

UNIVERSITI TEKNOLOGI MARA

**STREAMFLOW PREDICTION
USING NON-PARAMETRIC
REGRESSION METHODS AT
PAHANG RIVER CATCHMENT**

DEWI ANNEKA BINTI HALID

Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

Faculty of Civil Engineering

September 2016

ABSTRACT

Flood disaster cannot be stopped or avoided, but all stakeholders should learn how to face this problem with an aggressive approach and maximum efforts to minimize the losses in terms of fatalities and economic. One of the remaining ways to minimize the flood problem is to constantly seek new knowledge and alternatives to improve the flood forecasting system. An ongoing need to achieve the best accuracy of flood forecasting obviously has been stimulating many recent studies to give more attention in many advances technique of flood prediction. Therefore, the aim of this study is to investigate the potential of two non-parametric regression methods as a flood predicting tool, where the application is relatively new in the hydrologic problems. The approaches studied are K-Nearest Neighbours (KNN) and Multivariate Adaptive Regression Splines (MARS). Pahang River situated in Pahang, Malaysia has been selected as an area of interest of this study. 30 years of historical data set of daily rainfall and streamflow at upstream tributaries of Pahang River were used as input data to develop and evaluate the effectiveness of both approaches in one-year-ahead prediction of streamflow. The effect of different length of data sets to the performance of models was also examined. Simulation results showed that longer period data can provide significant improvement to the performance of both approaches. However, based on the comparison of performance between KNN model and MARS model, all the error values and efficiency percentage for KNN model (CC=0.7241 to 0.7601; MRSE=0.591 to 0.2503; MRAE=0.464 to 0.3361; CE=11.62 % to 31.72 %) at all predictive points are not as good as the error values and efficiency percentage for MARS model (CC=0.9898 to 0.9921; MRSE=0.0278 to 0.0184; MRAE=0.1098 to 0.0962; CE=97.97 % to 98.45 %). This clearly indicated that satisfactory result of streamflow prediction only appeared superior for MARS model. Overall, all findings that emerge from this study have gone some way towards enhance the understanding of the capability and limitation of KNN and MARS model in long term flood prediction.

ACKNOWLEDGEMENT

In the name of Allah S.W.T the most gracious and most merciful. Lord of the universe, with His permission Alhamdulillah the study of this research has been completed. Praise to Prophet Muhammad S.A.W, His companions and to those on the path as what He preached upon, might Allah Almighty keep up His blessing and tenders.

Foremost, I would like to express my special appreciation and thanks to my supervisor, Assoc. Prof. Dr. Ismail bin Atan for his continuous support, supervision, advices, guidance, patience, immense knowledge and motivation in making it possible for me to complete my master study and research. Not forgotten, my appreciation to my ex co-supervisor, Prof. Madya Ir. Dr. Aminuddin bin Mohd Baki and my co-supervisor, Assoc. Prof. Dr. Wardah binti Tahir for their support, advices and knowledge regarding this research. Special thanks also go to Department of Irrigation and Drainage (DID) Malaysia for their effort in supplying hydrological data for this research.

I also would like to thanks the Ministry of Science, Technology and Innovation Malaysia (MOSTI) and Research Management Institute (RMI), Universiti Teknologi MARA Malaysia (UiTM) for giving fund support in conducting my research works and to Ministry of Education Malaysia (MOE) for sponsoring the fees of the study. My special appreciation also goes to all the staff of Faculty of Civil Engineering UiTM especially Dean of Faculty, Prof. Dr. Azmi bin Ibrahim for their directly or indirectly technical support, co-operations and help towards my postgraduate affairs.

I owe tremendous appreciation to my family especially for my beloved parent for giving birth to me and supporting me spiritually in every way throughout the time of my study. My gratitude also goes to all of my bestfriends and colleagues who supported and encouraged me to strive towards my goal. To those who indirectly contributed in this research, your kindness means a lot to me. Thank you very much.

Finally, this thesis is heartily dedicated to the loving memory of my very dear late grandfather, Hj. Ajinullah bin Sanda, and late grandmother, Hj. Langkahrayang bin Ahmad for their endless love, vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulillah.

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