

TEXTURE CLASSIFICATION USING NEURAL NETWORK

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MASTER OF SCIENCE
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TEXTURE CLASSIFICATION USING NEURAL NETWORK

MOHD YAHYAL HAQ BIN MUSLAN

**Thesis Submitted in Fulfillment of the Requirement for the
Degree of Master of Science in the Faculty of Science and Technology
Kolej Universiti Sains dan Teknologi Malaysia**

January 2006

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Abstract of thesis presented to the *-To my parents-* Universiti Sains dan Teknologi
Malaysia in fulfillment of the requirement for the degree of Master of Science

TEXTURE CLASSIFICATION USING NEURAL NETWORK

MOHD YAHYAL RAQ BIN MUSLAN

January 2006

Chairperson : Associate Professor Muhammad Suzuri Bin Hitam, Ph.D.
Member : Professor Mustafa Bin Mai Deris, Ph.D.
Professor Md Yazid Bin Mai Sarhan, Ph.D.
Faculty : Science and Technology

Texture is one of the attributes commonly used in image analysis and pattern recognition. At this moment, there is no single method that could be used to classify all type of textures resulting from the complexity in variation of texture. Besides, several popular techniques have been reported to have high classification accuracy for certain type of textures.

This thesis presented new methodology for image texture classification which combines the projection method as a simple way for extracting useful image features with the multi-layer perceptron (MLP) neural network which acts as a texture classifier. In the later part of this thesis, Gray Level Co-occurrence Method (GLCM) and Local Binary Pattern (LBP) are also have been employed for similar purpose.

Extensive experimental evaluations have been carried out to test the possibility of using MLP neural network for texture classification. From these experiments, it is found out that projection method provide a good texture extraction and representation of texture for a small class classification problem with advantage in

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computational simplification, while GLCM and LBP have the power to classify large
Malaysia sebagai arahnya untuk keperluan untuk Ijazah Master Sains.
classification problem.

PENGEKELASAN TEKSTUR MENGGUNAKAN RANGKAIAN NEURAL

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Tekstur merupakan salah satu atribut yang selalu digunakan dalam analisis gambar dan corak. Pada masa kini, tidak ada kaedah tunggal yang dapat digunakan untuk mengklasifikasikan semua jenis tekstur disebabkan oleh variasi antara tekstur yang sangat kompleks. Sebaliknya, terdapat beberapa teknik popular yang telah dilaporkan memperoleh ketepatan pengklasifikasian yang tinggi terhadap jenis tekstur yang tertentu.

Tesis ini menunjukkan kaedah baru untuk pengklasifikasian imej tekstur yang menggabungkan kaedah *projection* sebagai satu cara mudah untuk mengekstrak ciri-ciri imej yang berguna dengan rangkaian neural perseptif pelbagai lapisan yang bertindak sebagai pengklasifikasi tekstur. Pada bahagian lebih berikutnya, kaedah Gray Level Co-occurrence Method (GLCM) dan Local Binary Patterns (LBP) juga telah digunakan untuk tujuan yang sama.

Eksperimen-eksperimen telah dijalankan berulang kali untuk menguji kecekapan menggunakan rangkaian neural MLP untuk mengklasifikasikan tekstur. Daripada keputusan-eksperimen tersebut, kaedah *projection* menunjukkan hasil

Abstrak tesis yang dikemukakan kepada Senat Kolej Universiti Sains dan Teknologi Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains.

PENGKELASAN TEKSTUR MENGGUNAKAN RANGKAIAN NEURAL

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pengekstrakkan ciri-ciri dan perwakilan tekstur yang baik terhadap masalah pengklasifikasian yang melibatkan bilangan kelas yang kecil, dengan kelebihan menggunakan pengiraan mudah, manakala GLCM dan LBP mampu mengklasifikasikan bilangan kelas yang besar.

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