Pedestrian visual recommendation in Kertanegara – Semeru corridor in Malang City

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Abstract. Streetcape could be the first impression to see an urban area. One of the streetscape that should be attended to is corridor of Jl. Kertanegara – Semeru since at that corridor is the road corridor having the strong character also as the one of the main axes in Malang city. This research is aim knowing the visual quality also the exact structuring recommendation for Jl. Kertanegara – Semeru based on pedestrian’s visual. The method used to this research is Scenic Beauty Estimation (SBE) and used historic study. There is several variables used, they are scale space, visual flexibility, beauty, emphasis, balance and dominant. Based on those variable the pedestrians as a respondent doing the assessment. Based on the result of SBE have been done, it is showed that the visual quality in Corridor Kertanegara Semeru is well enough since the result showed that there are 10 photos in low visual quality in Jl. Semeru and 14 photos in high visual quality in Jl. Kertanegara, Jl. Tugu dan Jl. Kahuripan. By the historic study and based on high visual quality reference doing the structuring recommendation in part of landscape having the low visual quality.

1. Introduction
Visual quality is one of the factor which giving the satisfaction to the user or observer directly. Visual quality is difficult enough to be declared objectively but measurable by the human responses. Landscape visual quality cannot be measured with measuring, but it could be a quality result from the human perspective, the measuring should be involed by human being [2]. Visual perception is the type of external perception, the perception that coming from stimulation from the outside of observer or individu. Perception existence can persuade somebody to make them realize with the environment around them. The thing need to do by somebody in order to enjoy their visual environment by preparing the environment. Society’s perception based on the visual environment can strengthen the meaning and knowing the environment characteristic itself. The assessment of visual environment is needed to be done in order to make the result of design of public space integrated in imaging the city.

The development of Malang city from time to time influenced the visual quality. It is not only occurring at the road corridor Jl. Kertanegara to the Jl. Semeru where both of that places having a differentiation of visual quality. Meanwhile, if it is confirmed by RTRW Malang city, road corridor Jl. Kertanegara – Semeru have the great potential to strengthen the characteristic of Malang city. Those things become the basis that need for arranging the structure road corridor. Based on RTRW Malang city in 2010-2030 has been explained that the vision of Malang city is to build a Malang as a Best educated city, Healthy and Sustainable City, Cultural Tourism City, toward the society advancement and independent. The meaning of Cultural Tourism City is based on the mission to build and enlarge.
the cultural tourism also maintaining and envolving the environment and the heritage building to historical necessary, science, culture, and tourism. Predetermined plan in tourism area are, Gajayana Stadium, Public Library and Archive of Malang city, Tugu Plaza, Railway station of Malang city. In addition, as strategic social culture area in Tugu Plaza, Corridor of Jl. Semeru, Ijen Boulevard and Gajayana Stadium complexes.

Structuring all along the road, especially based on pedestrians’ perception as the subject that feeling the visual caracter Malang city from the corridor that able to strengthen the visual caracter Malang city also support how the planning has been there on RTRW Malang city. The historical and valuable buildings hope that they are able to impress everyone who see it, therefore the impression could be persuaded by the manufacturing and structuring the other element near it.

The assessment of visual quality in one location is influenced by the several landscape elements and the factor could be influenced by the somebody’s feeling while on it. The element also the substance mentioned are scale, the visual comfort will cover the spaciousness and aesthetic, the unity which cover the balance and emphasis, and also domination [3]. Visual content refers to the structure and the space of one area giving an infomation to the each individu such a perception in used as purpose of developing the environment [7]. The structural of physical objects and the human activity construing the environment and the relation of the elements that could be the huge character in the shaping the area [8].

The several identifications matters in study area are:

1. Rapidly development causing the changing of image of Malang city, especially in the main road as a corridor of Jl. Kertanegara – Semeru. Those things are able to influence the visual quality reduction in corridor Jl. Kertanegara – Semeru.
2. The identity of th city in the beginning since the development of Malang city in corridor Jl. Kertanegara – Semeru could not be caught the whole part by the pedestrians because the increasing of the activity in that corridor and there is a development the area.
3. There are several spots visual scenery in corridor Jl. Kertanegara – Semeru was blocked by the another objects such as trees and billboard so that the visual comfort of pedestrian in view unobstructed. It will persuade the visual quality from the coridor Jl. Kertanegara – Semeru.

2. Methods

This research is done through the direct observation, and admission the quisionaire by the pedestrians in the corridor of Jl. Kertanegara – Semeru to get the assessment visual quality in each corridor based on society perception. The variable used in this research and they are scale, circulation, aesthetics, emphasis, balance and dominant [3]. Scale variable which is intended in this research are the high and space between the exist building, in other way the circulation variable and the aesthetic include in sub variable from the unity and it occurs in the emphasis and balance variable which are included in sub variable from the unity. The next variable is dominant (soft and strong element).

Scenic Beauty Estimation method (SBE) is quantitative system for indext the landscape aesthetics quality. The purpose of using this method is to bestow the valid prediction using the observer perception. The aesthetic quality assessment are showed by the scale intervale according to the aesthetic scenery based on perception and human assessment. The observer which intended could be as representative as the society, or the choosen society in the particular population. Scenic Beauty Estimation is the aesthetic notion in using of SBE method consist of three main steps and they are landscape imaging, slide presentation and data analysis [4]. In this research there is changing in the step of determining the value of SBE and there are:

1. landscape photograph based on vantage point is done by applying the human perspective principle based on perspective point, degree, or a space.
2. The photos election. After applying the primary survey with take a photo by observing point then those photos are choosen by the presenting to the respondens. The choosen respondens in this study are the society in pedestrians’ area.
3. Assessment by respondents. The using of rating scale 1 – 10 for valuation the landscape quality based on each variable in used by this research, where the point 1 shows the lowest assessment
toward landscape visual quality and the rating scale of point 10 shows the highest assessment. The assessment by respondents are only taken once, it is not allowed repeatedly.

The using of SBE method in this study through the several steps, first is landscape photographing. Landscape photographing is done by the human being point of view, besides that it is doing based on taking the landscape photo. Taking photo need 20 m of space started from the front part of public library Malang city until Jl. Kertengara and the exact place of take a photo in Trunojoyo park to the Jl. Semeru. Whereas the south part of the photo is taken from Jl. Semeru until Kertanegara. The aim of taking a landscape photos in certain space and direction is in order to make the taken photos could represent the whole of corridor. The result of the photos are 323 landscape and after that doing the eliminate. The eliminate of the photo is done based on the similar characteristic in every photos. The result after doing the elimination shows that there are only 53 photos will be valued by respondens.

Calculation of the number of respondens that were used in this study that is using time linear function. The following function of Time Linear Function:

\[ N = \frac{(T-to)}{t_1} \]

Description:
- \( n \) = The choosen sample
- \( T \) = The available time (10 days x 24 hours = 240 hours)
- \( to \) = The timing survey (9 hours/day x 10 days = 90 hours)
- \( t_1 \) = Time survey used in every unit sampling (0.25 hours x 10 days = 2.5 hours)

\[ N = \frac{(T-to)}{t_1} = \frac{(240-90)}{2.5} \]

\[ = 60 \text{ Respondens} \]

Spreading the quisionaire to the each respondens is using the taking sample method accidental sampling. Accidental sampling is the method which the process of taking enough sample by taking whoever meets by observer in the field suit with study necessary [5]. The boundaries and survey map of this research could be seen in (Fig 1).

The next step is calculating SBE value. The calculating visual value with the method of SBE started with data tabulation, frequency calculation in every score (f), calculting cumulative frequency (cf) and cumulative probabilities (cp). And after that determining the z value in every cp value. The average value of z in every photo enter the SBE rule. And the SBE rule are as follow:

\[ SBEx = (Z_x - Z_o) \times 100 \]  

Description:
- \( SBEx \) = SBE landscape value toward \( x \)
- \( Z_x \) = Average of Z landscape toward \( x \)
- \( Z_o \) = The average of Z in standart landscape (average value of Z in accumulation toward zero point)
Fig 1. The boundaries and survey map

With the result of SBE value from each photos, we will enter to the low, medium and high category. From those result, there are the result of visual quality in corridor of Jl. Kertanegara – Semeru. The step is done after the calculating the road visual landscape by doing the visual quality analysis. Visual quality analysis is one after knowing the SBE value in each photo. The purpose of visual quality analysis to knowing how the visual quality of corridor Jl. Kertanegara – Semeru based on pedestrians and how’s the visual condition in the past.

Except using SBE analysis, this research also using the serial vision [1]. This method is used to recognize changing of Jl. Kertanegara – Semeru from the first developmental and the condition in present. Serial Vision is the visual imaging which is caught by the observer in occured while they were walking from one to another place in the certain location. Visual record by the observer become the photos college in every phase and it is shaping the unity visual record to the observer. The orientation become one important factor in understanding a city. The characteristic of a city is based on every area could be seen or understood as serial vision. The thing should be emphasized in this case is the mentoring every motion. Those process is called optic wich consist of two main group, the existing view and the emerging view. Existing view concern in one area only while the emerging view concern in relation between one area and another [1].

3. Results and Explanation
The assessment of corridor visual of Kertanegara – Semeru based on pedestrians in every landscape photos could be calculated using the SBE rule. High visual quality (high SBE value) shows the landscape having the highest assessment as the beutiful landscape, in other way the low visual quality (low SBE value) shows that the bad or poor landscape (Table 1).

The result from the SBE calculating in every photo, then it is divided into three classes, the low, medium, and high class based on the class interval (Table 2) with use of simplified rating by the rules as follow:
\[ I = \frac{(the \ highest \ value - the \ lowest \ value)}{total \ class} \]

\[ = \frac{(108.013 - (-73.033))}{3} \]

\[ = 60.348 \]

Table 1. Calculation of SBE

| Picture 1U 01 | Skor | cf | cp | z   | Skor | cf | cp | z   | Skor | cf | cp | z   |
|--------------|------|----|----|-----|------|----|----|-----|------|----|----|-----|
| 1            | 0    | 12 | 1  | -   | 1    | 0  | 12 | 1   | -    | 1   | 0  | 12 | 1   |
| 2            | 2    | 12 | 1  | 2.326 | 2    | 0  | 12 | 1   | 2.326 | 2    | 0  | 12 | 1   |
| 3            | 2    | 12 | 1  | 2.326 | 3    | 1  | 12 | 1   | 2.326 | 3    | 1  | 12 | 1   |
| 4            | 2    | 10 | 0.833 | 0.967 | 4    | 1  | 11 | 0.917 | 1.383 | 4    | 0  | 11 | 0.917 | 1.383 |
| 5            | 1    | 8  | 0.667 | 0.431 | 5    | 2  | 10 | 0.833 | 0.967 | 5    | 1  | 11 | 0.917 | 1.383 |
| 6            | 5    | 7  | 0.583 | 0.210 | 6    | 4  | 8  | 0.667 | 0.431 | 6    | 2  | 10 | 0.833 | 0.967 |
| 7            | 2    | 2  | 0.167 | -0.967 | 7    | 4  | 4  | 0.333 | -0.431 | 7    | 4  | 8  | 0.667 | 0.431 |
| 8            | 0    | 0  | 0   | -2.326 | 8    | 3  | 4  | 0.333 | -0.431 | 8    | 3  | 4  | 0.333 | -0.431 |
| 9            | 0    | 0  | 0   | -2.326 | 9    | 1  | 1  | 0.083 | 1.383 | 9    | 1  | 1  | 0.083 | 1.383 |
| 10           | 0    | 0  | 0   | -2.326 | 10   | 0  | 0  | 0.000 | 2.326 | 10   | 0  | 0  | 0.000 | 2.326 |

The total number of Z: 1.685
The total number of Z: 0.024
The total number of Z: 4.677

Table 2. Class Interval

| Category | Value of SBE |
|----------|--------------|
| Low      | -37.033 - (-12.685) |
| Medium   | -12.684 - 47.664 |
| High     | 47.665 - 108.013 |

Based on the class it could be determined in 10 photos in a low visual quality, 29 photos include the medium visual quality and the 14 photos contained as the high visual. The low visual quality mostly in Jl. Semeru, the high visual quality majority in Jl. Tugu and Kertanegara. The low visual quality landscape are 1U 01, 1U 02, 2U 04, 3S 01, 3S 03, 3U 01, 3U 02, 3U 03, 3U 04, 3U 05. From the 10 pictures having the low visual aesthetic so that it would not create the beutiful scenery to the pedestrians. The less of vegetation impact the rigid impression in the corridor since the dominance of strong element. The variety in using the vegetation also could give the monotonous and boring impression.

Globality, there is no harmonism balance in every element will influence the landscape element in visual quality.the soft and strong element should be balance one and other so it will not evoke the rigid or over shady on the corridor cause it is dominaced by one element. The soft element such a tree which is blocked the scenery from the pedestrians also influence the visual quality in that corridor. The average of the vegetation in pedestrian path was blocked them from the scenery. In other case, the space in each building is not the same so it becomes the problem and it is the blocking scenery from the pedestrians.
The landscape in the low visual quality will be given the repair recommendation based on the landscape in a high visual quality. The landscape in a high visual quality in corridor of Jl. Kertanegara – Semeru amount 14 photos. The high visual quality is dominanced by the photo in Jl. Tugu and Kertanegara, besides it only several corridor in Jl. Kahuripan and Semeru. After got the visual quality from each photo, then it will be analized descriptively in relation with the condition in study field in the past in every variables. The result of the visual quality analysis produced the differentioation and similarity from the condition in the past and in present. After the analysis in every photo, then it is recommended as a structuring the corridor. The photo with a high visual quality has a several elements it is included in the high visual class, in other way th photo with the low visual quality has a several factor which is valuate as a bad quality by the pedestrians. The next step is done by giving structuring recommendation in photo which is having the low visual quality. The reccomendation given to these photo in low visual quality refers to the pgoto which is having the high visual quality with considering the similarity in it and the variable in photo with the low visual quality. Except that, the reccomendation refers to the differentiation and similairy condition between the past and present also it refers to th quality of the photo based on pedestrians. (Fig 2) (Fig 3).
**Figure 2.** The Recommendation of Corridor Kertanegara – Semeru

- **Location**
  - Corridor of Jalan Kertanegara – Semeru as main route

- **Recommendation**
  - Strengthen the start and end of the axis or corridor road with the Stasiun Kota Baru and Monument Surpam
  - Flagging visual flexibility toward the both end point
  - Highlighting some visual transition point
  - Fixing blocked visual toward landmarks so that created visual flexibility
  - Making existing landmark as a focal point that keeps the attention of pedestrians to move from one point to another

- **Visual Transition of Pedestrian**
- Building as focal point

- **Photos with Low Visual Quality**
- Scale space:
  - Selection of forms and types of vegetation, laying billboards, etc.*
  - Determination of the maximum building height is 2 floors and setback 1 meter from pedestrian
  - Gradual or barrier of plants between the building and the pedestrian does not exceed the height of 1.5 meter
  - Reverse some of the building or building canopies that are too close to the pedestrian**

- **Visual flexibility**:
  - At some point there is a billboard that blocks pedestrian visual to focal point or visual transition. So could do rear view of the location of the billboard, the billboard with the provisions instead of private property
  - At the point of vegetation that blocked visual pedestrian can be replaced with vegetation that has a crown shape is not too wide. This can be done on trees that have a diameter of more than 15 cm.
  - Selection of the vegetation on the narrow road corridor based on the assessment of respondents with high visual quality
  - Widening pedestrian to ≥ 3 meters and widening at the point interrupted or cut off by another object

- **Beauty**
  - Strengthen existing focal points
  - Adding street furniture as an object that directs pedestrians to keep going up and Jalan Jep – Jalan Kertanegara (Stasiun Kota Baru)**
  - Repair of damaged pedestrian
  - Replacement color on pedestrian so that more attention and create contrast
  - The color changes from several points of interest to make it more visible to the pedestrian
  - Application of electricity and telephone networks underground

- **Balance**
  - Establish a balance converging towards the focal point and a good visual transition from vegetation and street furniture

- **Emphasis**
  - Strengthen existing focal points
  - Emphasis on soft elements so that corridor has the impression of a shady, comfortable, and relaxing
  - Using street furniture that shows the impression heritage in order to form a contrast to the surrounding buildings and provide a contrast to the corridor

- **Dominant**
  - At far has domination of hard elements and soft elements, the addition of spacing between trees 10 meters
  - The use of soft elements are slightly varied both in the size or color. This is done to create contrast on the corridor
4. Conclusions

The road corridor Kertanegara – Semeru consist of several corridor and they are Jl. Semeru, Jl. Kahuripan, Jl. Tugu and Jl. Kertanegara. Totally, the corridor of Jl. Kertanegara – Semeru has the good visual quality caused there are 14 and 29 photos from 53 landscape photos with the high visual quality and medium visual quality. The grouping result based on SBE value in each photo with produced of photo with the high visual quality are the photo with the SBE value about 47.665 – 108.013, and the medium visual quality are the photo with the SBE value about -12.684 – 47.664 and the photo in low visual quality are the photo with SBE value about 47.665 – 108.013.

Photo in high visual quality is the one which is having vegetation dominant, having the harmonism between the soft and strong element, having the point of interest, having well visual comfort, also having the space between the high and large of the building. Those reasons become the basic recommendation is done toward the photo with the low visual quality. Besides, condition in present to the study field are the total objects was blocked visual of pedestrians such as tree and billboard with a huge size. The strong element gives more recommendation than the soft element, those things evoke the impression of rigid and uncomfortable corridor.

The structuring recommendation is got from the result of overlay between the pedestrian perception with the historic condition in corridor Jl. Kertanegara – Semeru. Besides the recommendation to improve the visual quality such an additional of vegetation. According to the photos in high quality, this recommendation is done by the additional soft element to the landscape which mostly dominate with strong element. The selection of vegetation considering the space scaling. There is several trees was blocked the pedestrians visual could do the changing of vegetation form but with a certain requirements. Several landscape consist of billboard with a huge size and it was blocke the aesthetic of landscape. In this condition, the billboard has the huge size and was blocked having an impact where it reduces the
aesthetic of the landscape itself, so the billboard is moved and changed the size. Besides to th billboard eith the huge size butit won’t really block the pedestrians visual, so that doing the changing of the size of billboard become smaller size. The unseen object or blocked in this existing condition such as twin building, Adipura monumen, the building from Bukopin Bank in Jl. Semeru also the flower monumen in Ijen Boulevard. Those objects having the potential to be a point of interest toward the landscape because it has a different shape from the other building so it will give more attention to pedestrians.

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