

UNIVERSITI TEKNOLOGI MARA

**AN IMPROVED PIXEL-BASED AND
REGION-BASED APPROACH FOR
URBAN GROWTH
CLASSIFICATION ALGORITHMS**

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

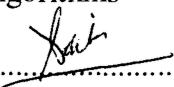
Faculty of Computer and Mathematical Sciences

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AUTHOR’S DECLARATION

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I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Urban growth classification categorized cities development according to its expansion forms. The forms of urban growth can be simulated using satellite remote sensing data and suitable classification technique. Due to limited information on the characteristics of urban expansion especially in developing countries, an urban growth classification model is required for urban growth analysis. Although extensive research has been carried out into urban growth classification, further research must focus on the improvement of classification algorithms since researchers are concerned about the limitation of existing classification algorithms that may produce incorrect classification results. This research is mainly about improving existing classification algorithms for a correct classification results and evaluating the accuracy of classification algorithms in correctly determining urban growth forms. The datasets are Landsat Thematic Mapper (TM) images of Klang Valley, one of the most rapid urban growth areas in Malaysia. In order to fulfil the research goal, the datasets are pre-processed into binary images containing the developed and undeveloped portion of the study area. The new urban areas identified from the binary images are classified to their urban growth forms using moving window, topological relation border length and landscape expansion index algorithms. The urban growth images obtained are analysed to improve existing classification algorithms. The improved algorithm is constructed by adding new parameter and classification rule to existing algorithm. The results are evaluated by receiver operating characteristic (ROC) graph and the existing technique that gives the best performance is landscape expansion index. An accurate urban expansion map helps town planners in planning land use allocation and identifying potential land area to be developed.

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