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Unveiling Heritage Through Space

A Spatial Analysis of Tourist Behavior in Kampung Kayutangan, Malang

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Abstract

Malang City is renowned for its rich local wisdom and well-preserved colonial-era heritage in East Java. Kampung Kayutangan is a settlement that exemplifies the city's cultural depth and serves as a significant destination for heritage tourism. This study examines how spatial structures and local knowledge affect tourist experiences by integrating space syntax analysis with axial and visibility graph analysis to forecast pedestrian movement, evaluating spatial connectivity and visibility, and using place-centered mapping results derived from field observations. The findings demonstrate that while syntactic indicators reveal spatial hierarchies and accessibility, visitors are often drawn to culturally meaningful locations, even when these sites are less visible. The study underscores the importance of incorporating local knowledge and historical context into urban spatial planning. By linking analytical methods with grounded cultural insights, this research presents a framework for sustainable heritage management and design that honors a place's identity and memory. Planning strategies should accommodate cultural assets by enhancing accessibility, signage, and amenities in culturally significant yet spatially disconnected areas, and by ensuring that local wisdom continues to inform and enrich contemporary urban development.

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1. Introduction

Malang City is one of East Java's historical cities that emerged during the Dutch East Indies era, with rich historical remains, including colonial architecture (Tutuko et al., 2021). The Malang City Government actively leverages these historical assets to promote heritage tourism, including Kampung Kayutangan as one of the city's prime heritage areas. Kayutangan is widely recognized as a tourist destination for its well-preserved colonial buildings (Antariksa et al., 2024), which are primarily distributed along the main corridor and extend into the *kampung's* internal alley network. These cultural tourism assets include heritage houses, traditional streetscapes, and community-based cultural features that together form a spatial sequence of heritage experiences accessible to visitors. However,

preservation challenges and ongoing modernization pose threats to the area's historical character (Azis et al., 2019; Pramono et al., 2021). As visitors increasingly seek immersive experiences that allow direct engagement with historical, cultural, and architectural identities (Timothy & Boyd, 2006), the development of Kampung Kayutangan as a heritage tourism destination has led to increasingly complex movement patterns among locals and tourists alike. This transformation reflects a broader trend in urban heritage areas, where historical environments coexist with contemporary tourism dynamics (Ernawati & Moore, 2014).

A dynamic and complex relationship between tourism and cultural heritage should be balanced with the demands of accessibility and tourist experience to preserve historical authenticity. Understanding the spatial arrangement of historical places is critical for realizing the full potential of heritage tourism. Information on movement activities and their socio-economic impacts is indispensable (Yang & Qian, 2023). The space syntax approach has been used to investigate the relationship between space and society by analyzing the configuration of the built environment (Hillier & Hanson, 1984). In contrast, it is widely acknowledged that the space syntax approach is practical for simulating human movement patterns (Liu et al., 2018). Some point out that it has limitations in capturing the configurational and experiential aspects of local spaces (Nes, 2021). Urban spaces are influenced by their physical layout and how tourists and locals interact and perceive them (Santosa et al., 2023). The effect of this interplay, as revealed by several previous studies on pedestrian prediction, has undermined the validity of the space syntax approach (Filomena et al., 2020; Yang & Qian, 2023). Combining the methods is not about distinguishing the effects of configurational and functional factors on pedestrian movement patterns, but rather about confirming predictions with direct behavioral observations.

Compared to manually placed-based mapping, which requires observational mapping of important activity nodes and pedestrian movements (Little, 2020), space syntax provides a more objective and measurable knowledge of spatial hierarchies and integration levels (Lyu et al., 2023). This theoretical approach complements traditionally employed methods, such as manually placed center-based mapping, which provides key activity nodes and pedestrian flows but may struggle to reveal underlying structural patterns and integration levels within the spatial arrangement (Wang et al., 2018). The combination of manual place-based mapping provides rich contextual insights and ground-level accuracy. At the same time, space syntax can identify locations that naturally attract movement, and behavior mapping can identify social interaction, prompting deliberate measures to manage visitor flow (Hutson & Solinis-Casparius, 2023).

Integrated methodologies for urban analysis increasingly rely on establishing comprehensive spatial mappings of tourist behavior. The location's attractiveness, organization, and novelty are the primary factors influencing perceptions of the tourist experience (Ernawati & Moore, 2014). Nevertheless, few studies have examined the intricate relationship between spatial configuration and tourist behavior to enhance the overall tourist experience. In the Kayutangan Areas, previous research has extensively analyzed the public perception of heritage spaces (Azis et al., 2019), the impact of community-based activities on spatial dynamics (Antariksa et al., 2024), the studies on emotional and cultural place attachment (Johanda et al., 2024), and the tracing of potential CBD land in historic areas (Tutuko et al., 2021). By mapping movement patterns, interactions, and cultural significance, one can gain insights into the intersection of the spatial logic of urban form with the values and dynamics of spaces.

The primary goal of this research is to promote the preservation of historical structures to improve the educational experience of history by maximizing spatial area. This is crucial for preserving significant cultural heritage and fostering a more inclusive, safe, and resilient city (Kutut et al., 2014). The spatial analysis in this work aims to better understand the spatial structure and movement dynamics inside a historic hamlet that serves as both a residential and tourist destination. Ultimately, this analysis provides insights into how the built environment facilitates or restricts visitor movement while maintaining residential viability for the local community and addressing existing research gaps.

2. Literature Review

Heritage tourism has become a growing trend in the global tourism industry. This tourism is driven by visitors' growing interest in authentic experiences that immerse them in a place's history, culture, and architectural heritage (Timothy & Boyd, 2006). As tourist numbers increase in heritage areas, understanding the relationship between spatial form and human behavior becomes crucial for managing visitor movement, preserving heritage assets, and ensuring the well-being of local communities (Hegazi et al., 2022). This is connected to how spatial structures influence social dynamics and visitor experiences, particularly in heritage contexts (Koseoglu & Onder, 2011). According to Ernawati & Moore (2014), a significant correlation exists between organizations and their attractiveness, suggesting that tourism interaction encompasses the visitation of attractions and the experience of the spatial and social dynamics inherent to a location. Spatial elements, such as paths (routes of movement) and places (nodes of activity and cultural significance), shape tourist behavior and influence their perception of the destinations (Huang et al., 2022). Analyzing these elements allows us to understand how spatial configurations support or hinder visitor flow, social interaction, and cultural appreciation. The research by Lyu et al. (2023) examined the spatial analysis of how people recognize and understand their environment, including environmental images, distance judgment, spatial orientation, wayfinding, and place naming.

In the heritage tourism context, space syntax can be used to investigate the spatial structure of the historic core and give value to suggested locations, helping to identify the best place in the area center to maximize the service of its cultural and socio-economic identity (Eldiasty et al., 2021; Santosa et al., 2023; Zakiya et al., 2025). Space syntax is a spatial analysis theory Hillier & Hanson (1984) developed to explore spatial configurations within the built environment. Space syntax gives a quantitative framework for understanding the relationship between physical space and human behavior by modeling spatial networks using Integration, Connectivity, and Choice measures (Wang et al., 2018). Space syntax is commonly used in heritage sites as a tourist attraction by uncovering the underlying spatial logic of urban forms, offering predictive insights into how tourists navigate and experience the space using the Integration value to assess the significant relation between the elements in heritage areas and the choice value to assess the path used as routes to connect the nodes in linked areas (Hutson & Casparius, 2023).

Since people perceive, use, and assign meaning to spaces, this cannot be done solely through space syntax, as spaces are not only physically important but also emotionally and culturally valued (Johanda et al., 2024). Unlike abstract models that prioritize geometric configurations, the approach highlights the meanings and functions associated with places through human activity, known as place-centered mapping (Poux et al., 2020). Comparing and combining space syntax and place-centered mapping offers different perspectives. This

was due to the space's significant relevance, expressed not only by its physical presence but also by the interpretations derived from people's experiences interacting with it. While the space syntax is detailed in identifying hidden spatial structures and predicting behavioral tendencies based on geometry, it may overlook contextual, social, and cultural nuances. Place-centered mapping fills this gap by bringing behavior mapping by human dimension to the forefront, capturing informal use patterns, community values, and emotional attachment to places (Little, 2020).

In many heritage sites, particularly traditional urban settlements such as kampongs, a duality exists between their role as living residential communities and as tourist destinations (Jyoti & Agusintadewi, 2025). Understanding the spatial patterns that emerge from the spaces used, shared, separated, and contested is essential for promoting harmonious coexistence and sustainable heritage management. Several studies used spatial patterns to explore other contexts, such as primarily treating these heritage sites as either preserved architectural assets (Kutut et al., 2014), the potential land uses in historic areas (Tutuko et al., 2021), the deviation and ratio of spatial arrangement patterns in housing and city development (Bonifacius et al., 2021) and the sense of place in heritage areas (Johanda et al., 2024). This highlights a critical gap in current research on the need for focused spatial analysis that accounts for tourists, particularly through combined methods that incorporate spatial patterns identified through physical and behavioral mapping.

3. Methods

Research Case

The research site is a heritage village located in Malang City, the second-largest city in East Java. In addition to its stunning natural landscapes, Malang is also known for its rich historical tourism, which contributes significantly to the city's economic and social development. The Malang City Government has designated Kampung Heritage Kayutangan as an official historical tourism destination, showcasing an old village dating back to the 13th century. Kampung Kayutangan is situated in Kauman Subdistrict, Klojen District, Malang City. Its strategic location in the city center, particularly on the western side of Jenderal Basuki Rachmat Street, known as the Kayutangan Street Corridor, provides tourists with convenient access to explore various historic buildings throughout the area.

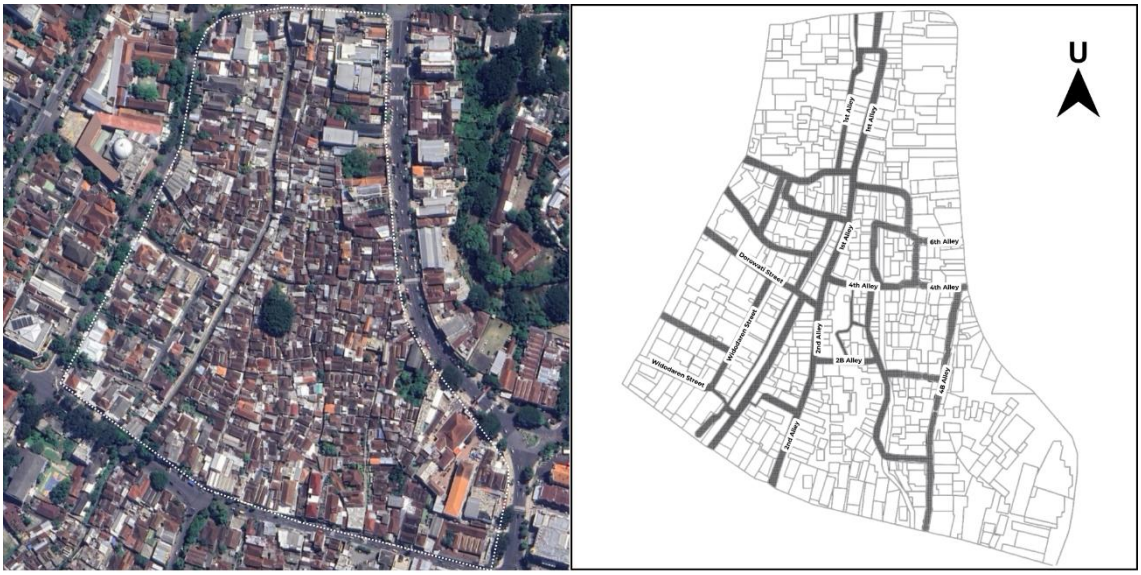

Figure 1. Aerial View and Area Map of Kampung Kayutangan (Author, 2025)

The research location is well known for its representation of developments in colonial architectural style during the Dutch period, particularly in the houses of Kampung Kayutangan. *Figure 1* shows that the area extends north on Semeru Street to south on Arif Rahman Hakim Street, Malang City. This area has become a meeting place for residents and tourists, and as a result, the district's dual functions are connected.

Figure 2. Tourist Attractions in Kampung Kayutangan (Author, 2025)

Kampung Kayutangan is a lively heritage spot with a rich history and cultural legacy. The area features a range of beautifully preserved Dutch colonial-era buildings, each with intricate facades and vintage touches repurposed into adaptive-reuse buildings such as cafés and coffee shops, as shown in *Figure 2*. Plenty of amenities are built to support tourism, like pedestrian paths, vibrant murals, and historical signs that share stories from the past, all part of the heritage tourism experience.

Research Approach

Understanding spatial configuration is crucial for optimizing heritage tourism. Space syntax offers a sophisticated quantitative approach to analyzing spatial layouts by measuring Integration and Choice, which reveal that spaces naturally attract movement and social interaction (Turner, 2007). The space syntax analysis uses axial map analysis to predict the metrics of Connectivity, Integration, Intensity, Mean Depth, and Entropy. Interviews with tourists were not conducted in this study. Instead, the identification of attractive tourism objects was based on a combination of place-centered behavior mapping and movement density observations. Locations with frequent stopping behavior and prolonged visitor presence were interpreted as key attractions (Penn, 2001). This approach allows movement preferences to be inferred directly from spatial behavior patterns and their relationship with spatial configuration. The observers took turns counting pedestrians at six locations during two periods (10:00-12:00 GMT+7 and 18:00-20:00 GMT+7) on all weekdays and weekends. Combining both methods enables cross-validation of empirical data with analytical metrics, offering a comprehensive understanding of how spatial arrangements influence the tourist experience.

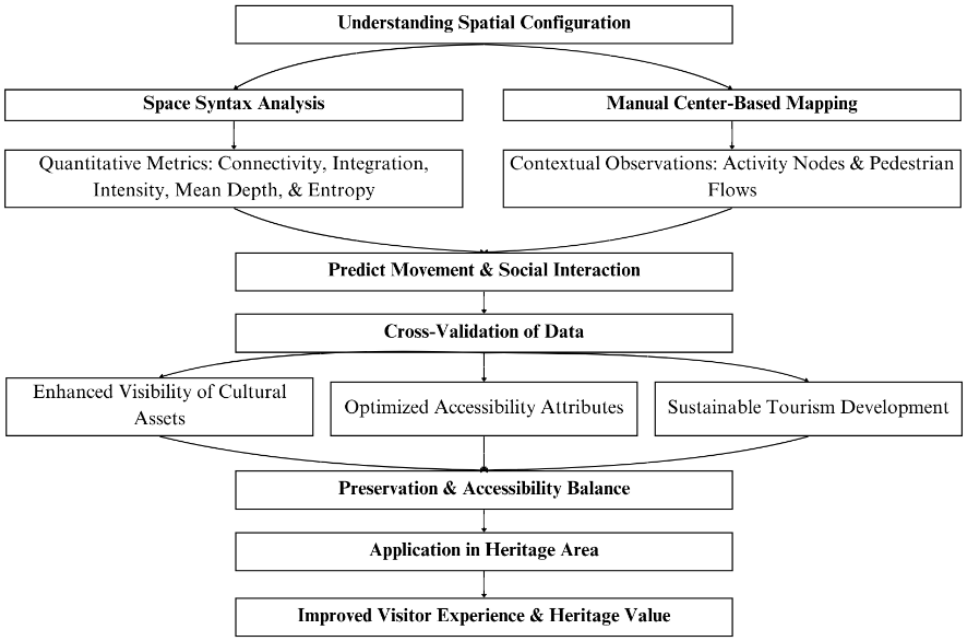

Figure 3. Spatial Heritage Area Configuration Methods (Author, 2025)

Cross-validation can be achieved through empirical observations from manual mapping of the predictive models generated by space syntax, confirming areas of high movement and social interaction (Turner, 2007). Space syntax highlights spaces with high Integration or Choice values, directing attention to streets or nodes naturally conducive to tourism flow, which can be prioritized for signage, interpretation, and preservation (Penn, 2001). Optimizing circulation routes can be achieved by analyzing spatial connectivity, identifying logical circulation paths for tourists, reducing confusion and congestion, and enhancing accessibility to key heritage sites (Hillier & Hanson, 1984). The combined data support design interventions that respect the integrity of the heritage site while enhancing functionality, ensuring that development aligns with community values (Antariksa et al., 2024) and conservation goals (Ashworth et al., 2000; Dovey, 2010). Combining space syntax's analytical results with the contextual richness of manual center-based mapping provides a comprehensive toolkit for heritage tourism planners, as shown in *Figure 3*. It enables informed, multi-layered strategies that optimize spatial configurations, reinforce cultural visibility (Santosa et al., 2023), and promote sustainable tourism development in Kampung Kayutangan (Batty, 2004).

4. Results And Discussion

Overlay and Correlation

Based on the DepthMapX software's calculation steps, an image in DXF format is processed to obtain the Visual Graphic Analysis (VGA) results. The analysis continues to Isovist Area values within the VGA to further understand the relationship between spatial configuration and tourist behavior. Isovist Area extends this understanding by quantifying the total visual openness from that point. VGA shows the Isovist Area in hierarchical color, with the highest path colored red, orange, yellow, and green, and the lowest path colored blue. The result shows that the highest openness area is at the intersection center of the Kampung Kayutangan Area in 4th Alley and 2nd Alley. The lowest area is in the smallest alleys and the cul-de-sac, as shown in *Figure 4*.

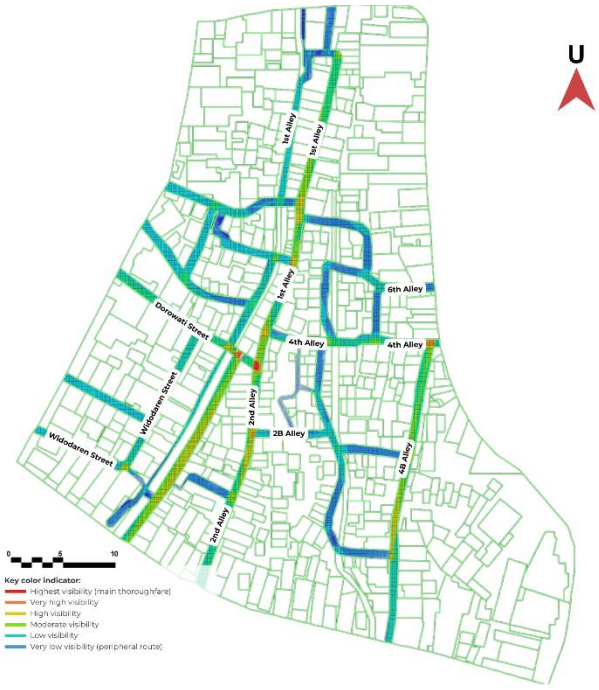

Figure 4. Isovist Area in Kampung Kayutangan (Author, 2025)

The Isovist Area results aligned with the place-centered mapping at those nodes, as shown in *Figure 5*. The nodes are located along the main road, which serves as an interchange between destinations and entrances. This is further supported by behavioral mapping of tourists, which shows that they tend to use this road and decide at the intersection which tourist attraction to visit. In reality, based on place-centered mapping, this intersection connects various alleyways within the kampong. It is surrounded by numerous supporting facilities, such as food stalls, cafés, and souvenir shops, which make the road consistently crowded. The high traffic on this road also influences tourists, especially first-time visitors unfamiliar with the area, to choose it as their preferred route.

Figure 5. Weekly Pedestrian Flows in Kampung Kayutangan (Author, 2025)

To further deepen the spatial analysis, axial map evaluations using shape graph analysis were conducted. These included key syntactic metrics such as Connectivity, Integration, Entropy, and Mean Depth to comprehensively assess the spatial accessibility within the Kampung Kayutangan heritage area. The axial analysis explains that Connectivity captures the number of immediate visual or spatial connections from a given axial line. Integration reflects how easily a location can be reached from all other system parts, indicating its potential for through-movement. These attributes, summarized in *Table 1*, predict the uneven distribution in Connectivity (4 – 153), Integration (1.5 – 5.09), and Choice (0 – 75,241) because some areas are highly valued, while others are minimally valued. This suggests clear spatial hierarchies, with few streets serving as primary connectors or tourist corridors, while others remain peripheral or locally used. The high maximum Choice value (75,241) implies that specific pathways are critical thoroughfares. Moderate diversity in spatial arrangement corresponds to the same result reflected in the Entropy value, which shows low variation (1.83–2.83), and the Mean Depth constant value of 5.92 measures the average number of steps needed to access other lines, illustrating how deep or shallow the space is within the system. By examining these metrics together, the analysis reveals how the spatial structure of Kampung Kayutangan influences tourists' navigation and movement choices.

Table 1. Kampung Kayutangan's Attribute Summary

	Attribute	Minimum	Average	Maximum
1	Connectivity	4	59.6391	153
2	Line Length	4.18411	64.1122	244.237
3	Entropy	1.8322	2.41144	2.83383
4	Integration [HH]	1.50481	2.73161	5.0901
5	Intensity	0.481783	48.0865	1.28873
6	Mean Depth	2.45309	5.91517	5.91517
7	Node Count	1003	1003	1003
8	Relativised Entropy	1.63071	2.16075	3.03113
9	Choice	0	2866.05	75241

Furthermore, this analytical framework identifies mismatches or alignments between spatial accessibility and culturally or economically valued places. In ideal conditions, highly integrated and connected spaces should correspond with heritage landmarks and commercial nodes, ensuring those attractions are easily accessible and visible to tourists. However, in some cases, important places may lie in spatially segregated or low-accessibility zones, creating a disconnect between the value of the place and its visibility and accessibility. These mismatches highlight areas where intervention is needed, such as improving wayfinding, opening visual corridors, and enhancing pedestrian paths to align spatial legibility with the site's historical and experiential value.

In *Figure 6*, the Connectivity attribute in shape graph analysis derived from space syntax reveals the spatial structure and movement potential across the heritage area through local visibility and access. The visual output shows a spectrum of Connectivity values, with red and orange segments indicating highly connected spaces. These segments are predominantly located along the main axial paths, especially in the central north-south and east-west corridors, forming the primary routes for tourists' movement. The yellow and green segments represent moderately connected paths that serve as secondary routes, supporting main arteries by linking them to smaller local streets. The blue segments with

the lowest Connectivity values are often narrow alleys or peripheral routes that are visually and spatially less accessible, and thus less likely to attract spontaneous tourist movement.

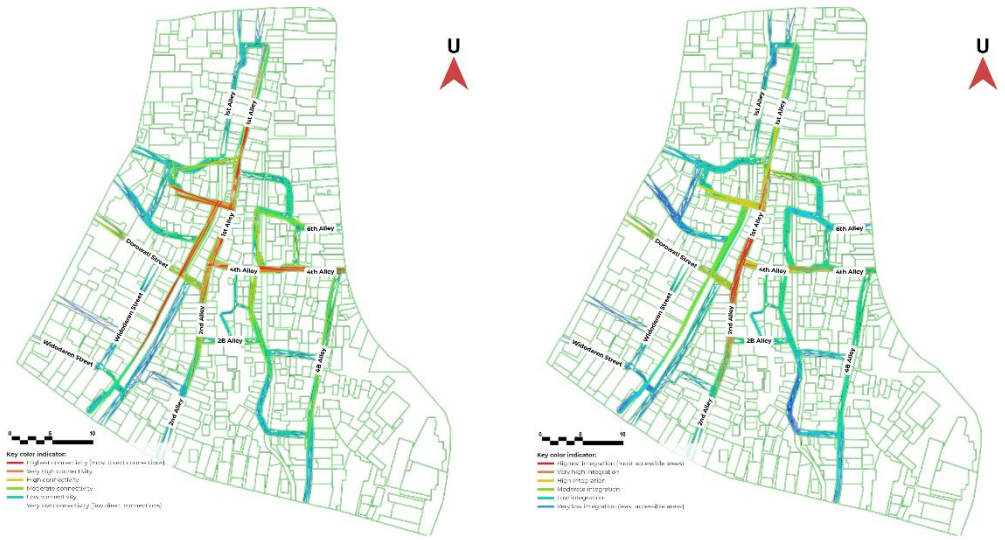

Figure 6. Connectivity (Left) and Integration (Right) in Kampung Kayutangan (Author, 2025)

Compared with the Integration attribute results, the measure of accessibility to the entire system shows that both maps highlight the main north-south and east-west paths in the center of Kampung Kayutangan as the most prominent segments. While the Connectivity result shows that some side roads are more evenly distributed, and also appear more active, the Integration result concentrates red areas around the core axial intersection, showing their strategic importance to help identify key movement attractors and potential flow channels, and measures how easily a space can be reached from all other spaces.

Tourist Behavior vs Spatial Configuration

As first-time tourists to Kampung Kayutangan, they seek cultural richness through heritage tourism. When the tourists enter the area through the entrance corridors from the main road (Kayutangan Street), they tend to follow the most visually clear and spatially integrated paths. This path guides newcomers through primary streets, offering a greater line of sight and directional continuity. These roads are often perceived as 'safe' or 'obvious' options, especially for those unfamiliar with the neighborhood's layout. Tourists will pause at intersections and vibrant nodes, where sensory cues such as signage, crowd, café activity, or architectural landmarks converge. These decision points play a crucial role in guiding movement toward specific attractions. However, tourists' behavior diverges when non-integrated but meaningful places, such as colonial houses and photo spots, are involved. While these may not be on the most heavily trafficked routes, tourists will receive prior information via online guides such as social media and maps. Others may stumble upon them after being drawn in by a visual glimpse through narrow alleys or following other tourists' movements. In summary, the tourist's behavior underscores the importance of combining clear spatial design with interpretive signage, storytelling, and visible cultural cues to ensure that meaningful places that are spatially hidden are not overlooked.

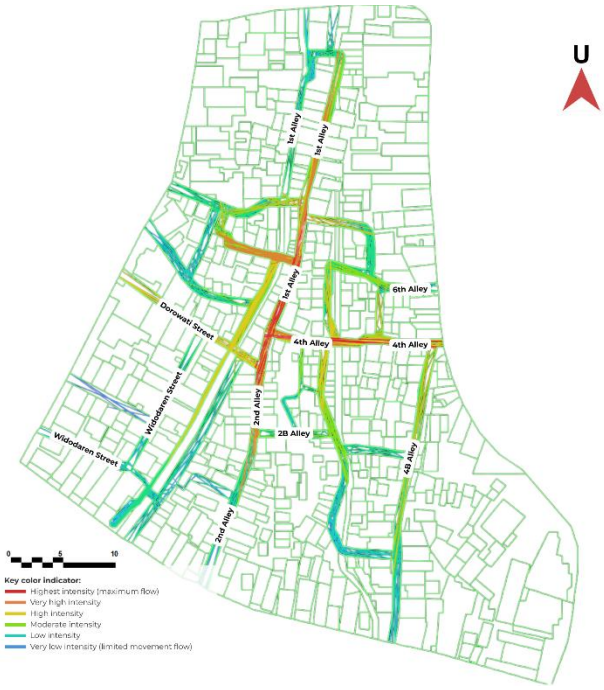

Figure 7. Intensity in Kampung Kayutangan (Author, 2025)

The tourist behavior reveals crucial insight: spatial accessibility does not always align with the experiential or cultural value. While space syntax highlights structurally dominant routes that shape movement, it may overlook emotionally or historically significant nodes that are spatially secluded. Some highly accessible areas may serve as thoroughfares without meaningful engagement. Direct mapping via place-centered mapping yields results that are mainly consistent with the findings from Connectivity and Integration metrics in the space syntax framework. The observed flow of tourists confirms the main movement corridors identified; however, several specific points and paths emerge as local attractions for tourist activity despite not being highlighted as highly intensive in the DepthmapX spatial analysis in *Figure 7*.

Figure 8. Crowd Accumulation in Kampung Kayutangan (Author, 2025)

A notable example based on direct observation of crowd accumulation mapping in *Figure 8* is the intersection of 4th Alley and 6th Alley, which includes the Latar Ombo area with three colonial houses, aligned with a large hall in front that serves as a visually and historically compelling attraction, along with Canal Kayutangan, beside the settlement river, a hidden but popular tourist attraction in Kampung Kayutangan. Although space syntax results categorize this path as having moderate to low levels of Connectivity and Integration, on-site observations indicate a high tourist presence. This suggests that spatial accessibility is not the only factor determining tourist movement; facilities, aesthetic appeal, historical significance, and unique spatial experiences can significantly influence tourists' movement preferences. This is further supported by the mean depth and entropy attribute values, which demonstrate that certain areas, although more embedded in the spatial system (high depth), may still offer a sense of clarity and order (low entropy), making them psychologically approachable despite their low syntactic prominence, as shown in *Figure 9.*

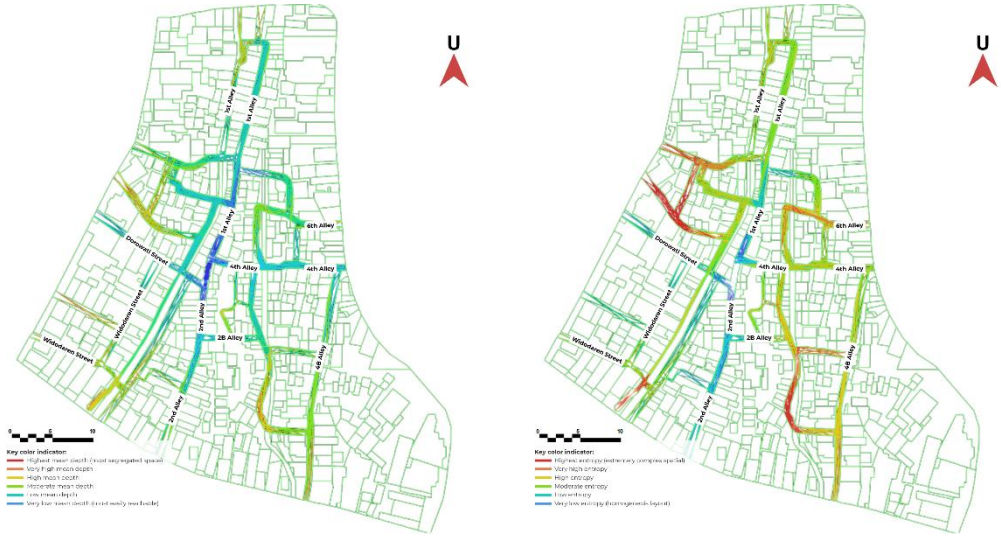

Figure 9. Mean Depth (Left) and Entropy (Right) in Kampung Kayutangan (Author, 2025)

Therefore, understanding tourist behavior in Kampung Kayutangan requires more than reading about spatial accessibility; it requires direct observation of the attractions there. This is essential for identifying and enhancing underappreciated yet meaningful locations, and for managing movement through structurally dominant yet less culturally rich spaces.

Linking Spatial Configuration with Cultural Context

The importance of complementing quantitative spatial analysis with qualitative place-based mapping lies in achieving a comprehensive understanding that captures more contextual richness than purely syntactic analysis may overlook. Space syntax analysis has a robust capacity to identify key structural routes, providing invaluable data on spatial configuration and movement potential within urban contexts (Hillier & Hanson, 1984). However, this method may underrepresent culturally meaningful micro-spaces, such as narrow alleys, pocket courtyards, and informal gathering areas, which contribute significantly to the tourist experience and local identity (Zou et al., 2023). For instance, cultural micro-centers such as Latar Ombo Place, located at the intersection of 4th Alley and 6th Alley (*Figure 10)*, attract visitors not primarily because of their spatial prominence but

rather because of their aesthetic appeal, historical character, and local narratives that enrich the tourist experience (Lynch, 1960).

Figure 10. Latar Ombo Place in Kampung Kayutangan (Author, 2025)

Latar Ombo is an area in front of the house that connects three historical houses in Kampung Kayutangan. These houses are the D'Penghulu house, the Jengki house, and the 1870 house, which blend colonial and local architectural elements. This location has relatively low spatial intensity (represented by the blue values in the syntactic analysis), but place-centred behavior mapping reveals consistently high visitor presence and stopping behavior. These heritage houses collectively form a recognizable image of Kampung Kayutangan tourism, demonstrating how cultural value and experiential qualities can outweigh spatial centrality in shaping tourist attraction.

Similarly, the Kayutangan Canal functions as a pedestrian corridor along the river within Kampung Kayutangan, as shown in *Figure 11*. This canal has undergone renovations to enhance tourism in Kampung Kayutangan and has also been beautified to serve as a photo spot. Despite its location deep within the kampung and limited direct accessibility due to winding alleyways, the canal remains a popular destination following recent revitalization efforts that enhanced its visual appeal and photo-spot status. This condition highlights a spatial mismatch between configurational accessibility and experiential attractiveness, reinforcing the need to consider both syntactic and qualitative dimensions when evaluating tourism movement.

Figure 11. Kayutangan Canal in Kampung Kayutangan (Author, 2025)

To enhance the visibility of cultural assets that affect the overall tourist experience (Jyoti & Agusintadewi, 2025)It is essential to improve accessibility to these less-connected but culturally valuable areas through strategic interventions. These include installing better signage, interpretive markers, and digital or physical wayfinding tools to encourage tourists to explore beyond the main thoroughfares (Anggraini, 2019; Wan, 2024). Furthermore, enhancing essential facilities like seating, shade, lighting, and rest stops along the less-traveled yet culturally significant paths can increase comfort and promote exploration (Zakiya et al., 2025). Clear visual cues and interactive maps at strategic decision points can also assist tourists in making informed choices that ensure spatially dominant and contextually valuable areas are integrated into their journey (Ashworth et al., 2000; Dovey, 2010).

The area can foster a more inclusive, immersive, and sustainable tourism environment by bridging the analytical rigor of space syntax with the nuanced understanding derived from place-based mapping and ethnographic insights. This approach respects the movement patterns shaped by spatial configuration and the intangible qualities of place, such as atmosphere, memory, and local identity, that collectively shape meaningful tourist experiences (Huang et al., 2022; Lyu et al., 2023). Ultimately, such integrative planning enhances the cultural vitality of heritage areas while distributing tourist flows more evenly, mitigating overcrowding on main routes, and preserving the authenticity of micro-centers' cultural spaces.

Besides heritage micro-centers, a potential tourism route can be created along streets that undergo selective modernization, retaining an ‘old village' feel. These routes feature small food stalls and vendors at 1st Alley, 2nd Alley, and Krempeyeng Market, offering modern culinary products in a nostalgic setting that blends tradition with contemporary touches. These streets are particularly active in the evening, forming a complementary tourism trail that differs from the heritage-focused daytime route. Although these routes and temporal activities are not strongly reflected in space syntax values due to their limited spatial integration and time-dependent use, place-centred mapping and observational data indicate their importance in shaping visitor movement and experience.

5. Conclusion

This study has revealed that a combination of spatial configuration and place-based meaning shapes the tourist experience in Kampung Kayutangan. Through the integration of space syntax analysis (including Connectivity, Integration, Intensity, Mean Depth, and

Entropy attributes) and supported by place-centered mapping, it becomes evident that tourists are not solely guided by spatial accessibility but also by visual appeal, historical resonance, and social activity concentrated in specific micro-locations. Although axial lines with high connectivity channel significant pedestrian movement, some culturally significant nodes can also attract tourists, even with moderate-to-low syntactic values. This indicates a mismatch between the structural importance and the perceived value of some parts of the heritage area.

The study also demonstrates how space syntax offers a macro-level understanding of movement potential and spatial hierarchy, while place-centered mapping captures ground-level behavior, preferences, and interactions. Using these methods together provides a more comprehensive picture of spatial experience, identifying high-traffic areas and 'hidden gems' that matter to tourists. This dual approach also supports more informed recommendations for interventions, such as installing directional signage in deeper alleys, enhancing amenities in under-visited cultural spots, and preserving routes with both functional and symbolic significance. For future research, more robust data collection methods, such as visitor interviews or temporal movement analysis, can enrich the understanding of spatial behavior over time and across all tourist seasons. Furthermore, extending the study to compare Kampung Kayutangan with other heritage areas, or expanding the scale of the research object areas, could offer valuable insights into how spatial factors influence tourism across different historical and urban contexts.

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