A Study on the Image of Areas in Tokyo through Airbnb Website for International Tourists

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1. Introduction
1.1 Background and Aim
Today, technological advancements enable people to have easy access to a wide range of information about cities, even though they have never been there before. Especially for tourists, websites play an important role in forming their initial impressions of a city. Airbnb is one of the most popular accommodation platforms that offers rental properties from individual hosts, known as listings[1]. Besides providing a place to stay, these listings influence tourists' image of a city through descriptions of neighbourhoods and nearby attractions written by the hosts[2]. Focused on Tokyo, a popular international visiting destination, this research analysed locations and descriptions of the listings on the Airbnb website, aiming to illuminate the image of popular tourist areas in Tokyo for international visitors.

1.2 Methodology
1.2.1 Airbnb Contents as Research Material
To extract the contents from Airbnb.com, this research defined the homepage with the search bar of listings as Layer 1. After searching the area keyword, the next page which shows the result of listings as Layer 2, and the details page with text description introduced by hosts of each listing as Layer 3. The location of each listing from Layer 2 and the tourist spots extracted from text descriptions from Layer 3 were analysed respectively to provide an image of areas in Tokyo (Fig.1).

1.2.2 Research Subject Areas
This research focused on eight popular areas, identified through seven well-known international guidebooks of Tokyo. These areas, referred to as subject areas and also serve as search keywords ('keywords' for short) of research subject listings, include Ginza (GN), Ueno (UN), Asakusa (AS), Harajuku (HR), Aoyama (AO), Shibuya (SB), Shinjuku (SJ), and Nihonbashi (NB) (Table.1).

2. Airbnb Listings Location Analysis
This chapter analysed the distribution of listings searched with each subject area for further discussion. Given the design of the search engine of the Airbnb website, all listings[3] that include the keyword in their title or introduction text will appear in the search results. Throughout mapping these listings, we illustrated the spread of listings with each subject area. An outline was drawn to simplify the gathering of listings on the map (Fig.2). The distribution patterns reveal an obvious expansion trend in most areas, with listings spanning nearly the entire area of Tokyo's 23 wards. The findings show that, regardless of their geographical location, most listings frequently mention these popular keywords, especially Shibuya, Shinjuku, Harajuku and Ueno, in their textual description to gain higher exposure on
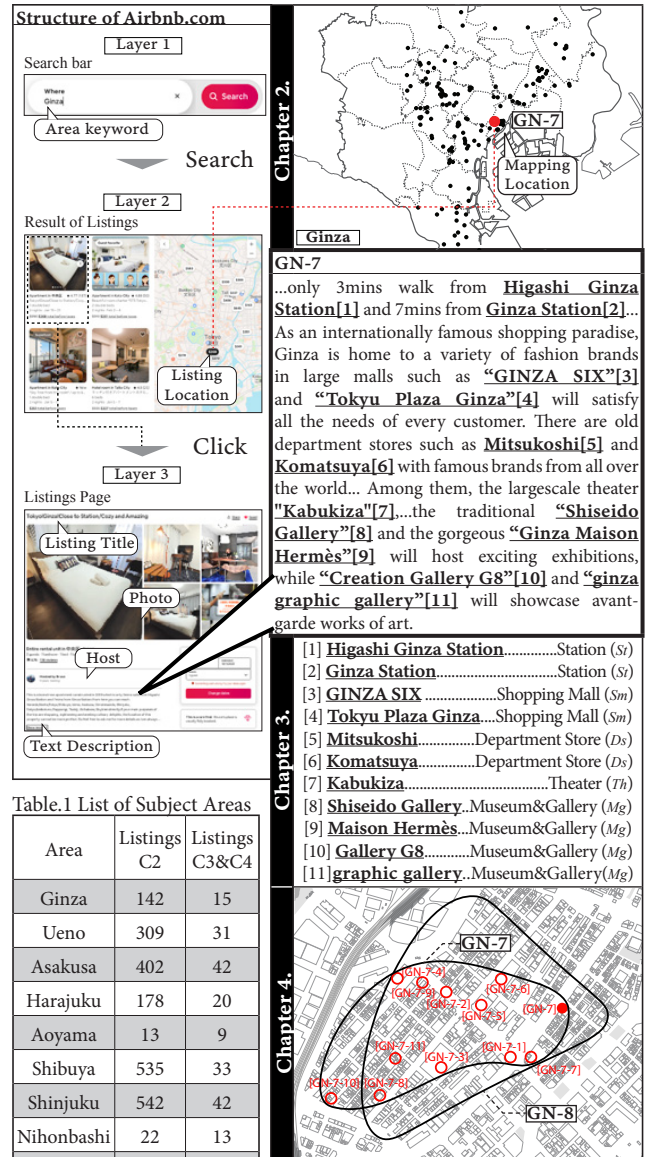

Structure of Airbnb.com

GN-7

...only 3mins walk from **Higashi Ginza Station[1]** and 7mins from **Ginza Station[2]**... As an internationally famous shopping paradise, Ginza is home to a variety of fashion brands in large malls such as **"GINZA SIX"[3]** and **"Tokyu Plaza Ginza"[4]** will satisfy all the needs of every customer. There are old department stores such as **Mitsukoshi[5]** and **Komatsuya[6]** with famous brands from all over the world... Among them, the largescale theater **"Kabukiza"[7]**,...the traditional **"Shiseido Gallery"[8]** and the gorgeous **"Ginza Maison Hermès"[9]** will host exciting exhibitions, while **"Creation Gallery G8"[10]** and **"ginza graphic gallery"[11]** will showcase avant-garde works of art.

[1] **Higashi Ginza Station**..............Station (*St*)
[2] **Ginza Station**................................Station (*St*)
[3] **GINZA SIX** ....Shopping Mall (*Sm*)
[4] **Tokyu Plaza Ginza**....Shopping Mall (*Sm*)
[5] **Mitsukoshi**...............Department Store (*Ds*)
[6] **Komatsuya**...............Department Store (*Ds*)
[7] **Kabukiza**.....................................Theater (*Th*)
[8] **Shiseido Gallery**..Museum&Gallery (*Mg*)
[9] **Maison Hermès**...Museum&Gallery (*Mg*)
[10] **Gallery G8**............Museum&Gallery (*Mg*)
[11] **graphic gallery**..Museum&Gallery(*Mg*)

Fig.1 Research Flow Example

Table.1 List of Subject Areas

Area	Listings C2	Listings C3&C4
Ginza	142	15
Ueno	309	31
Asakusa	402	42
Harajuku	178	20
Aoyama	13	9
Shibuya	535	33
Shinjuku	542	42
Nihonbashi	22	13
Total	2143	205

Based on the listings location for each keyword area, simplify and obtain the corresponding outline

Nihonbashi

- listing location
- Aoyama
- Nihonbashi
- Ginza
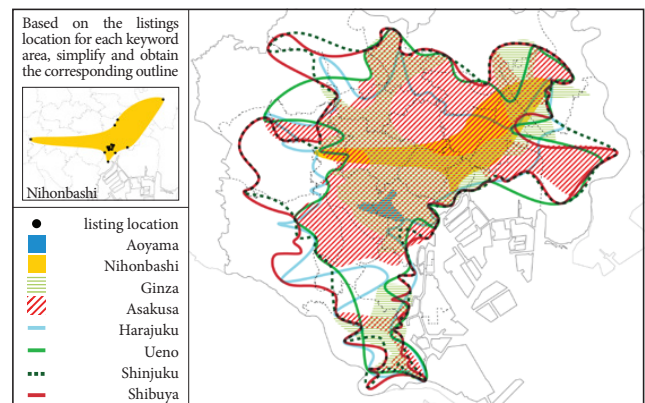- Asakusa
- Harajuku
- Ueno
- Shinjuku
- Shibuya

Fig.2 Distribution of Listings by Each Keyword

the Airbnb platform. However, Aoyama presents a stark contrast, with its listings only occupying a small vicinity around its actual geographic location. Similarly, Nihonbashi's listings also exhibit a compact distribution with slight expansion towards the northeast.

In order to obtain a clearer area image without the influence of those 'noise' listings, the listings narrow-down process is necessary for further discussion.

3. Analysis of Picked Tourist Spots

As depicted in Fig. 1, the text description of Layer 3 covers not only the traffic accessibility of listings but also contents conveying the charm of their surroundings, especially various tourist spots. This chapter analysed the tourist spots picked by Airbnb hosts ('spots' for short) extracted from text descriptions in the listings, to provide an image of characteristics on subject areas.

3.1 Selected Subject Listings

Responding to the spreading situation outlined in section 2.2, this chapter implemented a refinement of the research target, specifically narrowing down the listings to those hosts' descriptions introducing the subject areas as part of the neighbourhood[4].

3.2 Characteristics Analysis

Spots were categorized into four main themes: Context Item, Commerce, Entertainment, and Culture, reflecting their attributes (Fig.3). Context Item which means basic geographical information about the area, includes sub-categories like Station (*St*), Water (*Wa*), Intersection (*In*), and Park (*Pa*). Other spots were classified by their function or associated activities: Commerce (Shopping Street (*Ss*), Shopping Mall (*Sm*), etc.), Entertainment (Eat and Drink (*Ed*), Observation (*Od*), etc.), and Culture (Temple and Shrine (*Ts*), Monuments and Statues (*Ms*), etc.). Given that Context Item provides foundational descriptions, it was presumed that they barely influence the characteristics of the area. Therefore, they were excluded from the ratio comparison (Fig.4).

The results indicate that the Commerce category predominates with a total of 447, followed by the Culture category with 290, and the Entertainment category,

which has the least, with 184 times of mention. Based on the distribution model of the total spots, three distinct groups were identified: high-cultural (NB, GN, UN), high-entertaining (AS, AO), and high-commercial (SJ, HR, SB).

Among the high-cultural groups, GN stands out for being comprised solely of culture and commerce spots, and occupies the highest frequency of *Ms*. Within the high-commercial category, SJ and HR exhibit the high popularity of *Ss*, whereas SB features a multitude of commercial establishments of *Sm*, with 53 mentions. This distinction may stem from Shibuya109's dual role as a shopping mall and a notable landmark, strongly appealing to tourists. As for the high-entertaining group, AS is simultaneously remarkable for its proportion of *Ts*, representing a significant interest in local religious sites.

4. Boundary defined by Picked Tourist Spots

This chapter used tourist spots from Chapter 3 to define an area boundary (termed as 'defined boundary'), aiming to explore its relationship with administrative boundaries and draw out the territorial image of subject areas.

4.1 Boundary Analysis

Each Listing, based on its location and picked spots, was represented as an individual boundary (depicted as a closed curve). The collective outline formed by the overlapping of these closed curves is considered as the defined boundary of the area. Furthermore, an area where the frequency of overlapping exceeds 70% is identified as the core area within these defined boundaries (Fig. 5). In this framework, administrative boundaries are denoted by 'A,' the core area by 'Z,' and defined boundaries by 'S.' The Center Coincidence Rate was calculated as $A \cap Z/A$, and the Expansion Rate as S/A. Based on these metrics, the relationship between administrative and defined boundaries was divided into four types: **Type I** Low-expansion, Low-center coincidence (SB, AO), **Type II** Low-expansion, Medium-center coincidence (HR, AS, SJ, GN), **Type III** High-expansion, Medium-center coincidence (NB), **Type IV** Medium-expansion, High-center coincidence (UN).

Context Item	Characteristics	Examples		Total(1478)	NB(95)	GN(97)	UN(267)	AS(291)	AO(47)	SJ(319)	HR(129)	SB(233)
	Station	AS-1-1: ...walk away from Kuramae Station...	St	462	42	42	100	72	16	105	47	38
	Water	NB-3-3: ...on foot along the "Sumida River"...	Wa	26	1	0	9	15	0	0	0	1
	Intersection	SB-3-4: ...Shibuya crossing is famous.	In	21	0	0	0	0	2	0	1	18
	Park	SB-3-5: ...Yoyogi park is within 10min...	Pa	48	0	1	21	3	2	3	9	9

Fig.3 Characteristics Categories with Examples (Commerce / Entertainment / Culture):

Category	Characteristics	Examples	Abbr
Commerce(447)	Store	HR-6-8: ...Hermes Omotesando - 5 min...	Sto
	Department Store	NB-4-5: ...to Mitsukoshi Department Store...	Ds
	Shopping Mall	GN-9-3: ...Ginza SIX-Newly opened in 2017...	Sm
	Market	GN-2-5: ...friendly Tsukiji Outer Fish Market...	Ma
	Shopping Street	GN-10-5: ...Ginza Avenue is one kilometer...	Ss
Entertainment(184)	Zoo&Theme Park	UN-2-13: ...and ueno zoo to visit...	Zt
	Eat&Drink	AO-4-7: ...LIVE Restaurant Aoyama..	Ed
	Club&Live house	SB-2-2: ...Club Camelot 0.2km...	Cl
	Observation	NB-3-4: ...high buildings and Tokyo Sky Tree...	Od
	Stadium	HR-1-4: ...Jingu Stadium – 10 minutes...	Std
	Greening	HR-1-3: ...Jingu-Mae Park – 7 minutes...	Gn
Culture(290)	Temple & Shrine	HR-1-7: ...leads to the Meiji Shrine, one of...	Ts
	Monuments & Statues	SB-5-3: ...main highlights of...Hachiko Statue...	Ms
	Education	UN-6-6: ...walk route: ...University of Tokyo...	Edu
	Theater	GN-7-7: ...the large-scale theater "Kabuki"...	Th
	Museum&Gallery	NB-5-7: ...Daiichi Sankyo Medicine Museum...	Mg
	Arts center	SB-2-10: ...Bunkamura 0.6km...	Ac

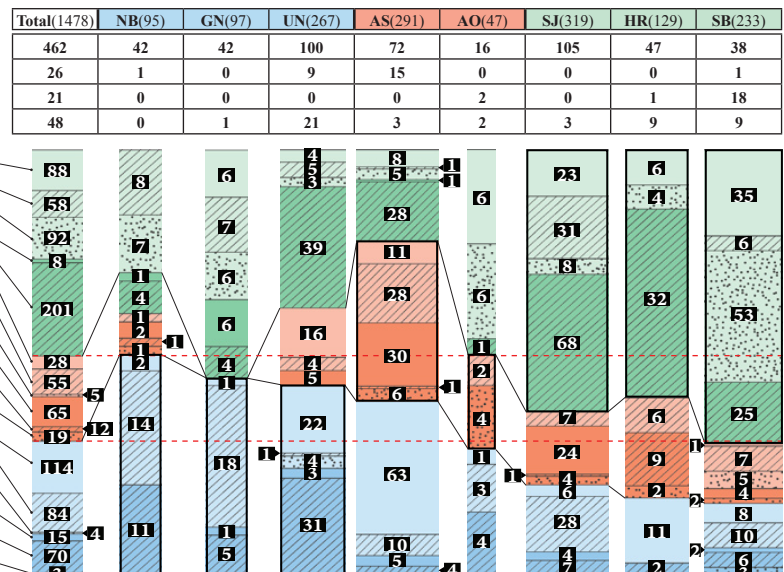Fig.3 Characteristics Categories with Examples　　Fig.4 Characteristics' Proportions

Half of subject areas exhibit a **Type II** pattern, showing a center coincidence rate around 20% to 35% and an expansion rate between 500% and 1500%. SJ and AS show similar characteristics, while famous tourist spots (Kabukicho, Sensoji etc.) are situated within administrative boundaries, anchoring the central core attached to the administrative zone, newly built landmarks such as the Tokyo Metropolitan Government Building and Skytree tend to expand the core area outward. While HR and GN show a different feature. In HR, frequently mentioned spots gathered into two separate clusters, resulting in a divided core area.
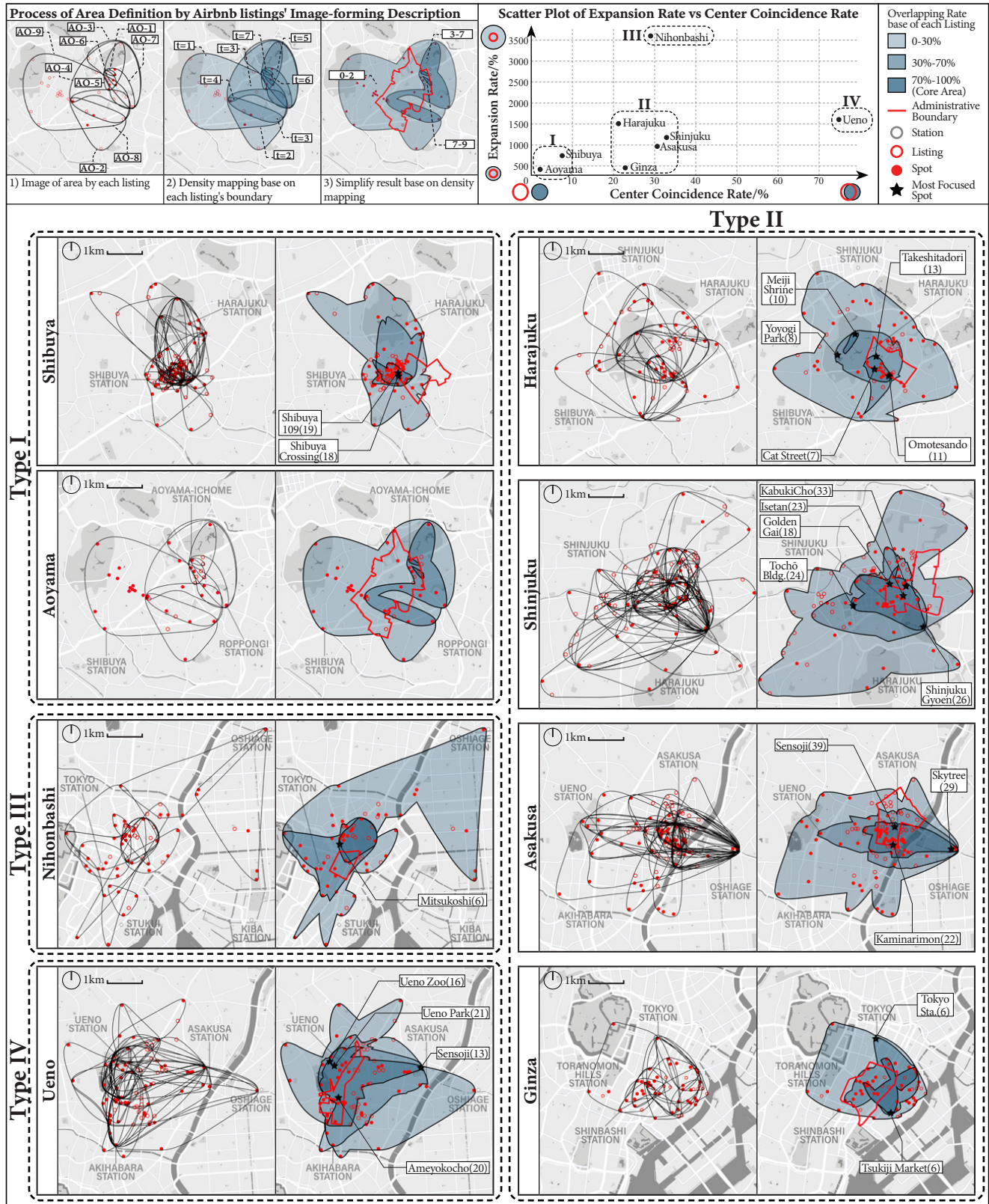
Fig.5 Discussion of Postional Relationship about Boundary
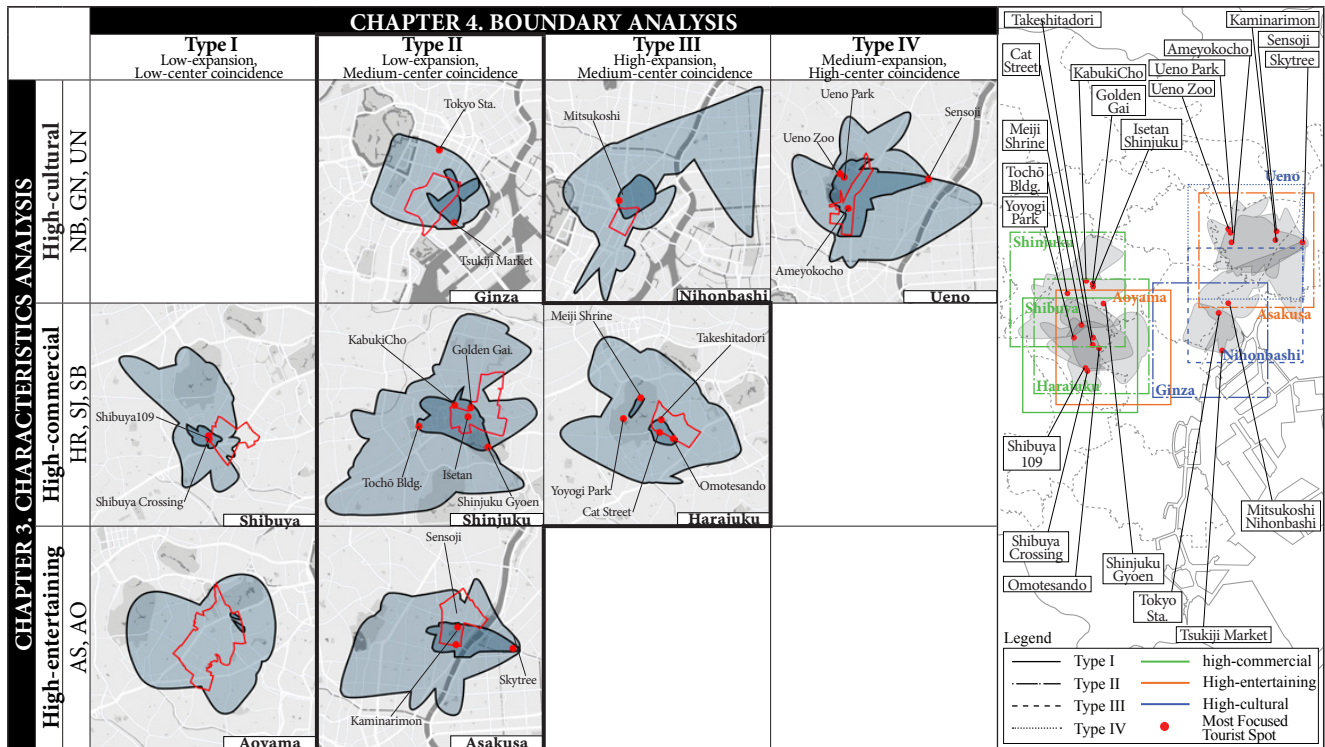
Fig.6 Overall Area Images

Conversely, in GN, two significant spots (Tokyo Sta. and Tsukiji Market) in neighbour areas drag the core area from two directions. This finding suggests that notable spots lead to the cognitive integration of neighbour areas' boundaries. In **Type I**, SB and AO, despite similar rates, show different boundary relationships. SB's expansion originates from highly concentrated spots (Shibuya109 and Shibuya Crossing), whereas AO's boundary is shaped by evenly distributed spots across the area. **Type III** is marked by significant defined boundary expansion, likely because of the limited number of notable tourist spots in Nihonbashi, hosts tend to grab nearby spots in Ginza, Tokyo Station even Asakusa as their neighbours. **Type IV** is distinguished by a substantial overlap (over 70%) between the administrative and core boundaries, though most high-frequency spots (like Ueno Zoo) are located outside the administrative boundary.

5. Comprehensive Analysis

This chapter's analysis reveals the overall image of subject areas through the association of the findings of Chapters 3 and 4 (Fig.6).

The analysis reveals a consistent boundary relationship trend among high-commercial groups, particularly in SB and SJ. In these areas, the core areas are positioned near the center of each defined boundary and overlap only marginally with the administrative boundaries. Uniquely, the defined boundaries of these two areas leave part of their respective administrative boundaries uncovered.

Viewing Tokyo's 23 wards in totality, these defined boundaries merge in two extensive parts: SJ, SB, HR, and AO in the west of Tokyo, and UN, AS, NB, and GN in the east. In the western part, the defined boundaries overlap tightly and intensively, while in the eastern part, they connect sequentially, with NB acting as a bridging point, and clearly delineating the outline of the boundary in each area. A pattern illustrates where the western part leans towards a commercial area, whereas the eastern part is more culturally attractive to international tourists. This distinction likely arises from urban development patterns, with commercial spots gathering and creating areas of high density, while unique and dispersed cultural spots lead to a more scattered distribution.This finding reflects the impact of historical urban planning and development on a large urban scale. It also suggests that the expression of area characteristics can be transferred by notable spots in between the interconnected boundaries. From the perspective of territorial image, cognitive boundary types do not display a clear spatial trend in distribution.

6. Conclusion

This study delves into eight popular areas among international visitors, analysing the location and tourist spots of listings on Airbnb website to illuminate the area image in Tokyo. These listings show that the territorial image of these areas is shaped by an expanded perceived boundary, heavily influenced by featured spots regardless of the administrative zone. The distribution of these spots causes varying shifts in boundary perception, suggesting that the territorial image is dynamic and inclusive. This perception differs from local perspectives, as international visitors often associate areas with their standout features rather than administrative boundaries. Thus, the image of characteristics in these areas extends beyond individual boundaries, conveying and being amplified as part of a broader regional image in Tokyo.