Augmenting the Hadba Minaret Role as A Landmark in the city of Mosul

[1]**Ahmed Yousif Alomary -** Ass. Prof.
[2]**Nahedh Taha Alqimaqche -** Ass. Prof.
[3]**Emad Hani Alallaf -** Ass. Prof.
[1,2,3](Dep. of Architecture, University of Mosul)

Received : 13/11/2014
Accepted : 3/6/2015

Abstract

Al-Hadba, the oblique Minaret of the historic Grand Mosque is considered as the famous and the most important landmark in the old town of Mosul as it is the oldest architectural monument which have been built in 568 AH – 1172 AC. Till now, as a visual landmark of 45 meters height, it is the icon that gives the city its identity across nine centuries, which represents as an obvious indicator for orienting the direction of inhabitants movements in the old built fabric from remote distance, and as a component of this environment, it is characterized as a vital value for the visual views those can be seen through alleys that lead to the Grand Mosque, consequently, presenting richness, continuity and variety for such visual scenes. As a result of disorder of urban built, random buildings, unconsidered planning decisions, and the lack of prior urban design dimension which gives the Minaret its importance to the surrounding areas of the mosque, all that led to reduce the Minaret role as an urban landmark, besides creating vision coverage that prevented the Minaret from being as a visual mark. This paper attempts to study all visual districts in Mosul city in which the Minaret currently can be seen through alleys, in any viewpoint, direction and skyline with determining the built constructions that cover or reduce the visual sight toward the Minaret, evaluating the extent and level of its perception as a landmark on pedestrians level, identifying the best visual positions in the sequence, and presenting urban recommendations about how to improve the Minaret role as a monumental landmark in the city.

Keywords: Visual perception, Urban landmarks, Mosul City, Al-Hadba Minaret.

1. Introduction

Generally, industrialization followed by immigration and unmanaged population, all causes rapid urbanization, leading to raising random and unplanned formations that distant from aesthetic resolutions, and composing one of the major difficulties for cities of developed countries (Potsiou et al, 2010). By recovering social, economic, environmental and physical settings, currently, strategies are employed to solve such dilemma. Daily life of an urban environment could be influenced by any small and simple intervention, hence, in their urban renewal projects, all participants' objectives, including planners designers conservationists and stakeholders, should have accordance and mutual criteria and understanding, thus, it can be achieved. Departing from this attitude, certain qualities of planning, both physical and social, should be carefully evaluated and analyzed in a different study area including motion perception. Due to currently intensive traffic network, inhabitant perceives and interprets the city activities along routes, pedestrians and alleys. In this perspective, in the planning of landmark areas of a city silhouette, a comprehensive silhouette analysis should also be included in addition to plans, sections, facades and photos taken in certain viewpoints (Kalin &Yilmaz, 2012).

2. Landmark and the Visibility of Urban Fabric

In 1954 Kevin Lynch began a research project called The Perceptual Form of the City. The research findings were published in 1960 in Lynch's seminal work, The Image of the City. The Perceptual Form of the City study addressed the legibility and imageability of the American city. Lynch influenced the field of city planning

through his work on the theory of city form, and on the perception of the city environment and its consequences for city design. According to his theory, landmarks are easily identifiable objects which serve as external reference points (Lynch, 1960, p.3, 78). In urban studies as well as in geography, a landmark is furthermore defined as an external point of reference that helps orienting in a familiar or unfamiliar environment (Lynch, 1960, p.48). Perceptual Form of the City was an investigation directed toward development of a theoretical concept of city form. An attempt is being made to supply the fundamental criteria and techniques for conceiving, expressing and controlling our perceptual environment. The objective of this work is the development of new design possibilities and principles for the city." In its final iteration the study comprised a field trip made by a trained observer, who mapped out the various elements of the city, which Lynch describes (Appleyard, Lynch, and Myer, 1964).

2.1. The Significance of Landmark in Perceiving Urban Environment

According to Lynch's theory, users perceive an urban environment in its fragmentation into elements and patterns. All perceptions are different and special, and are related to users' knowledge, experience or familiarity with an urban site. Almost every sense is in action all of the time (Predrag, S., 2007, p.30). Lynch presumes the visual quality of the city by studying the mental image of that city which is held by its citizens (Lynch, 1960, p.2). Consequently, in the course of navigating in the urban ambience, the visual characteristics of some constituents and objects are utilized as simplifications. According to Lynch's theory, the visual quality of the city is concentrated in four elements (Lynch, 1960, p-p, 10-40) :

Legibility - is defined as elements whose parts can be recognized and organized in a coherent pattern or symbols.

Building the image (image) - the image of a given urban environment may vary between different observers (users) and it is an individual mental image as the result of a two-way process between the observer and his environment,

Structure and identity (identity) - were defined by Lynch as an environmental image that can be analyzed into three components: identity, structure and meaning and they are in reality always appearing together, and

Image ability - is defined as the "quality in a physical object which gives it a high probability of evoking a strong image in any given observer.

Lynch also analyzed the effects of physical, perceptible objects, and from this the five elements of the urban environment were derived (Predrag, S. 2007, p63). In his theory he does not explain all other influences of an urban environment on imageability, such as social meaning, functionality, tradition, names, and so on (Figure 1).

2.2. Visual Analysis Studies

The first attempts to assess the environmental quality of urban spaces based on perception were presented in the late fifties and in the sixties as result of interdisciplinary studies in architecture, psychology, anthropology and sociology. The introduction of the discipline of proxemics by the American anthropologist Edward T. Hall (Hall, 1966, p. 71) opened up a series of applications in architectural and urban design. Proxemics is defined as the study of spatial interrelationships between people as they interact. Hall investigates the cultural aspects that involve human behavior in space. In his theory the 'social field of vision' determines human behavior and communication in social spaces. The key-descriptors for this discipline are the 'social distances' that enable different types of human activity and different levels of intimacy in the interrelationship between human beings (Morello &Ratti, 2009).

As Sidjanin stated research into the cognitive structure of the urban environment can be subdivided into three parts (Sidjanin, 2001, p.20):

1. Micro-level studies: the aim of this approach is to find out how well people can locate specific points in urban areas.
2. The problem of determining what metric is used to measure distances in urban areas. It relies on a variety of scaling techniques to extract information from data sets. The first is exemplified in the attempt to define perceptually small areas of the city- generally described using the term 'neighborhoods' the second is an attempt to reconstruct a set of urban features which are observed on journeys through urban areas.
3. Macro-level emphasis attempting to reconstruct maps of urban areas from the knowledge that individuals have about those places.

Planners, architects, sociologists and psychologists have been interested for various reasons in the perception and cognition of the larger environment. Perception cannot be understood in isolation from values or behavior (Predrag, S., 2007, p. 65).

2.3. Landmark in the urban context studies

As Kalin mentioned: In recent years, visual perspectives of vehicle drivers, road traffic and pedestrians, and the role of landmarks in way finding and navigation studies are the most important two topics appearing as central concerns of urban studies related with visual experience of cities (Kalin. and Yilmaz, 2012, pp. 243-244).

The former group contains studies about aesthetic experience of road traffic, from the point of view of people both inside motor vehicles as drivers and passengers, and outside vehicles as pedestrian and cyclists. The latter group has a number of studies investigating the nature of landmark from various points of view such as the knowledge creating extensive spatial ability in way finding; the value in aiding visual orientation and navigation (Kalin. and Yilmaz, 2012, pp. 243-244);the visibility, legibility and the visual salience.

Spatial knowledge is said to be necessary to build a complete mental representation of an environment and visual landmarks are the most remembered, thus the most descriptive elements of this representation. This means that the salience of landmark in some sense (visually, auditory, olfactory, or semantic) (Caduff and Timpf, 2008) is accepted as the most important element for the visual image of the city and the navigation of its inhabitants. Klippel and Winter define the structural salience of landmarks along routes in two steps; formalization of salience of objects, and conceptualization of their way-finding actions. It is true for formalization process but not enough as the salience or saliency denotes relatively distinct, prominent or obvious features compared to other features. The complexity of spatial layout in an urban landscape causes the most general requirement of landmark that it must be in contrast with the environment in order to have perceptual distinction (Klippel and Winter, 2005). Despite the vast number of studies, few attempts have been made to definethe visibility of a landmark by sequential view process while approaching it.

Various visual analysis methodologies have been proposed for urban landmarks as defining fractal dimensions of street vistas in order to assess levels of visual variety in everyday street scenes; fractal dimensions of landscape silhouette outlines; path selection choices made in a virtual environment visualizing the information provided by movement in the environment; an isovist, or the subset of points in space that are visible from a particular vantage point (view- shed approach); segmentation by using color range; dynamic segmentation of the dataset based on natural urban subdivision; region detection and segmentation of a scene. Besides the photographic survey based scene capturing studies provide many techniques to study landmarks such as (Kalin Yilmaz, 2012):

- Scanned scenes with multiple cameras or a fish-eye camera on a moving vehicle, which generates a real scene achieve along streets.
- Pace-the-scene movie, which is a video-based scene reproduction method for natural scenery.
- Real time visualization of urban scenes having huge complexity of the geometrical data and widely varying visibility conditions.
- Urban scenery modeling based on analysis of moving images taken from a running vehicle.

3. Research Objectives& Methodology

This paper seeks to characterize and identify the continuous sequential scene arrays that could be taken from various surrounding routes and alleys, and most perceptible single or interval of points as a visibility analysis methodology of a landmark. As the present study examines the sequential scenes of a landmark from different approaching routes by extracting the silhouette of landmark and segmenting the visibly different regions of the scene, the photographic survey based scene capturing methodology is used to analyze the visibility.

3.1. Al-Hadba Landmark in Mosul City

The old city of Mosul in Iraq, widely known for its manufacture of Muslin and its unique marble, is also home to many important Iraqi heritage sites (UNESCO). The Minaret in Mosul city is one of the famous and oldest Islamic monuments in the city. It's known by locals as al-Hadba because of its precarious slant. Built by the Seljuk ruler Nur al-Din al-Zangi Atabeg, in 1172-73 AC, shortly before his death, it was part of a religious complex including a mosque and a madrassa named for its patron. At the time of its completion, the Minaret was 45 meters high, with seven ornamental bands of brickwork at different levels around its cylindrical shaft. (World Monuments Fund).

When the cylindrical Minaret was built it stood 45 meters high, with seven bands of decorative brickwork in complex geometric patterns ascending in levels towards the top. Both the

mosque and its madrassa were dismantled and reassembled in 1942 in a restoration program undertaken by the Iraqi government (Al-Hadba Minaret , 2011). The mosque and madrassa were dismantled and reassembled according to a new plan, but the Minaret remains as one of the few original elements of the medieval Nur al-Din complex. The Minaret 's tilt has long been a source of concern. Despite efforts in the 1970s to stabilize the structures, cracks have proliferated along the Minaret 's base. (World monuments fund). The Minaret has remained un-restored, although attempts were made in 1981 by an Italian firm to stabilize it. (Al-Hadba Minaret , 2011).

Iraqi antiquity officials cite more scientific reasons for the tilt of the Minaret and fear that without quick restoration it may eventually collapse into a pile of bricks. The mosque is a square, plain affair not as pretty as its Minaret. The Minaret 's inner layer is made with stone bricks and its exterior is decorated with mud bricks set in a stitch-like pattern. Now, the Minaret 's body shows spidery cracks and the small, white-plastered dome has gaps one can wedge a fist in (Deseret news).
On 20th of September, 2012 Mosul government and UNESCO prepared an agreement by which UNESCO will help in preserving Al Hadba Minaret which is one of the region's historical icons, Under the newly signed "Executive Cooperation Program for the Study and Documentation for the stability and conservation of Al-Hadba Minaret ", UNESCO will undertake a comprehensive research of the materials, geological bedding and structural analysis during a 12 month period funded by the governorate, before deciding on the type of treatment that should be applied (UNESCO).

3.2. Case Study

No doubt that the most visual region of Al-Hadba Minaret is the surrounding urban fabric of the old Mosul city with its content of allays and routs, hence the survey employed in this study focus on the main routs of the surrounding district which framed by surrounded streets.
Photographs had been taken within interval walking distances to indicate the vision area ratio of the Minaret to the total scene area which formed the main data of the case(Figure, 3).Then sequential view frames were captured along the determined routes.The shoots were initiated from the point Al-Hadba Minaret entered the view and continued until it disappeared with intervals of approximately 20-25 meters. Along these walking routes, a total of 50 photographs were taken on a partly cloudy day by using a Canon A-700 digital camera.
Since the shooting interval was relatively short and some captures were nearly identical, the number of photos was reduced in order to achieve the best flow of the serial vision. In this context, the captures in all directions were reduced in a way not to break the continuity so as to remove similar photos having little differences and to reveal the change clearly.
In the next stage, sequential view analysis charts (Figure 4), were prepared in order to define the visibility of Al-Hadba Minaret in the obtained photo sequences. The sequential view frames in these charts were abstracted by applying the visionary area ratio of the Minaret to the total scene area (Figure 5), (Figure 6).

4. Results and Discussion

After the collecting information process relating to the case study and examining the results about the possibility see ratio the Al-Hadbe Minaret within its surrounding alleys in the urban fabric of the old city of Mosul, It can be noticed that this ratio ranges between four levels, as follows:

1. Lack of vision of the Minaret along the route due to blocking vision by buildings located on the two sides of the alley, or originally, lack of the alley orientation towards the Minaret directly.
2. The possibility of seeing the Minaret in a part of the path and the inability to see it in other parts, as in the paths: F (F1-F7), G (G1-G7), M (M1-M9).
3. The possibility of seeing the Minaret along the entire path, in varying degrees, and its blocked in a few percentages, as in the paths: A (A1-10), D (D1-D6), H (H1-H23).

The possibility of seeing the Minaret intermittently from time to time and disproportionately, as in the path : (C-L) (C1-J-K-L2). In Cases No.1,2,4, when there are deteriorated or modern buildings obscure the vision of the Minaret in the alleys.

The vision of the Minaret (Figure 7) can enhance as an urban landmark by removing such constructions and some parts of the damaged urban fabric which should specified by the specialized studies of such process, thus, some urban spaces in these areas can be created instead of those eliminated and disinterested buildings, as well as determining the appropriate heights that not blocking the vision for new buildings to be

created instead of those old, in decision of a policy of reconstruction or redevelopment of those areas.
As well as in the case of No.3, the Minaret sight can be enhanced by removing some parts of the heritage buildings in critical cases, those have no value after the on-site survey and the specific studies. The research recommends that the heritage concerned bodies and institutions need to take considering the importance of the Minaret as an indicative landmark of the whole fabric of Mosul urban city in any development process or intervention procedural performed on it, and seeking to concentrate on promoting the Minaret vision as largest as possible within the urban fabric and preventing any construction works cause blocking or reducing the level of this vision.

5. Conclusions

By analyzing the case study, it can be observed that the longest path in which the largest number of views of the Minaret is the continues alleys (CJKL), the path that provides a larger area of vision of the Minaret body compared to the rest alleys is the path H, the shortest path provides to see 100% of the Minaret is the path A, which extends from Farouq main street toward the Minaret (Fig.7).
Although many allies shows a considerable vision ratio in their scenes to the Minaret but several locations provides a good framing view of the Minaret(Fig. 9). A number of these locations provide fully framing, as the view from the arcades of the mosque (Fig. 8), other cases provide partial framing, such as the location between courtyard trees of the mosque which represent natural elements in the urban landscape, and views between the newest Minaret of the mosque.
Considering to visual pollution, the research found a large number of causes of visual pollution influence the urban scene, which, obviously, negatively affects on the field of view of the Minaret and the degree of its visibility, and works on distorting the sight, including electrical wires and poles in the first place (Fig. 10)
Within the paths that the Minaret could be seen, researchers found a number of areas including the creation of residential buildings in modern styles, which have inharmonic features with the characteristics of the historic urban context that cause of increasing the visual pollution, whereas its elements represent the formal exotic and hybrid details on the characteristics of the architectural heritage of the old city of Mosul. This is also can be applied to the elements and forms of the buildings facades along the main public streets surrounding the study area, which split their historic urban fabric.
The poor process of the mosque restoration and renovation - using modern materials which are unsuitable with the spirit of the place is one of the most important visual pollution problems, besides, its negative impact on the architectural and historical value of the building, in general .
Some of the scenes are distinguished from others due to their possibility to see the Minaret, as the case of seeing it within an urban space or from an alleys node in the urban fabric, or the case of seeing it from several alleys, despite their narrow width and relative distance from the Minaret.
The height value of the Minaret varies with the alleys sky line in the different scenes, where the Minaret height equal the sky line sometimes, and go up or down at other times. As a result of the fusion of the Minaret with the urban fabric and due to the materials similarity of the Minaret with the materials colors of the residential buildings within the area, it is not possible in some cases to easily distinguish the Minaret.
In the latest study in 2007-2010 performed by an Italian company in conjunction with Iraqi institutions of planning and authorities to renovate the old city, the study classified and determined traditional paths within the region under study to spiritual, heritage, administrative and green paths, nevertheless, it did not take into account the crucial value of the Minaret on the path classification, and did not take their importance as landmark and monumental construction that positively effect on the characteristics of these routes and their categorization.

6. Recommendations

The research recommends to select the paths which in the Minaret can be seen, for the purpose of augmenting its vision by the conservation and restoration polices, especially the continues path (CJKL) as it provides a large number of views, creates a visual sequence with scenes can be traced cross the path.
The research also recommends the necessary of urban renovation for this path considering of providing the seeing high value of the Minaret, and as it represents a gateway to enter the site and one of the main paths for visitors and tourists. The research also recommends strengthening the visual view of the Minaret among other paths by activating an appropriate

laws that work to remove all new created objects and buildings, which have a harmful impact on the process of vision.

The researchers point out the difficulties inherent the process of conducting the current study because of the security limitations and political conditions of the country, which led to the closure of most alleys in the present time, and rationing the photographs capture process, which caused restriction and minimizing the study area, and undertaking a part of the urban fabric of the old city. Therefore, the research recommends the need for future successive studies include the adoption of a comprehensive analysis at the level of other urban areas surrounded the Minaret , at the level of public main streets, on the extent of the entire urban fabric of the city of Mosul, and within the river panorama of the city.

7. Acknowledgment

Authors would like to acknowledge the authority of Mosul municipality for their efforts and cooperation in site survey, and data collection, also the authors would like to thanks all engineering groups who assist the photograph capturing.

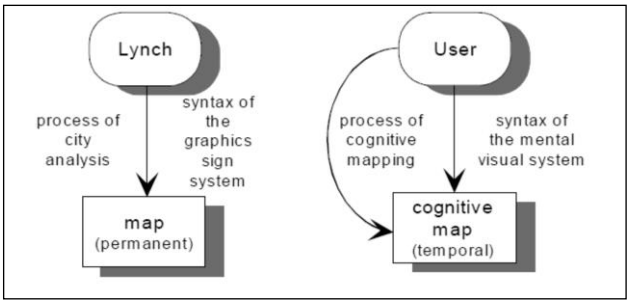
References

1. Lynch K., (1960). The image of the city, MIT Press, Cambridge, Massachusetts.
2. Predrag S., (2007). On Lynch's and Post-Lynchians Theories, Architecture and Civil Engineering, Fact universities, (5:1), pp. 61-69.
3. Morello, E. and Carlo R., (2010), A digital image of the city: 3D Isovists in Lynch's urban analysis, Environment and Planning B: Planning and Design, Pion Ltd. (36:5), pp.837-853.
4. Hall E.T., 1966, The Hidden Dimension, Doubleday, New York.
5. Kalin A. and Yilmaz, D.,(2012), A Study on Visibility Analysis of Urban Landmark : The Caseof A Hagia Sophia (AYASOFYA) in Trabzon, METU JFA,(29:1), pp. 241-271.
6. Sidjanin P., (2001) A Cognitive Framework for an Urban Environment Design Tool, Delft, DKS.
7. MIT Institute Archives & Special Collections, "Kevin Andrew Lynch, 1918-1984, Papers, 1934-1988." http://libraries.mit.edu/archives/research/collections/collections-mc/mc208.html
8. Appleyard, D., Lynch, K., and Myer, R. The View from the Road, MIT Press, Cambridge MA, 1964
9. Richards, D. (2008). The chronicle of Ibnal-Athīr for the crusading period from al-Kamilfi'l-Ta'rikh: The years 541-589/1146-1193, Vol. 2., Aldershot, Hants: Ashgate Publishing, Ltd., p. 193.
10. "Al-Hadba' Minaret ". World Monuments Fund. Retrieved at 2011-06-27: http://www.wmf.org/project/al-hadba%E2%80%99-Minaret
11. UNESCO web site, Retrieved at 2013-02-12:http://www.unesco.org/new/en/iraq-office/about-this-office/single view/news/al_hadba_Minaret_unesco_to_protect_the_icon_in_mosul/
12. Deseret news, web site Retrieved at 2013-02-14: http://www.deseretnews.com/article/655157/Is-tower-bowing-or-tumbling.html.
13. Potsiou, C., Doytsher, Y., Kelly, P., Khourir, R., Mclaren, Hartmut, R., Mueller, H. (2010) Rapid Urbanization and Mega Cities: The Need for Spatial Information Management, MIT Press. Cambridge MA., p. 102.
14. Klippel A., Winter S. (2005) Structural Salience of Landmarks for Route Directions, In (ed.) Cohn A., and Mark, D., Spatial information theory-COSIT05, Springer, Ellicottville; pp. 347-62.

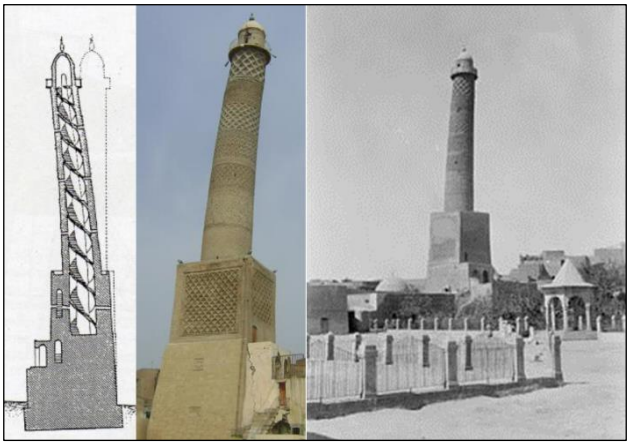
تعزيز دور منارة الحدباء كشاخص بصري في مدينة الموصل

د . احمـد يوسف العمري – استاذ مساعد
د . ناهض طه القيماقجي – استاذ مساعد
د . عمـاد هـاني العـلاف – استاذ مساعد
(قسم الهندسة المعمارية – جامعة الموصل)

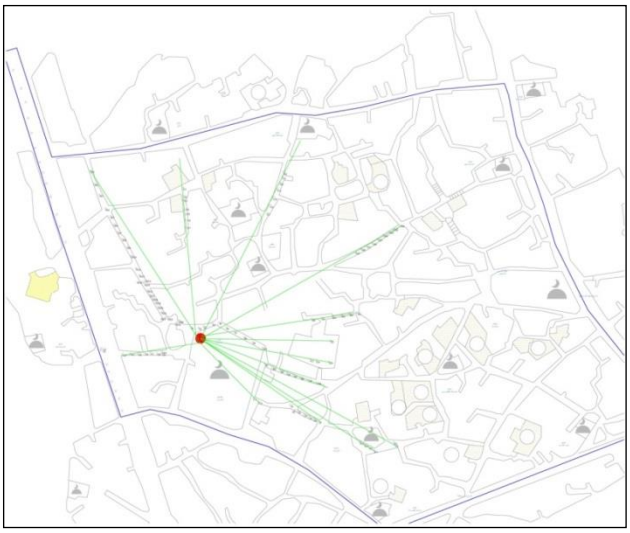
المستخلص :
تشكل منارة الحدباء المئذنة المائلة لجامع النوري الكبير معلما وصرحا مهما لمدينة الموصل بصفتها أقدم معلم معماري اثري ، ولا تزال رمزا أعطى للموصل هويتها عبر تسعة قرون كشاخص بصري والذي كان ولا يزال يمثل دلالة واضحة لمدينة الموصل القديمة يتم رؤيته كمعلم مهم يحدد الاتجاه من أماكن بعيدة . شكل وجود المنارة كجزء من النسيج الحضري لمدينة الموصل القديمة قيمة إضافية للمشاهد البصرية التي يمكن استيعابها من خلال الأزقة المتجهة إلى المسجد الجامع وهو ما أعطى الاستمرارية والثراء للمشاهد البصرية . ونتيجة للفوضى العمرانية والبناء العشوائي والقرارات التخطيطية غير المدروسة وعدم وجود تصميم حضري مسبق يعطي قيمة للمنارة للمناطق المحيطة بالجامع ، كل ذلك أدى إلى تقليل دورها كمعلم دلالي إضافة إلى حجب رؤيتها كشاخص بصري . يهدف البحث إلى دراسة كافة النطاقات البصرية التي ترى منها منارة الحدباء حاليا في مدينة الموصل من محاور الحركة المحيطة ومن كافة الزوايا والاتجاهات وعلى مستوى خط السماء وتحديد النطاقات البنائية التي تعترض و تؤثر في التقليل من رؤيتها وتقييم مدى ودرجة استيعابها كشاخص بصري ، وتحديد أفضل نقاط الرؤية في المتتابعة البصرية للوصول إلى توصيات تخطيطية وحضرية تعزز من دور المنارة كشاخص ومعلم حضاري في مدينة الموصل.



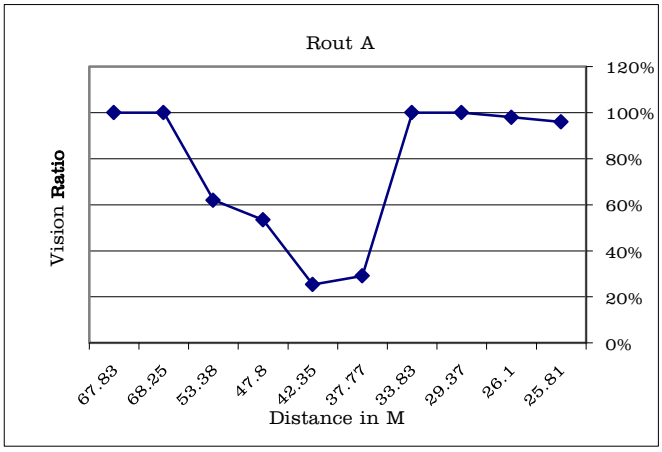
(Figure 1) The visual communication syntax in Lynch's theory (Predrag, S. 2007, p63).



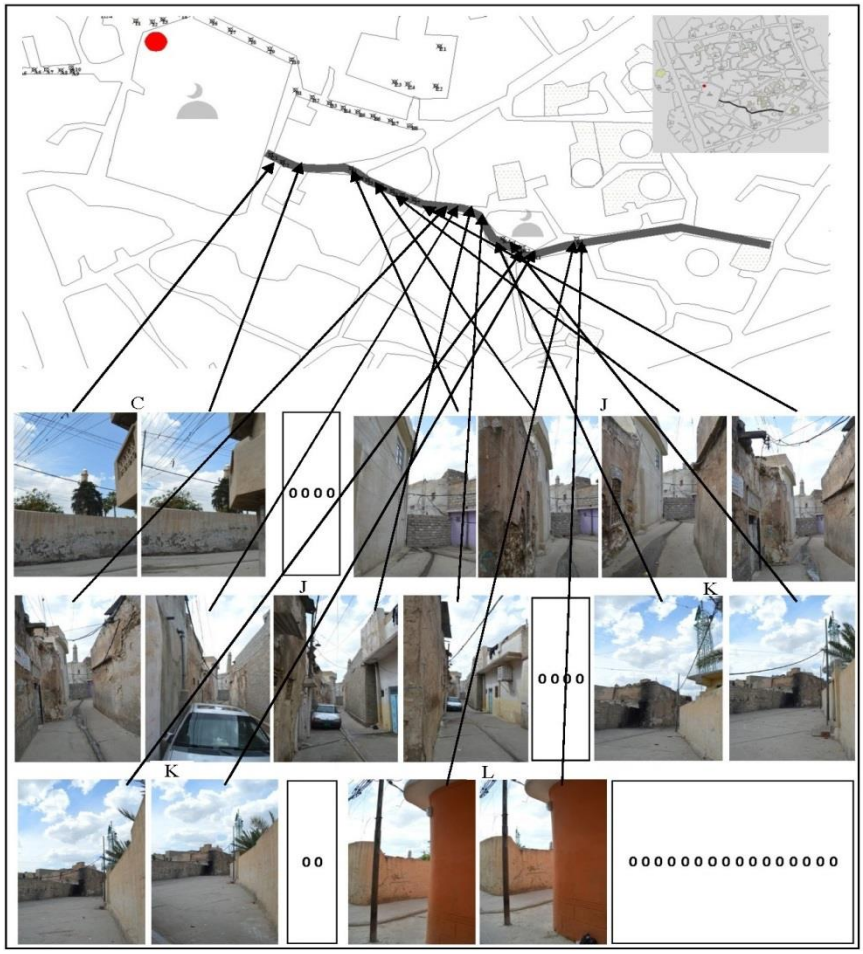
(Figure 2) Different scenes of Al-Hadba Minaret. (Al-Hadba Minaret Report, 2011)



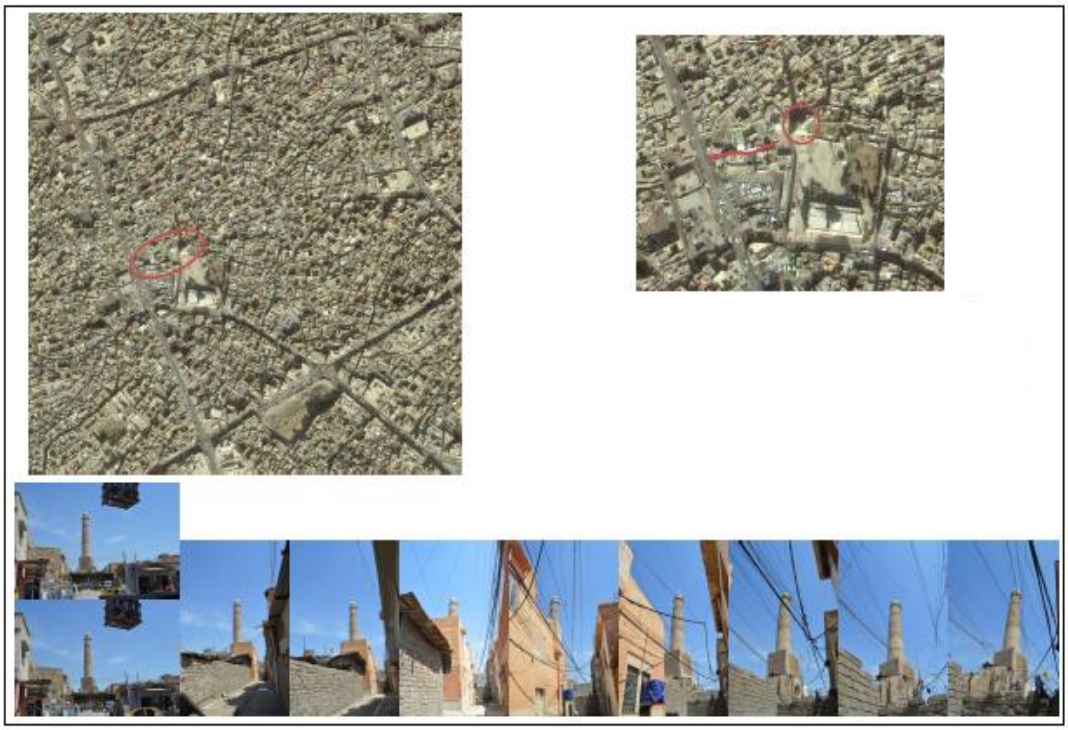
(Figure3) The vision possibilities of the Minaret within the alleys of the case study and the photograph capturing points within the allays. (Researcher, after Al-Hadba Minaret Report, 2011)



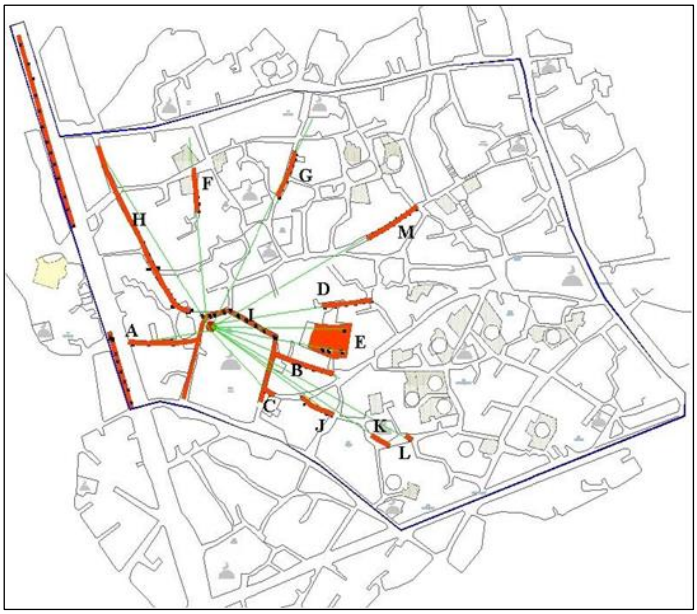
(Figure 4) Sequential vision area ratio along rout A. (Researcher)



(Figure 5) the sequential picture capturing on the route A. note that the squares marked (0000) refer to a blind vision of Minaret on the scene.
(Researcher, after Al-Hadba Minaret Report, 2011)

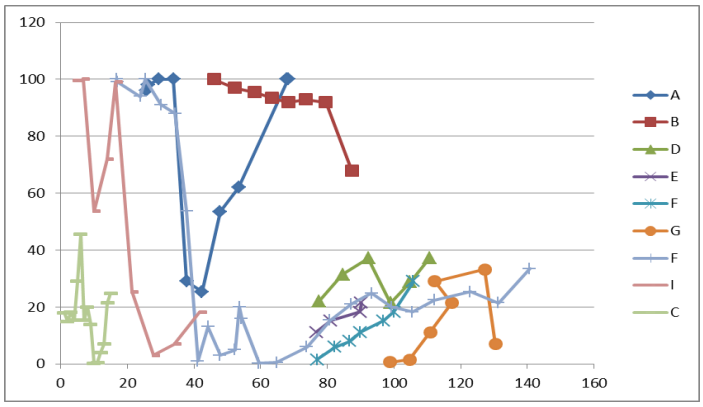


(Figure 5) the sequential picture capturing on the route A. note that the squares marked (0000) refer to a blind vision of Minaret on the scene.
(Researcher, after Al-Hadba Minaret Report, 2011)



(Figure 7) current possibility of Al-Hadbe Minaret vision.
(Researcher, after Al-Hadba Minaret Report, 2011)

(Figure 8) Framing the Minaret by the arcades, by the trees, and by the newest Minaret.
Minaret (Al-Hadba Minaret Report, 2011)



(Figure 9) Sequential vision area ratio along all the routs. (Researcher)

(Figure 10) The visual pollution. (Researcher)