

# **Air Pollution Determination Using a Surveillance Internet Protocol Camera Images**

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Air pollution has long been a problem in the industrial nations of the West. It has now become an increasing source of environmental degradation in the developing nations of east Asia. Malaysia government has built a network to monitor air pollution. But the cost of these networks is high and limits the knowledge of pollutant concentration to specific points of the cities. A methodology based on a surveillance internet protocol (IP) camera for the determination air pollution concentrations was presented in this study. The objective of this study was to test the feasibility of using IP camera data for estimating real time particulate matter of size less than 10 micron (PM10) in the campus of USM. The proposed PM10 retrieval algorithm derived from the atmospheric optical properties was employed in the present study. In situ data sets of PM10 measurements and sun radiation measurements at the ground surface were collected simultaneously with the IP camera images using a DustTrak meter and a handheld spectroradiometer respectively. The digital images were separated into three bands namely red, green and blue bands for multispectral algorithm calibration. The digital number (DN) of the IP camera images were converted into radiance and reflectance values. After that, the reflectance recorded by the digital camera was subtracted by the reflectance of the known surface and we obtained the reflectance caused by the atmospheric components. The atmospheric reflectance values were used for regression analysis. Regression technique was employed to determine suitable in situ data to be used with the available IP camera images signals. The proposed algorithm produced high correlation coefficient (R) and low root-mean square error (RMS) values. This preliminary finding shows that IP camera has the potential to supply useful data for real time air quality study.