

**ESTIMATION OF AIR POLLUTANT INDEX (API) IN KLANG
VALLEY USING ARTIFICIAL NEURAL NETWORK (ANN)**

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ABSTRACT

The air pollution problems has received more attention during the last decades whereby there has been a significant increase in public awareness of the potential dangers caused by chemical pollutants and their effects both human beings and the environment. To overcome these problems, the need for accurate estimates of air pollutant index (API) becomes important. To achieve such estimation tasks, the use of artificial neural network (ANN) is regarded as an effective technique. The purpose of this paper, ANN trained with feed-forward back-propagation algorithm is used to estimate the air pollutant index (API). The API system normally includes the major air pollutants which are ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and suspended particulate matter of less than 10 microns in size (PM10). This method uses the past raw data values to estimate the API. The data collected comprises of data for the previous three month, beginning from October 2006 for Klang Valley areas which are Shah Alam, Klang, Petaling Jaya and Kuala Lumpur. The results indicate that the ANN model estimated API with good accuracy to more than 90%.

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

Air pollution is the accumulation in the atmosphere of substances that, in sufficient concentrations, endanger human health or produce other measured effects on living matter and other materials. The World Health Organization (WHO) estimates that 500,000 people die prematurely each year because of exposure to ambient concentration of airborne particulate matter [1]. Worldwide air pollution is responsible for a large number of deaths and cases of respiratory disease.

There are many natural sources of air pollution such as eruption of volcanoes, biological decay and lightning-caused forest fire [2]. Naturally, the Earth already has its own air pollution loading. However, industrialization or just everyday routines has become added burden to the existing air pollution loading. Sources of air pollution are issue from industrial and development activities, motor vehicles, power generation, everyday routine and open burning [3], [4].

Local air quality affects how human live and breathe. Like the weather, it can change from day to day or even hour to hour. The Department of Environment (DOE) and others are working to make information about outdoor air quality as easy to understand as the weather forecast. A key tool in this effort is Air Pollutant Index (API). The API is an index for reporting daily air quality.

The API system normally includes the major air pollutants which are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and suspended particulate matter of less than 10 microns in size (PM10). The API scale will shows the air quality good, moderate, unhealthy, very unhealthy, hazardous or emergency.