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DATA AUGMENTATION BY USING IMAGE PROCESSING TECHNIQUE FOR LOW LIGHT CHARACTERISTICS WATER OF INTELLIGENCE UNDERWATER VISION SYSTEM

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Data augmentation is used to significantly increase the number of available datasets for training models in Convolutional Neural Network or CNN. CNN required a lot of datasets in order for training and testing the models to acquire better accuracy of overall project. However, an available dataset for underwater images are vast and unmatched with low light characteristics due to cloudy water in pond environment. Therefore, this paper proposed the data augmentation by using image processing techniques for low light characteristics water of intelligence underwater vision system. The objective of this study is to develop an augmented underwater dataset by using various image processing techniques and to evaluate the effect of image augmentation on underwater images in the CNN performance. The data augmentations are using Gaussian Noise and Grayscale Conversion for augmenting the original datasets. Histogram Equalization is used to enhance the shrimp and underwater images as part of the image processing technique applied. Lastly, the CNN model is trained and validated using both before and after augmented datasets to compare the performance in terms of the percentage and the losses. The results show that after augmentation reached 99.3% for training and 99.1% for validation accuracy. In conclusion, this study has shown that by performing data augmentation, it is able to boost the number of datasets for training and testing the CNN model and also enhancing the accuracy of the trained models.

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