NIGHT SKY LIGHT POLLUTION LEVEL WITH DSLR CAMERA

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Silver Medal in Physics Category i-RYSCE 2017

1. Introduction

The high level of lighting in this world slowly cause light pollution that can lead to various effects on every aspect of life. To know where these places that have light pollution, light pollution mapping is possibly to do. Besides that, nowadays histogram in DSLR camera is applied only to see some light distribution on a photo. Not yet widely used for anything else. Though based on a preliminary study that has researchers did in 2016, histogram of images from DSLR camera has the potential to measure the light pollution of an area based on the star visibility.

Table 1 The Measurement Scale of Light Pollution Level from Histogram in DSLR Camera Based on Stars Visibility

Places	Mean	Level
Forest near the village (Eka Karya Botanical Garden, Bedugul, Bali)	2.168989899	**A**
Village area in the mountain (Catur Village, Kintamani, Bali)	3.905656566	**B**
Village area in the lowland (Penarungan Village, Mengwi, Bali)	22.9187	**C**
Center of district (Blahkiuh Village, Abiansemal, Bali)	25.079	**D**
Beach near the city (Sindhu Beach, Denpasar, Bali)	30.2501	**E**
Suburban village (Sibang Village, Abiansemal, Bali)	41.8846	**F**
Urbans area (Puputan Field, Denpasar)	73.8988	**G**

(Source: Duarsa & Yasa, 2016)

However, until now there has been no mapping of light pollution levels in Denpasar city based on the stars visibility using histogram of images from DSLR cameras.

The purpose of this study was to determine the mapping of light pollution levels in Denpasar City based on the appearance of stars using a histogram of images from DSLR cameras.

2. Research Method

This study is exploratory research. Exploration is done by photographing the libra constellation at eighth different places in Denpasar City-Bali Province. The photoshoot begin at approximately 10.00 PM in each place. Also, make sure the sky is clear from any cloud, fog, or any interference factor that will affect the photo result. The angel of the camera against the sky is determined ± 30º and the camera setting for all location as follow: ISO : 1600; Shutter Speed : 8 sec; Apperture (f) : 8.0; Zoom : 50. In each location, shooting is done by 100 times. After shooting, the result was analyzed using Adobe Photoshop CS6 application to know the *Mean* (the average of light intensity in each photos (Adobe Company, 2017)) on histogram. All of the data has tabulated and then was compared with the scale that has been found on preliminary study (to know the categories of light pollution level at each location that have been searched). Then, we used Google Earth application to finish the light pollution mapping.

3. Results and Analysis

Table 2. The Observing Result of Light Pollution Level in Denpasar City-Bali Province

Places	Mean	The Category of Sky	Level
Kompyang Sujana Field (West Denpasar)	25.331	Center of district *to* Beach near the city	**D – E**
Basket Monang-Maning Field (West Denpasar)	26.077	Center of district *to* Beach near the city	**D – E**
Pegok Sesetan Field (South Denpasar)	29.0583	Center of district *to* Beach near the city	**D – E**
SMAN 3 Denpasar Field (East Denpasar)	39.4519	Beach near the city *to* Suburban village	**E – F**
Padanggalak Rice Field (East Denpasar)	46.2551	Suburban village *to* Urbans area	**F – G**
Renon Field (South Denpasar)	50.8016	Suburban village *to* Urbans area	**F – G**
Cekomaria St., Rice Field (North Denpasar)	59.2693	Suburban village *to* Urbans area	**F – G**
Denpasar City Park (North Denpasar)	74.3072	Urbans area	**G**

Information: *Darker the color of point means as lower as level of light pollution at that location. Otherwise, brighter the color of point means as higher as the level of light pollution at that location.*

4. Conclusion

The conclusion of this research is *West Denpasar* District and the southern of *South Denpasar* District have low level of light pollution. *East Denpasar* District towards to the center of city has middle level of light pollution. *South Denpasar* District towards to the center of city, the eastern of *East Denpasar* District, and the northern of *North Denpasar* District have high level of light pollution. Besides that, *North Denpasar District* towards to the center of city has very high level of light pollution.

References

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Kenampakan Bintang. This paper is not published. Denpasar: SMAN 3 Denpasar.