

HUMAN BEHAVIOUR
RECOGNITION,
IDENTIFICATION,
AND COMPUTER
INTERACTION

Edited by

Othman Omran Khalifa, B.Sc., M.Sc., Ph.D.,
International Islamic University Malaysia

Shihab A. Hameed, B.Sc., M.Sc., Ph.D.,
International Islamic University Malaysia

Sheroz Khan, B.Sc., M.Sc., Ph.D.,
International Islamic University Malaysia



IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

HUMAN BEHAVIOUR RECOGNITION, IDENTIFICATION AND COMPUTER INTERACTION

Edited by

Othman Omran Khalifa, B.Sc., M.Sc., Ph.D.,
International Islamic University Malaysia

Shihab A. Hameed, B.Sc., M.Sc., Ph.D.,
International Islamic University Malaysia

Sheroz Khan, B.Sc., M.Sc., Ph.D.,
International Islamic University Malaysia



IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Cataloguing-in-Publication Data Perpustakaan Negara Malaysia

ISBN: 978-967-418-156-7

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

CONTENTS

		Page No.
Part-I Human Posture Recognition		
Chapter 01	Human Posture Recognition: An Overview <i>Othman O. Khalifa, Kyaw Kyaw Htike, Aisha-Hassab Abdalla and Lai Weng Kin</i>	1
Chapter 02	Human Posture Recognition: Literature review <i>Othman O. Khalifa, Kyaw Kyaw Htike, Lai Weng Kin and A. A. Alkhazmi</i>	7
Chapter 03	Theoretical Background of Human Posture Recognition <i>Kyaw Kyaw Htike, Othman O. Khalifa, Sheroz Khan and Lai Weng Kin</i>	15
Chapter 04	Human Posture Recognition Classifiers <i>Kyaw Kyaw Htike, Othman O. Khalifa, Lai Weng Kin and MD Rafiqul Islam</i>	22
Chapter 05	Human Posture Recognition: Methodology and Implementation <i>Kyaw Kyaw Htike, Othman O. Khalifa, and Lai Weng Kin</i>	32
Chapter 06	Human Posture Recognition Database and Preprocessing Simulation Results <i>Kyaw Kyaw Htike, Othman O. Khalifa, Rashid Abdallah and Lai Weng Kin</i>	39
Chapter 07	Human Posture Recognition Results using Database A <i>Kyaw Kyaw Htike, Othman O. Khalifa and and Lai Weng Kin</i>	49
Chapter 08	Human Posture recognition Implementation and Deployment <i>Kyaw Kyaw Htike, Othman O. Khalifa and and Lai Weng Kin</i>	58
Chapter 09	Review on Hand Gesture Recognition <i>Sara Bilal and Rini Akmeliawati</i>	68
Chapter 10	Computational Intelligence techniques for Hand Gesture Recognition <i>Sara Bilal and Rini Akmeliawati</i>	77
Chapter 11	Feature Extraction:Hand Shape, Hand Position and Hand Trajectory Path <i>Sara Bilal and Rini Akmeliawati</i>	85
Chapter 12	Towards Malaysian Sign Language Database <i>Haris Al Qodri Maarif, Sara Bilal and Rini Akmeliawati</i>	92
Chapter 13	The Development of Malaysian Sign Language Translator : Preliminary results <i>Sara Bilal, Haris Al Qodri Maarif and Rini Akmeliawati</i>	100
Part II Human Path Detection for Video Surveillance Systems		
Chapter 14	Introduction to Intelligent Video Surveillance Systems <i>Othman O. Khalifa, Imran Moez Khan, Yusof Zaw Zaw and Lai Weng Kin</i>	107
Chapter 15	Human Path Detection : A review <i>Imran Moez Khan, Othman O. Khalifa, Yusof Zaw Zaw, Sheroz Khan and Lai Weng Kin</i>	113

Chapter 16	Fuzzy Set Theory <i>Imran Moez Khan, Yusof Zaw Zaw and Othman O. Khalifa</i>	129
Chapter 17	The Mamdani Fuzzy Inference Algorithm <i>Imran Moez Khan, Yusof Zaw Zaw, Othman O. Khalifa and Lai Weng Kin</i>	138
Chapter 18	Human Path Classifier Architecture <i>Imran Moez Khan, Yusof Zaw Zaw, Othman O. Khalifa and Lai Weng Kin</i>	145
Chapter 19	Human Motion Detection and Classification <i>Othman O. Khalifa, Mat Kamil Awang and Aisha-Hassan Abdulla</i>	154
Chapter 20	Real-Time Human Detection for Video Surveillance <i>Fadhlan H. Kamaru Zaman, Amir A. Shafie and Othman O. Khalifa</i>	163
Chapter 21	Human Tracking Algorithm for Video Surveillance <i>Fadhlan H. Kamaru Zaman, Amir A. Shafie and Othman O. Khalifa</i>	178

Part- III Human Identification and Computer Interaction

Chapter 22	Automatic Identity Recognition Systems: A Review <i>Assal A. M. Alqudah,, Roziati Zainuddin, Mohammad A. M. Abushariah, and Othman O. Khalifa</i>	192
Chapter 23	An Application of Biometric Technology: Iris Recognition <i>Othman O Khalifa, Rashidah F. Olanrewaju and Mohd Fariz Ramli</i>	206
Chapter 24	Interactive Voice Response Technology for Telephony System <i>Mohammad A.M. Abu Shariah, R.N. Aionon and Othman O. Khalifa</i>	213
Chapter 25	EMG Signal Classification Techniques For The Development Of Human Computer Interaction System <i>Md. Rezwanul Ahsan, Muhammad Ibn Ibrahimyand Othman Omran Khalifa</i>	224
Chapter 26	English Digits Speech Recognition System Based on Hidden Markov Models <i>Teddy S. Gunawan, Ahmad A. M. Abushariah, Othman O. Khalifa</i>	244
Chapter 27	Signature Recognition Using Artificial Neural Network <i>Ahmad A. M. Abushariah, Teddy S. Gunawan, Othman O. Khalifa, and Jalel Chebil</i>	255
Chapter 28	Speaker Recognition Using Mel Frequency Cepstrum <i>Othman O. Khalifa, S. Khan, MD. Rafidul Islam, M. Faizal and D. Dol</i>	263
Chapter 29	Handwritten Arabic Word/Character Recognition: Common approaches <i>Assma O. H. , Othman Khalifa and Aisha Hassan</i>	289
Chapter 30	Speaker's Variabilities, Technology and Language Issues that Affect Automatic Speech and Speaker Recognition Systems <i>Mohammad A. M. Abushariah, Roziati Zainuddin, Assal A. M. Alqudah, and Othman O. Khalifa</i>	298

Chapter 31	Arabic Automatic Continuous Speech Recognition Systems	306
	<i>Mohammad A. M. Abushariah, Roziati Zainuddin, Assal A. M. Alqudah, and Othman O. Khalifa</i>	
Chapter 32	Face Verification : An Introduction	317
	<i>Shihab A. Hameed, Waleed A. Badurik</i>	
Chapter 33	Introduction to Fingerprint Verification	326
	<i>Shihab A. Hameed, Waleed A. Badurik</i>	
Chapter 34	Protein Coding Identification using Modified Gabor Wavelet Transform on Multicore Systems	334
	<i>Teddy Surya Gunawan</i>	
Chapter 35	Current Trend in Image Guided Surgery (IGS)	344
	<i>Abdulfattah A. Aboaba, Shihab A. Hameed, Othman O. Khalifa, Aisha H. Abdalla</i>	

Chapter 13

THE DEVELOPMENT OF MALAYSIAN SIGN LANGUAGE TRANSLATOR : PRELIMINARY RESULTS

Sara Bilal¹, Haris Al Qodri Maarif², Rini Akmeliawati³

Intelligent Mechatronics System Research Unit

^{1&3}Department of Mechatronics Engineering

² Department of Electrical and Computer Engineering

International Islamic University Malaysia (IIUM)

Jl Gombak 53100, Kuala Lumpur, Malaysia

Phone: +60361964412 Fax: +60361964433

¹smosb@hotmail.com, ²alqodri.maarif@gmail.com, ³rakmelia@iium.edu.my

13.1. INTRODUCTION

Everyday communication with the hearing population poses a major challenge to those with hearing loss. Most hearing people do not know sign language and know very little about deaf people in general. Even, most hearing people do not know how to communicate in spoken language with a deaf person who can speak and read lips. Therefore, not only the communication barriers for the deaf people appear at the bank, police station and etc, but also essential information about health, employment, and legal matters is inaccessible for them. Common current options for alternative communication modes include cochlear implants, writing, and interpreters.

Cochlear implants are not available option for all deaf people for example only 5.3% of the deaf population in America has a cochlear implant [1]. Handwriting is another alternative for communicating with deaf people. In fact, most of the deaf people cannot communicate well through written language because they use Sign Language (SL) as their preferable language for communicating. Interpreters are commonly used within the Deaf community, but interpreters can charge high hourly rates and be awkward in situations where privacy is of high concern, such as at a doctor or lawyer's office.

The aim of this chapter is to present our proposed a Malaysian Sign Language (MSL) recognition system as another choice of augmenting communication between the deaf and hearing communities.