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Estimation of Fine Dust Concentration from BGR Images in Surveillance Cameras

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This study proposes a novel approach on estimation of fine dust concentration from raw video data recorded by surveillance cameras. At first, several regions of interest are defined from specific images extracted from videos in surveillance cameras installed at Chung-Ang University. Among them, sky fields are mainly considered to figure out changes in characteristics of each color. After converting RGB images into BGR images, a number of discrete pixels with brightness intensities in a blue channel is mainly analyzed by investigating any relationships with fine dust concentration measured from automatic monitoring stations near the campus. Here, different values of thresholds from 125 to 200 are considered to find optimal conditions from changes in values of each pixel in the blue channel. This study uses the Pearson correlation coefficient to calculate the correlation between the number of pixels with values over the selected threshold and observed data for fine dust concentration. As an example on one specific date, the coefficients reflect their positive correlations with a range from 0.57 to 0.89 for each threshold. It should be noted that this study is a novel attempt to suggest a new, simple, and efficient method for estimating fine dust concentration from surveillance cameras common in many areas around the world.

Keywords: Fine Dust Concentration, BGR Image, Surveillance Camera, Threshold, Correlation Analysis

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