



# An Attempt to Assess the Need and Potential of Aesthetic Regeneration to Improve Walkability and Ergonomic Experience of Urban Space

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**Abstract.** The tempo of Industrialization within a city and that too in a developing context, along with rapid and uncontrolled urbanization and consequent expansion tend to reveal a lack of attention to the inner well-being of its communities and constituent individuals comprising the communities. Hence, a gap between the choice of a decision maker determining the expected conditions of the livability of urban environment and the quality of life expected by communities and individuals is gradually aggravated. Contemporary approaches in city planning however advocates more inclusive and ‘people-centric’ development to ensure processes of regenerating the city, as a whole.

To explore the interrelationship between the communities and the spaces, the paper focuses on two specific public spaces of Kolkata. They are a dense urban retail activity-feeding armature called Gariahat, and a relatively interspersed green belt dotted with recreational facility called Rabindra Sarovar. The paper compares the two areas based on imageability, average footfall of users or people and their impact on the basic functionality, overall aesthetics, imageability, and the inclusion of livable infrastructure design.

The paper assesses the gap between available and expected levels of infrastructure and designed aesthetics concerning the two cases. It subsequently draws meaningful insights for creating a stronger linkage between the variable needs and collective decision-making. The objective is to augment a range of experience of urban spaces including variety and heterogeneity. The linkages will boost aesthetic regeneration and that may be possible through an integration of improved walkability and ergonomic experience in the urban spaces.

**Keywords:** Aesthetic regeneration · Public spaces · Ergonomic experience · Space design · Pedestrian planning · Soft infrastructure

## 1 Introduction

The paper deals with urban space, its form and functionalities in enhancing the vitality of the cityscape. The premises are two, i.e., one, different types of urban space deal with individual considerations and capacities; and two, the capacity of a particular space has altered with time, population pressure, and diversity. Therefore, maintaining the indigenous character of the space is a constant process of adaptation and evolutionary dynamism. The dynamism consists of the change in the existing space utility, community clusters, deep space design pattern existing through ages and the evolution of pattern of space design. The exponential increase in the population index and a further increase in the floating population to avail the benefits of advanced resources and opportunities in the cities would create the dystopic imageries of the city. Thus, the essential qualities of urban space are on stake and retaining its cultural, social, spatial identity, become a major issue.

Therefore, to retain the crux of the city itself, regeneration of its social, cultural, and spatial fabric is the pressing need. Regeneration of spaces can be elaborated further as the process of transformation of a place, individual or public (residential, commercial or open-space) that have demonstrated the symptoms of environmental (physical), social, economic or aesthetic decline [8, 20]. Regeneration can be physical (tangible), social, economic, or aesthetic and the urban-psycho (intangible) that enhance the imageability of a space. In effect, aesthetics regeneration has the potential to bring back vitality to a degenerated space, add livability to an ailing community, revive the obsolete industrial area and all these collectively can have long-term improvements in the local quality of life, happiness and sustainability restoring the hierarchy of social, environmental and aesthetic needs [12].

Finally, the paper deals with attempts to assess the need for aesthetic regeneration to improve the ergonomic experience of the space. Therefore, the paper builds upon an argument for the need for an aesthetic regeneration considering the present urban scenarios. Secondly, it identifies the visual parameters based on their potential to enhance aesthetic sensitivity of urban space. Then the argument proceeds to understand the point-of-view of the stakeholders through field surveys that helps to comprehend the basic distinction between the top-down approaches and grassroots people's perception. Finally and conclusively, the paper forwards preferred imageability based on the user's reaction Cues and the directions of development.

## 2 Review of Literature

The history of urban design and planning is one of many attempts to manage public space in ways that build sociality and civic engagement out of the encounter between strangers, be it in the form of community interaction or gentrification or others. It draws upon a long pedagogy of planning thought including the classical Greek philosophers, theorists of urban modernity such as Mumford, Benjamin, Simmel, Lefebvre and Jacobs, and contemporary urban visionaries such as Sennett, Sandercock and Zukin, all suggesting a strong link between urban public space and urban civic virtue and citizenship [9].

Two interventions are possible by apprehending the potentiality of a space to redeem its lost visual-aesthetic framework. They are, one, policies on art interventions, synthesizing both physical (hard infrastructure) and normative (visual-cultural-aesthetics) and, two, which Rautenberg [14] suggests as aesthetic regeneration by re-appropriating visual-cultural design sensibilities that incorporates tangible-intangible, physical-normative dimensions. Considering Rautenberg, urban ecology is evident globally, as an integrally related paradigm of contemporary interest. To enhance urban space design by parameters of the visual-cultural heritage for a better ergonomic experience of the space is therefore the prime focus of this paper.

On the other hand, recent urban trends suggest that visual attractions enable stakeholders with a better experience, satisfaction and promote walkable city concept, that has become one of the relevant approaches of urban revitalization [10, 18, 19]. This has further escalated possibilities of reduction of congestion and car dependency in terms of transportation, although it is difficult to retrofit existing built-up areas [5, 6, 18]. Hence, aid to the enhancement of a healthy lifestyle by facilitating outdoor walking and exercise [11, 17] may promotes social interaction through “face-to-face collaboration” [19]. Therefore, integration of normative designs has a direct proportionate relationship with walkability and experience of a space.

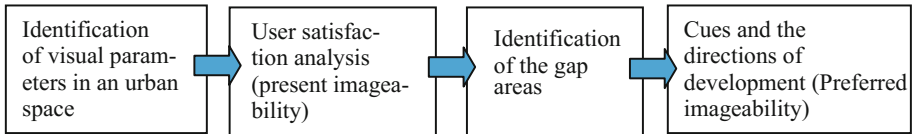
A city worth living has required the aesthetic disposition of spaces and edifices, a symbiotic relationship between ecology, human, and design aesthetics; to best cater the users in both the physical and the normative dimensions of infrastructure [4]. Today conservation and ecological balance are issues taken with much seriousness. The present trend in conservation is ‘eco-management or community-based approach’, where participations of local communities maintains the ecosystem [1]. In the case of Rabindra Sarovar, which is one of the lungs of the city in south Kolkata, has also given way to a huge number of structures built during 1966–1986 [7]. Rabindra Sarovar zone has also been converted to a residential conglomerate, over the years [1] compromising its ecological sensitivity largely. The case of Gariahat is similar agglomerate compromising its retail ribbon within a dense residential zone.

### 3 Methodological Constructs

To explore the interrelationship between aesthetic regeneration and the ergonomic experience of urban space, the paper focuses on two specific public spaces of Kolkata. The two lies in the proximity to each other, i.e., Gariahat and Rabindra Sarovar. Gariahat is a densely knit, throbbing market area having high footfall throughout the day, whereas, Rabindra Sarovar is an ecologically sensitive zone accommodating the most significant green plot of south Kolkata. Even after the proximity of two study areas, both the spaces do not reflect much homogeneity to cater to the community and individual needs. Hence, this paper compares the two areas concerning aesthetic parameters that secures imageability and measuring an undeniable impact on the overall ergonomic experience, soft-infrastructure and functionality of the spaces.

As can be seen in Fig. 1, to forward the cues and directions of aesthetic regeneration and development, the paper first identifies a set of aesthetic regenerative parameters. User’s opinion survey uses these parameters. Analysis of the survey results

further lead to defining the gap between the available parameters (present imageability) and the aspirations of the user’s. Assessment of the gap between available and expected levels of infrastructure and aesthetics, concerning different urban contexts (land-use, aesthetics, soft infrastructure, green margin) have helped to draw meaningful insights to create a stronger linkage and complementarity between the variable needs and collective decision making to best augment the experience of urban space.



**Fig. 1.** A four step methodological flow followed in the paper

In summary, to assess the available and expected levels of infrastructure and aesthetics, two specific areas, i.e., Rabindra Sarovar and Gariahat have been surveyed of based on their (a) mosaic of visual taxonomies and (b) user’s reaction to find the extent of aesthetic regenerative possibility.

### 3.1 Visual Taxonomies: Elements of Aesthetic Regeneration

Visual taxonomies for aesthetic regeneration of urban spaces are concerned with classification, especially of organisms of place, actors (users) and activities.

The features of visual taxonomies used in this paper can be broadly divided into three domains, based on, (1) their ability to secure basic sense of beautification [Basic Features] (2) ability to augment sensitivity of the space [Advanced Facilities] and (3) to

**Table 1.** Visual taxonomies used to assess the extent and possibility of aesthetic regeneration of urban spaces

Basic Features					
Availability of adequate green space	Availability of adequate open space	Adequate facility to use and promote recreational spaces	Visibility of color-scape	Presence and maintenance of water body	Presence and maintenance of heritage structure
Advanced Facilities					
Presence and maintenance of topiary	Visual augmentation by Using/ applying murals	Visual augmentation by Using/ applying graffiti	Visual augmentation by Using/ applying paintings	Visual augmentation by Using/ applying sculptures	Visual augmentation by Using/ applying art installations
Facilities for regeneration					
Adequate facility to arrange art performances	Adequate facility to arrange Performing arts	Facilitating the stakeholders with economic regenerative opportunities		Facilitating the stakeholders with community space to promote community interactions	

improve the ergonomic experience of urban space by aesthetic regeneration [Facilities for Regeneration]. Table 1 explains the domains and their features. The user's reaction survey of the two areas, i.e. Rabindra Sarovar and Gariahat have applied these elements to discover multiple ways to respect and include urban diversity.

#### 4 Selection and Introduction to the Study Areas

Based on the land use, population density, activity concentration of the majority of the stakeholders, two urban nodes are identified, namely, ecologically sensitive recreational zone and throbbing commercial zones aided with transit-oriented transportation facility catering to a large number of population. As is clearly stated in Table 2, It is crucial to notice that the two selected areas, i.e. Rabindra Sarovar and Gariahat, (situated within the periphery of 1 km), but exemplifies different scenarios regarding planning, development, community system, organizational principles of space and finally, imageability [2, 3].

**Table 2.** Comparison between Rabindra Sarovar and Gariahat based on activity pattern

Location	Description	Major land use	Major activity pattern
Rabindra Sarovar	<b>Rabindra Sarovar (Dhakuria Lake)</b> is an artificial lake in south Kolkata, West Bengal. It is flanked by Southern Avenue to the North, Shyamaprasad Mukherjee Road to the West, Dhakuria to the East and the Kolkata Suburban Railway tracks to the south	Ecologically sensitive, Green zone, Recreational, Residential	Natural retreat, Joggers park, The area around was developed for residential use, lakes and parks are used by different age groups
Gariahat	<b>Gariahat</b> is a throbbing market area in the southern part of Kolkata, India. In Gariahat, intersects some of the most important roads of the city, namely, Ballygunge Circular road, Gurusaday Dutta Road, Hazra Road, Rash-behari Avenue, Southern Avenue and Prince Anwar Shah Road	Commercial, Recreational, Residential	The space under Gariahat flyover hosts one of the most prominent open air public chess playing areas in Kolkata. It is the hub and shopping capital of South Kolkata, housing hundreds of informal shops

The two urban spaces exemplify a different set of challenges regarding its imageability. Both the areas come under the Kolkata Metropolitan Area. Kolkata Municipal

Corporation (KMC) represents the core city of Kolkata, the largest city in Eastern India. KMC consists of 141 wards, covers an area of 185 km<sup>2</sup>, with 4.48 million populations, approximately and a population density of 24000 persons/km<sup>2</sup>. The two locations as identified for the study are well-known activity centers [2]. The majority of urban dwellers have visited these locations and they have offered opinions based on local experience.

#### 4.1 Rabindra Sarovar: Location, Land-Use and Challenges

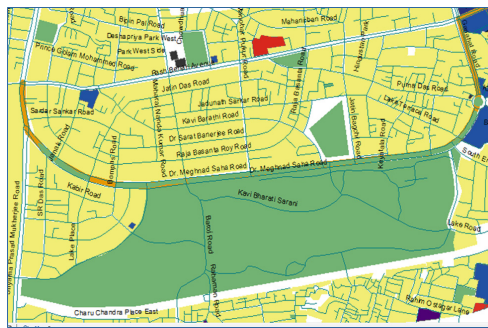
Rabindra Sarovar is an artificial lake in south Kolkata excavated in the early 1920s by the Calcutta Improvement Trust (CIT), in the Indian state of West Bengal. for developmental of the Kolkata metropolitan area, CIT acquired about 192 acres (0.78 km<sup>2</sup>) of marshy jungles. Their intentions are (refer Fig. 3),

- To develop the area for residential use
- Improving the roads by raising and levelling some of the adjacent lands
- Building lakes and parks

The area is flanked four boundaries. It is Southern Avenue in the North; Shyamaprasad Mukherjee Road in the West, the Dhakuria residential zone to the East and the Kolkata Suburban Railway tracks that bounds the southern edges (refer Fig. 2).

##### Physical-Ecological factors of Rabindra Sarovar area:

- The green open spaces have acted as a lung of the city, and therefore considered as a very important ecological and socio-cultural reserve. It is a green patch of southern Kolkata (Refer Fig. 2) alongside the waterbody.
- The lake holds different expression and meaning to both the young and old.
- Throughout the day about 10,000 people visit it daily to conduction physical exercise, sit, relax, meet friends, enjoy nature and witness a variety of bird species.



**Fig. 2.** Land-use map of Rabindra Sarovar and adjoining areas (Source: Wikimapia)

With the onset of time, lack of maintenance the lake had undergone a complete ecological degradation. Dumping of sewerage, water contamination, unhygienic environmental condition, decaying vegetation and neglected landscape were some of

the commonly identified concerns. Degradation of the place also concerns the points mentioned below:

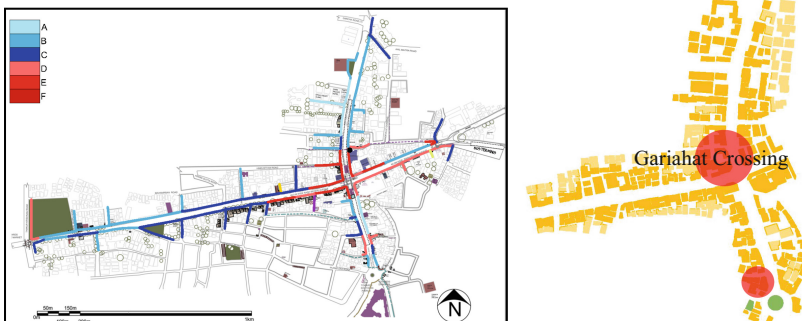
- Multiple entry points with no access control of any
- Unguarded vehicular and pedestrian movement around the lake
- The area around the lake become unsafe after dark due to poor lighting
- Vandalism and inadequate maintenance of hardware
- Ill barricaded fringes and lack of public signage



**Fig. 3.** Glimpses of Rabindra Sarovar and adjoining areas (*Source: Author*)

#### 4.2 Gariahat: Location, Land-Use and Challenges

Gariahat is a vital junction (refer Fig. 4) that has good connectivity with all other parts of Kolkata, especially south Kolkata. It is one of the largest informal shopping area of the city, which satisfies all the needs of people. The space under Gariahat flyover hosts one of the most prominent open-air public chess playing areas in Kolkata. It intersects some of the most important roads of the city namely Ballygunge Circular Road, Gurusaday Dutta Road, Hazra Road, Rashbehari Avenue, Southern Avenue and Prince Anwar Shah Road. The land-use pattern of Gariahat exemplifies a mixed-use pattern, where informal footpath shops and big malls are juxtaposed, posh areas of Ballygunge circular road coexisted with nearby informal low to medium income households. Figure 4 forwards the detailed descriptions of the locations [3].



**Fig. 4.** Land-use map of Gariahat and adjoining areas (*Source: Author*)

**Physical Factors** of Gariahat area:

- Densely knitted commercial and residential areas
- Well connected with transit nodes of the city
- Housed largest informal shopping market of south Kolkata
- Caters to a huge amount of visitors and pedestrians everyday

Dense and informal footpath shops is the most prominent feature of Gariahat. *“The Hawkers of Gariahat are a post 1947 phenomenon; they exist alongside regular shop owners on the same stretch. They have been part of the city’s economy for long despite efforts to evict them, some of these efforts being state sponsored. Now, both the Centre and the State have decided to accept the existence of the hawkers as a community that generates its own income and need to be formalized”* [15].

Gariahat has been the heart of the informal vending since its inception [16]. The importance of aesthetics in urban planning does not allow for the unpredictability, temporality and visual chaos of street vending arrangements but urban public space is an essential physical capital used by poor urban households everywhere [13]. Hence provide a unique opportunity to understand and assess the situation from the bottom’s up approach considering aesthetic regeneration for enhancing the experience of space and walkability (Fig. 5).



**Fig. 5.** Glimpses of Gariahat market (Source: Author)

## 5 Results and Discussion

Surveys occurred on sample size of 60 people. They are applied to understand the public perception towards the places, with a. The survey was done based on design parameters divided into three sections, namely, **a.** Basic features; **b.** Advance facilities and **c.** Facilities for regeneration. The scores obtained in the surveys are accumulated and presented in Table 3. The accumulated scores displayed in Table 3 clearly stated the opinion of the stakeholders. The surveys used a questionnaire. Scorings were a 1–9 point Likert scale. In a 1–9 point scale based investigation, a score of 5 is the intermediate threshold. It marks that states the need of regeneration. Scores below 5 need immediate consideration.

Rabindra Sarovar fulfils the need of the stakeholders by providing basic, advanced facilities of visuals, social, ecological and aesthetics. The area further provides the scopes for regeneration by proving space for community interaction and economic regeneration.



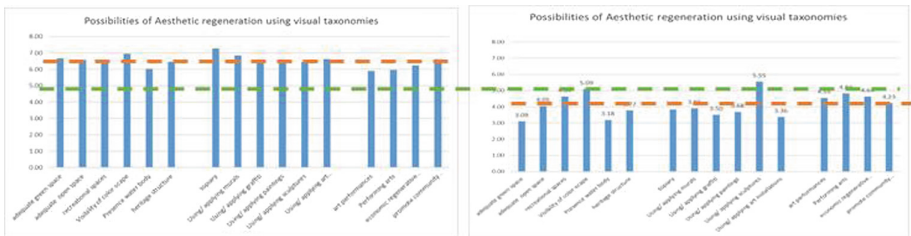
**Table 3.** Accumulated obtained scores of the surveys done with 60 stakeholders (each space) in Rabindra Sarovar and Gariahat

		Rabindra Sarovar	Gariahat
Basic Features	Availability of adequate green space	6.65	3.09
	Availability of adequate open space	6.58	4.05
	Adequate facility to use and promote recreational spaces	6.46	4.64
	Visibility of color-scape	6.96	5.09
	Presence and maintenance of water body	6.04	3.18
	Presence and maintenance of heritage structure	6.46	3.77
Advance Facilities	Presence and maintenance of topiary	7.27	3.82
	Visual augmentation by Using/ applying murals	6.85	3.91
	Visual augmentation by Using/ applying graffiti	6.54	3.50
	Visual augmentation by Using/ applying paintings	6.58	3.68
	Visual augmentation by Using/ applying sculptures	6.46	5.55
	Visual augmentation by Using/ applying art installations	6.62	3.36
Facilities for regeneration	Adequate facility to arrange art performances	5.88	4.55
	Adequate facility to arrange Performing arts	5.96	4.82
	Facilitating the stakeholders with economic regenerative opportunities	6.23	4.64
	Facilitating the stakeholders with community space to promote community interactions	6.62	4.23
<b>Average of the scores obtained</b>		<b>6.51</b>	<b>4.12</b>

On the contrary, Gariahat fails to provide basic features to secure the imageability and ergonomic experience of the space. Gariahat only scores above five on the parameter of visibility of color scape (considering the variety of footpath shops and products displayed). The scope of applying any form of art and installations are scored below 4. It exemplifies the problems due to space crunch and the pressure of huge footfall that demands immediate consideration.

**5.1 Rabindra Sarovar and Gariahat: Survey Results and Analyses**

The scores obtained in three gradual progressive domains of aesthetic regeneration clearly shows that the average scores of Rabindra Sarovar, i.e., 6.51 is quite above of the average score line (in green) of score 5. On the other, it is evident in Fig. 6, average



**Fig. 6.** Comparative study of the visual representation of the obtained scores of Rabindra Sarovar (left) and Gariahat (right) (Source: Author)

score of Gariahat is 4.12, calls for immediate consideration of restoring basic and advanced facilities to improve walkability and ergonomic experience of the space.

Lack of basic features, as, availability of adequate green space, availability of adequate open space, facility to use and promote recreational spaces, presence and maintenance of water body, presence and maintenance of heritage structure in Gariahat caters to degrade the imageability. That further degrade the visual attractions for the pedestrians, their safety, and hence, walkability and overall experience of urban space.

As evident in Fig. 7, weightage assigned to the elements of design shows lack of availability of open green spaces in Gariahat area, followed by the presence and maintenance of water body. Absence of the scope of installing art and visual elements degrades the experience of space that further discourages pedestrians and commuters movement.

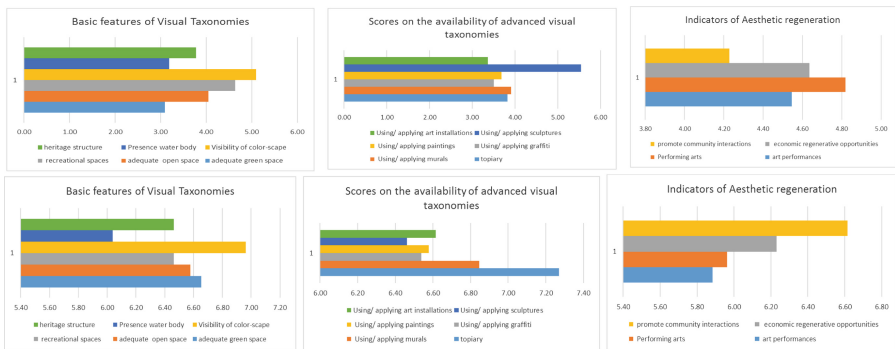
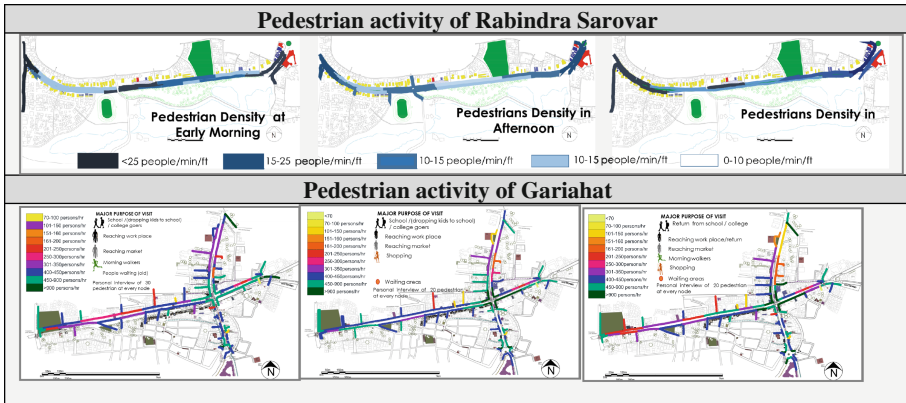


Fig. 7. Visual representation of the scores of three stage development parameters for aesthetic regeneration of Rabindra Sarovar (above) and Gariahat (below) (Source: Author)

### 5.2 Experience of Space and Pedestrian Activity

The aesthetic regenerative characteristics have considered two aspects, viz., a. A three-step design parameters b. Accessibility in terms of aesthetic traits. The indicators represent the integral relationship between the urban design parameters and ergonomic experience of the space. Applying and maintaining design sensitivity of urban space is highly dependent on the average footfall and pedestrians of the space itself. Consideration of footpath and pedestrian activity in the two selected areas are also found necessary.

The average width of footpath in and around Rabindra Sarovar is 3.5 m with encroachments at nodes, in front of commercial spaces and in front of the temple, i.e. Lake Kalibari. The huge Lake or ‘Sarovar’ is comprised of large green spaces, rich in natural elements like trees, inclusive of a mosaic of parks, and all that positioned in the heart of the city with adequate transport and communication facilities and near to the other case, the ribbon of commercial hub, i.e. Gariahat. To Gariahat, the Rabindra Sarovar acts as a natural retreat, and vice versa. The range and heterogeneity are the strengths and opportunities. The officer’s commuters also use Rabindra Sarovar in the



**Fig. 8.** Visual representation of pedestrian activities at Rabindra Sarovar and Gariahat throughout the day (Source: Author)

morning evening and in the afternoon for lunch. So, the average number of pedestrian considers,

$$\text{Average pedestrian density} = \frac{\text{Pedestrian Volume/minute (measured at nodes)}}{\text{Effective width of Foot Path}}$$

On the other and, Gariahat caters to a huge number of pedestrians that varies with time over the day, which is clearly evident in Fig. 8. In the morning hours, the average number of pedestrians are between 450–900/h at the main crossing of Gariahat that gradually decreases towards the area of Golpark and Parkcircus. Pedestrian density is highest during the mid-day (11 am–12.00 pm) with footfall of more than 900/h. The rush continues until late evening and gradually decreases up to 400–900/h.

Huge footfall leads to the deterioration of the space that further discourages stakeholders and commuters to use the pedestrian pathways. Lack of proper lighting, ill-maintained barricaded fringes, lack of visual attractions, art installations degrades the imageability and therefore overall experience of the space.

## 6 Conclusion

The paper has looked into the range of gaps between the available and expected levels of infrastructure and the designed aesthetics of soft infrastructures concerning the two different urban contexts. The outcomes of the study presses for the variable needs and collective decision making that may combine aesthetic regeneration with good ergonomic experiences of peddlers and pedestrians. They are evident by virtue of exploring, likening, contrasting and bringing together the two vital urban place-making zones within a large metropolis like Kolkata. On one hand, Rabindra Sarovar has self-revealed as a place of immense opportunity in sports, serene eco-leisure and quiet recreation based on its potential eco-transit features within a dense urban fabric. On the

other hand, a chain of lively and pulsating pedestrian networks accessing the complex retail armature is evident in Gariahat, which is itself a highly dense zone. In bringing together the variety and the contrasts embedded in the two cases, the study has been able to reveal:

- Not contrasts but good complementarities that exists within the two different but closely networked armature or mosaic that offer immense possibilities of integration through art-based and urban design driven innovations. The integration will bring along facilities that may promote walkability with leisure and walkability for varied retail experience by pedestrians. The innovations may also cater to the high commercial footfall in Gariahat though it may appear to be in opposition to the serene green urban ecosystem of Rabindra Sarovar.
- Better walkability and possible design interventions aiming at reduction in use of vehicles, and thereby demanding application of good visual aesthetics and spots of attractions through integration of art and aesthetics. The interventions will lead to a range of applications appreciating the heterogeneity embedded in the two cases.
- Good recovery of connections between the psychological needs of pedestrians to choose from multiple ways to commute for commerce and leisure, yet with experience of good imageability of visual attractions, which is also varied and diverse.

In summary, the paper makes a discovery of multiple ways and means to respect and include urban diversity and user's heterogeneity in urban design processes. It proposes an integrated approach to best assimilate the discovered features of urban art and commuting infrastructure. It finally earmarks ways to regenerate by combining ergonomic experience and walkability. The combination can be a vital key to bring back good livability through good aesthetic regeneration within a metropolis.

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