



An Application of Artificial Intelligence Technique for PM₁₀ Forecasting

Samsuri Abdullah*¹, Marzuki Ismail², Arnis Asmat³ and Ali Najah Ahmed⁴

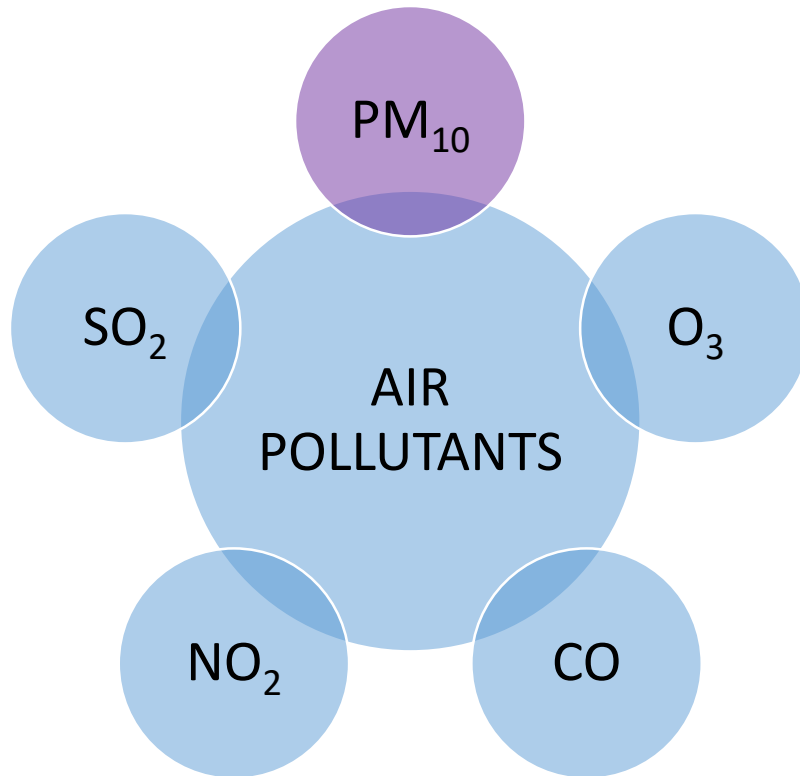
¹ School of Ocean Engineering, Universiti Malaysia Terengganu, 21030, Kuala Nerus, Terengganu, Malaysia

² School of Marine and Environmental Sciences, Universiti Malaysia Terengganu, 21030, Kuala Nerus, Terengganu, Malaysia

³ Faculty of Applied Sciences, Universiti Teknologi MARA, 40450, Shah Alam, Selangor, Malaysia

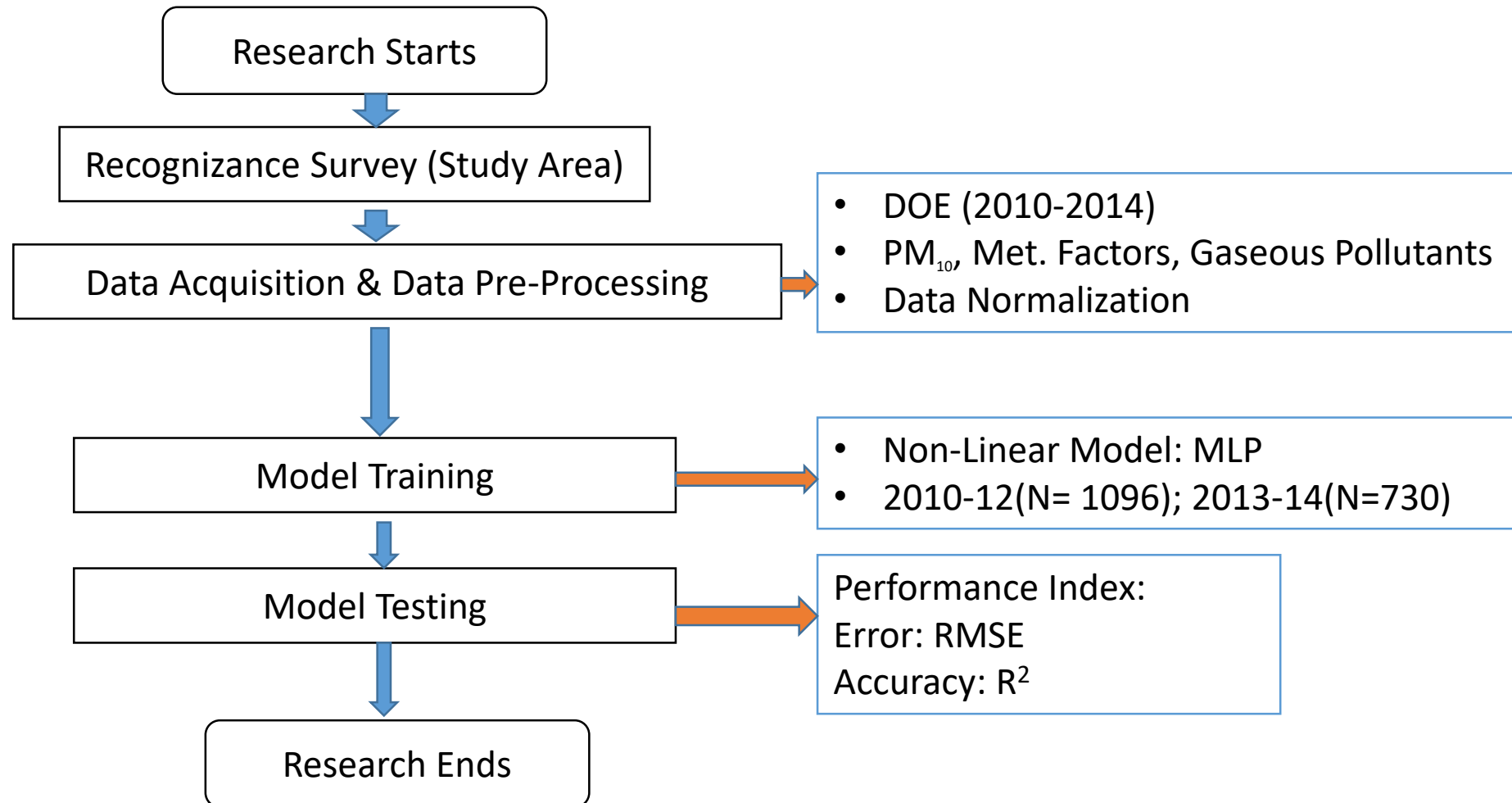
⁴ Faculty of Engineering, Universiti Tenaga Nasional, 43650, Bangi, Selangor, Malaysia

1.0 INTRODUCTION

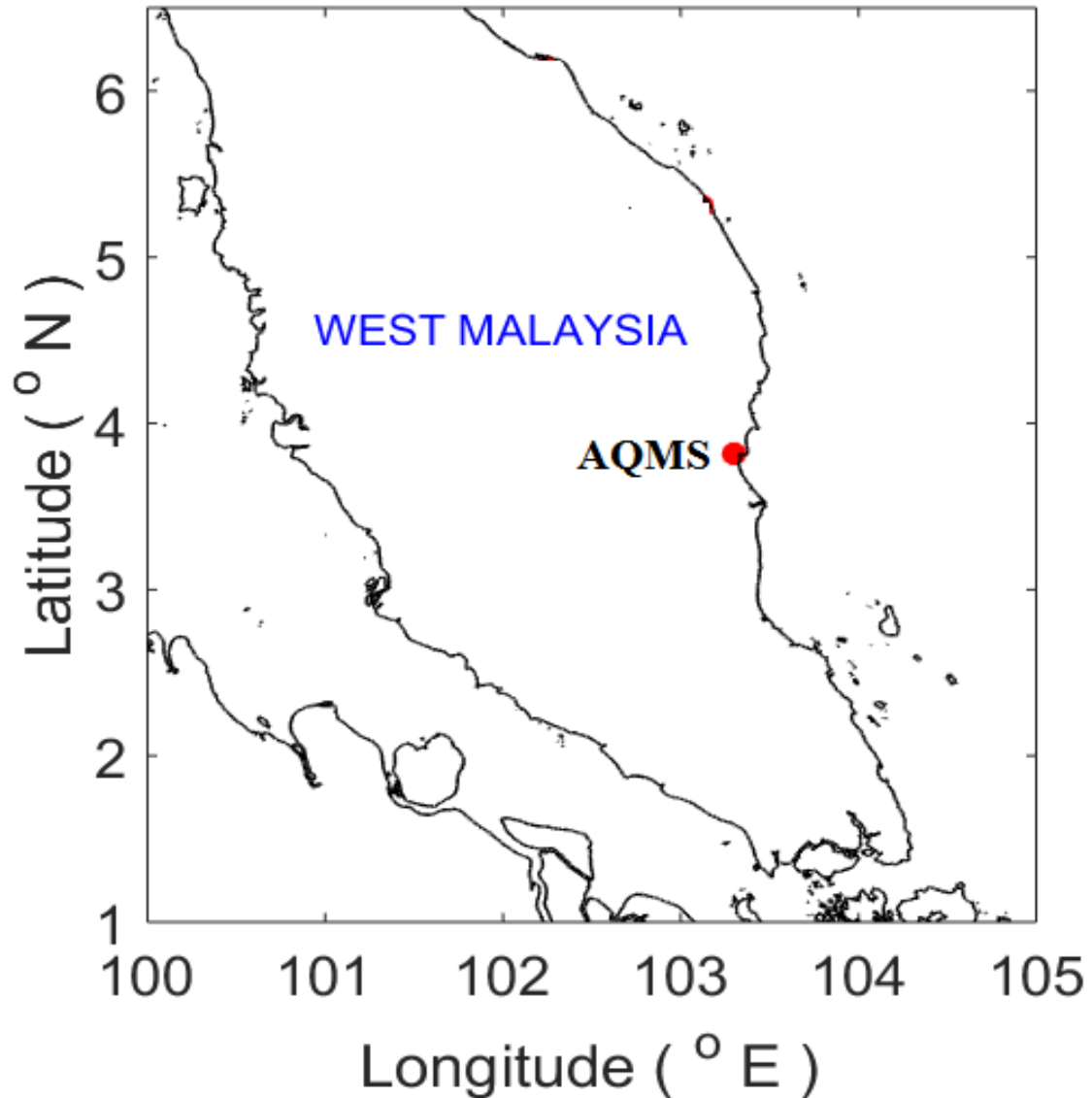


- Prediction:
 - Precautionary actions
 - Improve air quality
 - Scarcity of AQMS
- Model:
 - Multi Layer Perceptron (MLP)

2.0 METHODOLOGY

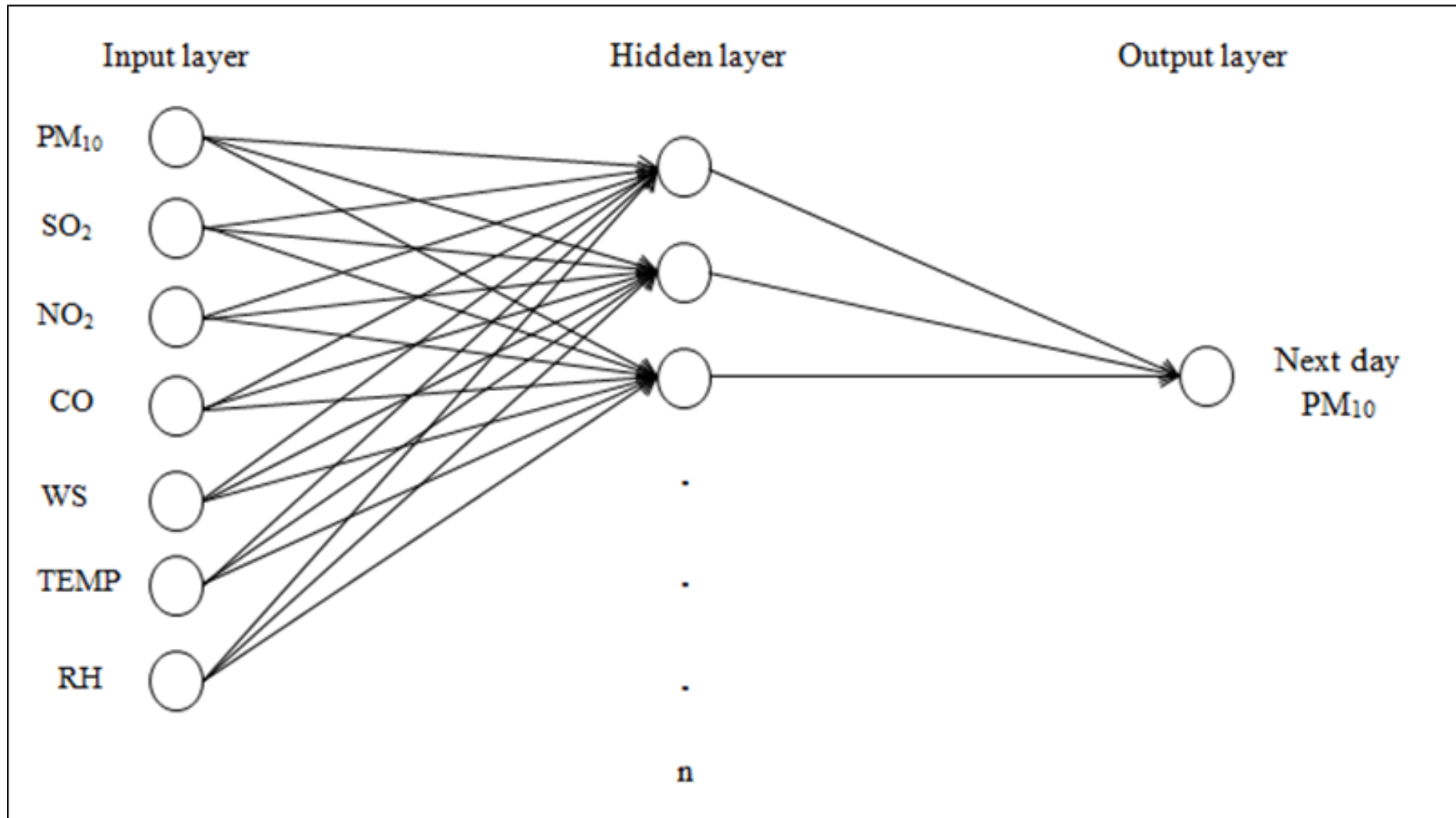


STUDY AREA

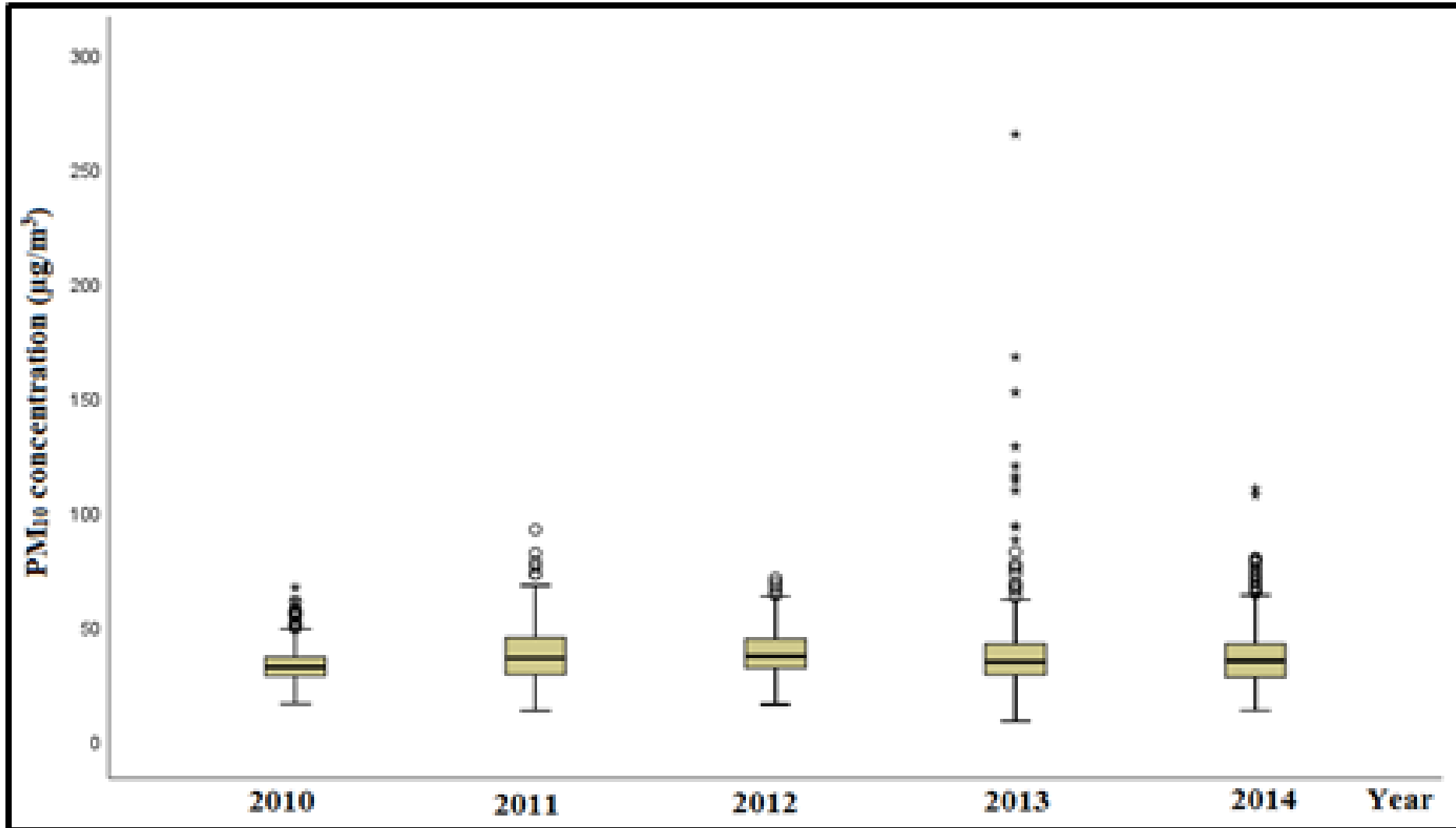


Station ID	Location	Classification	Coordinates
CA0014	SK Indera Mahkota, Kuantan	Sub-Urban	N03°49.138; E103°17.817

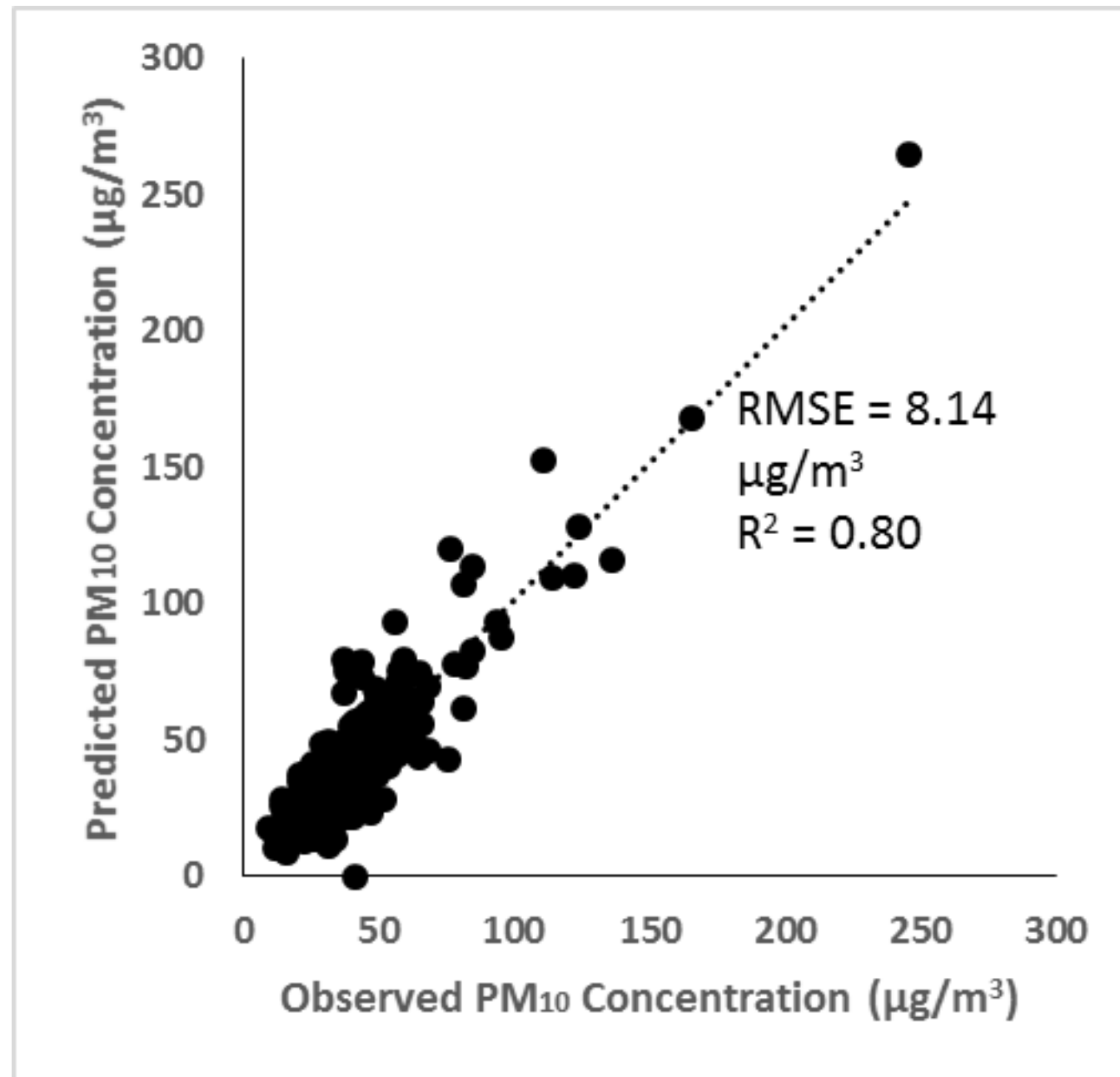
MULTI LAYER PERCEPTRON (MLP)



3.0 RESULTS AND DISCUSSION



Combination of Activation Function	Logsig-Purelin		Tansig-Purelin	
	RMSE ($\mu\text{g}/\text{m}^3$)	R ²	RMSE ($\mu\text{g}/\text{m}^3$)	R ²
Number of neurons in hidden layer				
1	6.86	0.53	6.86	0.53
2	6.77	0.55	6.83	0.54
3	6.63	0.56	6.71	0.55
4	6.49	0.58	6.50	0.58
5	6.49	0.58	6.40	0.59
6	6.35	0.60	6.45	0.59
7	6.17	0.62	6.38	0.60
8	6.17	0.62	6.40	0.59
9	6.16	0.62	6.19	0.62
10	5.98	0.65	6.03	0.64
11	5.91	0.65	6.10	0.63
12	5.89	0.66	5.91	0.65
13	5.71	0.68	5.58	0.69
14	5.70	0.68	5.59	0.69



4.0 CONCLUSION

- This study shows that the complexity and nonlinearity of PM_{10} in atmosphere are best captured by MLP with the combination of Tansig-Purelin activation function as showed by strong agreement ($R^2=0.69$, training) and ($R^2 = 0.80$, testing) between predicted and observed data with respect to meteorological and gaseous pollutants parameters.
- The model is robust and is ready for operational used. It is suggested for the local authority and DOE to use the MLP model in predicting PM_{10} concentration for improving air quality at specific location and as an early warning to inform the community for them to reduce the outdoor activities due to the unhealthy level of air quality

ACKNOWLEDGMENTS

- Air Quality Division, Department of Environment (DOE)
- School of Ocean Engineering (PPKK), UMT
- School of Marine and Environmental Sciences (PPSMS), UMT
- College of Engineering, Universiti Tenaga Nasional (UNITEN)
- Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam



UNIVERSITI MALAYSIA TERENGGANU

UMT

TERIMA KASIH / *THANK YOU*

www.umt.edu.my

