

**Exploring the Possibility of a Cost-effective Analysis Method
to Retrieve Air Quality Data Using Satellite Imagery: A
Machine Learning Approach**

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A dissertation submitted in partial fulfilment of the requirement for
Bachelor of Engineering. (Honours) degree in Software Engineering

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2021

Abstract

Spreading awareness about the regional air quality has become a much-needed objective for many developing countries due to reported unhealthy air quality levels in highly urbanised areas. Lack of robust air quality monitoring networks can lead to lesser awareness about the regional air quality levels creating public health risks. Air pollutants such as particulate matter and aerosols derivatives of these agents cause serious health risks. Particulate matter and aerosols reduce visibility by changing how the electromagnetic waves are absorbed, reflected, and refracted. Various sensors of earth-orbiting Satellites can produce images of the earth's surface. Particles in the atmosphere can scatter the light and changes the extinction properties of the formed satellite images. Thus, satellite images can be used as a surrogate to assess the aerosols and particulate matter in the air. Recent advancements in artificial intelligence have led to innovations that utilise machine learning and deep learning, which creates an ideal environment for modelling Air Quality using satellite data. Thus, this project aims to combine timely available satellite imagery with deep learning techniques to monitor air quality levels in different areas in Sri Lanka. According to the EPA (The Environmental Protection Agency) standards, a system was designed, developed, and evaluated to measure air quality using Satellite images and available ground-based data. The study showed low satisfactory result directly using Geo raster data into the deep learning model. Nonetheless, changing the satellite products and the layer by pre-processing the image gave changes to the prediction result accuracy. Therefore, the research project developed easy management and developed a baseline system by separating machine learning and analysis part for future research work. Hens this approach is a novel experimental approach in this area of research.

Keywords: AQI, Satellite images, Machine learning, Deep learning