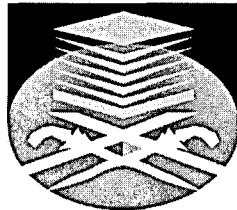


**AN APPLICATION OF ARTIFICIAL NEURAL NETWORK
(ANN) FOR AIR POLLUTANT INDEX (API) IN MALAYSIA**



**INSTITUTE of RESEARCH, DEVELOPMENT and
COMMERCIALISATION (IRDC)
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM
SELANGOR
MALAYSIA**

BY :

**MAHANIJAH BINTI HJ. MD KAMAL
ROZITA BT JAILANI
RUHIZAN LIZA BT AHMAD SHAURI**

MARCH 2006



UNIVERSITI TEKNOLOGI MARA

FAKULTI KEJURUTERAAN ELEKTRIK

40450 Shah Alam, Selangor Darul Ehsan

Tarikh : 26hb Jun 2004
Surat Kami :

Pn. Mahanijah Md Kamal
Pensyarah
Fakulti Kejuruteraan Elektrik
Universiti Teknologi MARA
40450 Shah Alam.

Puan

TAJUK PROJEK: 'AN APPLICATION OF ARTIFICIAL NEURAL NETWORK (ANN) FOR AIR POLLUTANT INDEX (API) IN MALAYSIA'

Dengan hormatnya perkara di atas adalah dirujuk.

Sukacita dimaklumkan bahawa Jawatankuasa Penyelidikan, Pembangunan dan Pengkomersilan di peringkat Fakulti telah membuat keputusan:

- i. Bersetuju meluluskan cadangan penyelidikan yang dikemukakan oleh puan serta Pn Rozita Jailani dan Pn Ruhizan Liza Ahmad Shauri.
- ii. Tempoh projek penyelidikan ini ialah 12 bulan, iaitu mulai 1 hb Julai 2004 hingga 30 hb Jun 2005.
- iii. Kos yang diluluskan ialah sebanyak **RM19,300.00** sahaja.
- iv. Penggunaan geran yang diluluskan hanya akan diproses setelah perjanjian ditandatangani.
- v. Semua pembelian peralatan yang kosnya melebihi RM500.00 satu item perlu menggunakan Pesanan jabatan Universiti Teknologi MARA (LO). Pihak puan juga dikehendaki mematuhi peraturan penerimaan peralatan. Panduan penerimaan peralatan baru dan pengurusannya dilampirkan bersama.
- vi. Kertaskerja boleh dibentangkan di seminar setelah 75% deraf awal laporan akhir projek dihantar ke Institut Penyelidikan, Pembangunan dan Pengkomersilan (IRDC) untuk semakan. Walau bagaimana pun, puan perlu membuat permohonan kepada IRDC.

03-55435105

03-55435106

03-55435107

03-55435108

03-55435109

03-55435110

03-55435111

03-55435112

03-55435113

03-55435114

03-55435115

03-55435116

03-55435117

03-55435118

03-55435119

03-55435120

03-55435121

03-55435122

03-55435123

03-55435124

03-55435125

03-55435126

03-55435127

03-55435128

03-55435129

03-55435130

03-55435131

03-55435132

03-55435133

03-55435134

03-55435135

03-55435136

03-55435137

03-55435138

03-55435139

03-55435140

03-55435141

03-55435142

03-55435143

03-55435144

03-55435145

03-55435146

03-55435147

03-55435148

03-55435149

03-55435150

Date : 27 March 2006

Project File No. : 10501

Y. Bhg. Prof. Dr. Azni Zain Ahmed

Penolong Naib Cancellor (Penyelidikan)

Institute of Research, Development and Commercialization (IRDC)

Universiti Teknologi MARA

40450 Shah Alam

Selangor

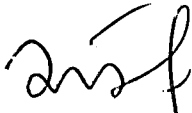
Sir,

**FINAL REPORT OF RESEARCH PROJECT “AN APPLICATION OF
ARTIFICIAL NEURAL NETWORK (ANN) FOR AIR POLLUTANT INDEX
(API) IN MALAYSIA”**

Referring to the above subject, please find enclosed 2 (two) copies of final report on the investigation of “AN APPLICATION OF ARTIFICIAL NEURAL NETWORK (ANN) FOR AIR POLLUTANT INDEX (API) IN MALAYSIA”.

Thank you.

Yours sincerely,



MAHANIJAH BINTI HJ. MD KAMAL

Project Leader

TABLE OF CONTENTS

ACKNOWLEDGEMENT	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	x
ABSTRACT	xi
CHAPTER 1: INTRODUCTION	
1.0 INTRODUCTION	1
1.1 RESEARCH OBJECTIVES	3
1.2 ORGANIZATION OF THE THESIS	4
CHAPTER 2: AIR POLLUTANT INDEX	
2.0 INTRODUCTION	5
2.1 AIR POLLUTANT INDEX	5
2.2 FORMULA OF AIR POLLUTANT INDEX	8
2.3 AIR QUALITY MONITORING STATIONS	10
CHAPTER 3: ARTIFICIAL NEURAL NETWORK	
3.0 INTRODUCTION	12
3.1 THE BACK-PROPAGATION ALGORITHM	16

ABSTRACT

This research investigates the effectiveness of Artificial Neural Network (ANN) model in predicting the Air Pollutant Index (API) for air quality monitoring in Malaysia. The network was trained with reference to five major parameters for determination of the API and Air Quality Index (AQI) in Malaysia. The pollutants included in Malaysia's API are ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and suspended particulate matter less than 10 micron in size (PM₁₀). The data collected comprises of data for the previous six months, beginning from July 2004. The API plays an important role in evaluating the air quality. The ANN model simplifies and speeds up the computation of the API, as compared to the current existing method. By optimizing the calculation, a significant saving in terms of money and time can be achieved. ANN model with Back Propagation Neural Network (BPNN) are considered and adopted to model the API.