Malang). *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, 3(9), 8554-8562.
- Hakim, A. R., & Rengga Asmara, A. F. Sistem Informasi Geografis Persebaran tempat Ibadah di Surabaya Menggunakan Google Maps API. *Jurnal Informatika dan Komputer PENS*, 1(1), 1-8.
- Hardati, P. (2015). Pola persebaran outlet air minum isi ulang di Kabupaten Semarang. *Jurnal Geografi*, 12(1), 72-82.
- Hartawan, I. P. (2021). Pola persebaran hotel resort di kawasan pariwisata Ubud. *Jurnal Analisa*, 9(2), 1-22.
- Haylan, R. (2019). Pola dan perkembangan permukiman di Kecamatan Mandiangin Koto Selayan Kota Bukittinggi. *Jurnal Buana*, 3(1), 142-153.
- Heldayani, E., Ritohardoyo, S., & Widiyastuti, D. (2015). Pola persebaran perumahan menurut kelompok etnis di Kelurahan Kuto Batu, Kota Palembang. *Majalah Geografi Indonesia*, 29(1), 31-39.
- Hidayat, A. M. (2016). Pemodelan pertumbuhan tata ruang Kota Semarang berdasarkan aspek ekonomi menggunakan konsep analisis spasial citra satelit resolusi tinggi. *Jurnal Program Studi Teknik Geodesi Universitas Diponegoro*, 5(3).
- Ikasari, D., & Irawan, E. S. B. (2019). Pemetaan fasilitas sosial dan fasilitas umum berbasis Sistem Informasi Geografis (studi kasus DKI Jakarta). *Jurnal Informatika Komputer*, 14(1), 12-20.
- Kementerian Agama RI. (2006). *Peraturan bersama menteri agama dan menteri dalam negeri, nomor 9 tahun 2006, tentang pendirian tempat ibadah*. Departemen Agama, Puslibang Kehidupan Keagamaan.
- Kementerian Dalam Negeri RI. (2009). *Peraturan Menteri Dalam Negeri Tahun 2009 Tentang Pedoman Penyerahan Prasarana, Sarana, dan Utilitas Perumahan dan Permukiman di Daerah*.
- Kustianingrum, D., Embunpagi, B., Azizah, R. N., & Indraswari, D. (2015). Pola spasial permukiman Kampong Batik Laweyan, Surakarta. *Jurnal Reka Karsa*, 3(1), 1-13.
- Mukhlis, M., & Musyawarah, R. (2019). Analisis pola persebaran dan keterjangkauan lokasi sekolah terhadap pemukiman di Kecamatan Batauga di Kabupaten Buton Selatan. *Jurnal Environmental Science*, 2(1), 78-86.
- Natoen, A., AR, S., Satriawan, I., & Periansya, P. (2018). Faktor-faktor demografi yang berdampak terhadap kepatuhan WP badan (UMKM) di Kota Palembang. *JRTA*, 2(2), 101-104.

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27(2), 2022, 151-162

- Negara, M. K., Rahardian, R. L., & Widiastira, I. G. N. D. (2020). Sistem Informasi Geografis pemetaan tempat ibadah pada Pulau Bali berbasis mobile. *Journal of Innovation Information Technology and Application (JINITA)*, 2(1), 55–66. <https://doi.org/doi.org/10.35970/jinita.v2i01.198>
- Nugroho, N. (2020). Kebijakan dan konflik pendirian rumah ibadah di Indonesia. *JSA*, 4(2), 1–18.
- Nursuci, S. R. (2013). Sistem Informasi Geografi tempat ibadah di Kota Bogor berbasis web dengan menggunakan quantum GIS. *Jurnal Teknik Informatika*, 1–5.
- Pitaloka, D., & Prakoso, B. S. E. (2016). *Pola spasial persebaran pasar modern dan implikasinya terhadap penataan ruang kawasan strategis ekonomi Kota Jambi*.
- Prasetyo, D. Y. (2019). Implementasi Geographic Information System (GIS) penentuan tempat ibadah masjid di Kecamatan Kempas Kabupaten Indragiri Hilir Provinsi Riau. *Jurnal Sistemasi*, 8(1), 10–18.
- Republik Indonesia. (1959). *Undang-Undang Dasar 1945*. Dewan Pimpinan PNI, Department Pen. Prop. Pen. Kader.
- Riadhi, A. R., Aidid, M. K., & Ahmar, A. S. (2020). Analisis Penyebaran Hunian dengan Menggunakan Metode Nearest Neighbor Analysis. *VARIANSI*, 2(1), 46–51. <https://doi.org/10.35580/variansium12901>
- Rozak, A. M., & Ariastita, P. G. (2013). Pola spatial persebaran pusat perbelanjaan modern di Surabaya berdasarkan probabilitas kunjungan. *Jurnal Teknik POMITS*, 2(2), 234–238.
- Saskara, I. P. A., Putra, I. G. P. A., & Wirawan, K. (2020). Pola sebaran lokasi minimarket dan faktor-faktor yang mempengaruhinya di Kota Denpasar. *Pranatacara Bhumandala: Jurnal Riset Planologi*, 1(1), 1–13.
- Satria, R., Afwani, R., & Anjarwani, S. E. (2021). Rancang bangun Sistem Informasi Geografis untuk pemetaan lokasi tempat ibadah di Kota Mataram Menggunakan metode extreme programming. *J-COSINE*, 5(2), 111–119.
- Septian, M. R., & Lelah, L. (2020). Penentuan rute terpendek untuk mencari lokasi terdekat menuju tempat ibadah di Kota Sukabumi menggunakan Algoritma Dijkstra. *Jurnal Ilmiah Betrik*, 11(01), 1–8.
- Widananto, K., Sudarsono, B., & Wijaya, A. (2016). Analisis persebaran tempat ibadah dan kapasitasnya berdasarkan jumlah penduduk berbasis SIG (studi kasus 5 kecamatan di Kota Semarang). *Jurnal Geodesi Undip*, 5(3), 11–16.