Malik Saad Sultan

Curriculum Vitae

Present Address:
Hong Kong Applied Science and Technology Research Institute Company Limited
3/F, Photonics Centre, 2 Science Park East Avenue Hong Kong Science Park, Shatin, Hong Kong
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Malik Saad Sultan is a Associate Principal Engineer at ASTRI Company Ltd, Hong Kong's largest R&D center. With a passion for innovation and exceptional capabilities in computer vision and AI, Saad has earned multiple awards throughout his remarkable career, including the Best Employee Award in 2022. As a Projects Lead and Senior Researcher, he has led teams to deliver innovative systems for biometric recognition, environment sensing, and computer-aided diagnosis.

Experience

2019

Projects Lead at ASTRI LTD
www.astri.org

Associate Principal Engineering – Software System (AI)

- Multimodal Transformer Architectures Unify Text and Visual Modalities Through Cross-attention Mechanisms.
- Development of Biometric Recognition System.
  - Face (2D & 3D), Iris, Palm Print, Palm Vein, Gait.
- Development of Smart External Sensing System.
  - People/Vehicle Detection & Counting on a Construction Site.
  - Personal Protective Equipment Compliance Check on a Construction Site.
  - Pose Estimation & Behaviour Analysis of Worker.
- Development of Smart Internal Sensing System.
  - Eye-Gaze Tracking in Near-Eye Head-Mounted Displays.
  - Iris Recognition in Near-Eye Head-Mounted Displays.
- Development of Biometric Sensing Fusion systems for AR/VR (Head Mounted Display).
- Development of Seamless Multi-Factor Human Centric Sensing Fusion system.
- Hand Gesture Recognition for Head-Mounted Display for AR Applications.
- Dynamic Vision Sensing System with Static Capturing Mode for Privacy Preserved behaviour analysis.

2014
2018

Projects Lead at Neadvance LTD
www.neadvance.com

Senior Researcher – Medical Image Processing

○ Computer Aided Diagnosis System for Rheumatoid Arthritis (Musculoskeletal Ultrasound)
   – Image Denosing, Segmentation (Bones, Joint Capsule, Tendon), Feature Extraction and Classification (Mild, Moderate, Severe).
○ Computer Aided Diagnosis System for Rheumatic Heart Diseases (Echocardiography Images – Including Doppler)
   – Image Denosing, Segmentation and Tracking (Heart Valves, Chambers, Walls, Regurgitation Jet of Blood), Feature Extraction and Classification (Mild, Moderate, Severe).

2010
2013

Projects Lead at Beijing Institute of Technology
www.bit.edu.cn

Researcher – Robotic Vision

○ 3D Pose Estimation of the Robotic Arm for the Drawing Robot
   – Camera Calibration, Object Identification, Pose Estimation (Localization).
○ Outdoor Vehicle Localization using Active Landmarks
   – Camera Calibration, Landmark Identification, Pose of Vehicle reference to the landmarks (localization), Shortest Possible Path to destination.

External Supervisor

2021
2023

Hong Kong Metropolitan University, *Department of Electronic Engineering and Computer Science, School of Science and Technology*

ASTRI's Intern Student Supervisor

2020
2022

Emerging Sensing and Display Technology, *IOTSAI ASTRI*

Educational Background

2020

Applied Behaviour Analyst (Autism therapy), *Registered Behavior Technician Course, Autism Partnership Foundation*

2014
2018

PhD in Computer science, *Faculty of Computer Science, University of Porto* (FCUP), Porto, Portugal

2010
2013

MS in Mechatronics, *Beijing Innovation Center for Intelligent Robots and Systems, Beijing Institute of Technology* (BIT), Beijing, China

Thesis

PhD Thesis

TITLE	Diagnosis of Rheumatic Heart Disease Based on Ultrasound Videos
ADVISOR	Prof. Miguel Tavares Coimbra
CO-ADVISOR	Dr. Manuel João Ferreira
FUNDING AGENGY	Funded by a project (Ref: NORTE-01-0247-FEDER-003507-RHDecho), under the PORTUGAL 2020 Partnership Agreement, through the European Regional Development Fund (ERDF) and Fundação para a Ciência a e Tecnologia (FCT-MAPi) under the grant no: PD/BD/105761/2014.

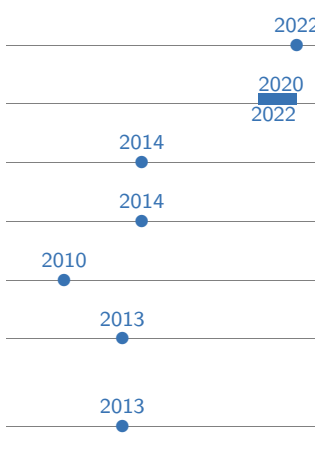### MSc Thesis

TITLE	3D Visual Positioning System for Vehicles Using Infrared Landmarks and Dual Perpendicular Cameras
ADVISOR	Prof. Huang Qiang
CO-ADVISOR	Prof. Chen Xiaopeng
FUNDING AGENGY	Funded by a China Scholarship Council, the National Natural Science Foundation of China under Grant no. 60925014 and 61273348 and Beijing Science Foundation under Grant no. 4122065

Awards & Distinctions

2022   **Outstanding Employee Award**

2020
2022   **Consecutive 3 Years Best Team Award**, *ASTRI – CTO/IOTSAI/ESDT*

2014   **Secured FCT-MAPi Grant for PhD**

2014   **Secured RHEUMUS Research Project Grant**

2010   **Secured Chinese Scholarship Council (CSC) Grant for Master Degree**

2013   **Excellent Student Award from International Student Centre (ISC), 1st Prize**

2013   **Distinguished Student Award from Beijing Institute of Technology (BIT), 1st Prize**

Research & Development Interests

- Artificial Intelligence (deep learning) Based Systems
- Augmented and Virtual Reality
- Smart Surveillance Systems
- Smart Biometric Systems
- Healthcare Applications
- Autonomous Vehicle
- Autism Intervention
- Robotics

Languages

Urdu	Native	
English	Official Language	
Mandarin Chinese	Fluent	*1 Year Language Course at BIT, Beijing, China*
Portuguese	Basic Fluency	

Skills

Programming	OpenCV, MATLAB, Python, PyTorch, Tensorflow
Project Management	Activity and Resource Planning, Organizing and Motivating a Project Team, Controlling Time Management, Ensuring Customer Satisfaction, Analyzing and Managing Project Risk, Monitoring Progress

Publications

Patent

US, China Patent
(2022)
Alwin Tam, **M.S. Sultan**, Xiuling Zhu, Kenny Chan, "**An Artificial Intelligent Action Recognition Dynamic Vision Sensing System with Static Capturing Mode via Optical Approach**" (Submitted)

Journal publication

IEEE JBHI
Impact factor 5.772
SJR Q1
(2018)
M.S. Sultan, N. Martins, E. Costa, D. Veiga, M.J. Ferreira, S. Mattos, M. Coimbra, "**Virtual M-Mode for Echocardiography: A New Approach for the Segmentation of the Anterior Mitral Leaflet**", (early access publication) in IEEE Journal of Biomedical and Health Informatics (DOI: 10.1109/JBHI.2018.2799738)

IEEE JBHI
Impact factor 5.772
SJR Q1
(2017)
N. Martins, **M.S. Sultan**, D. Veiga, M.J. Ferreira, F. Teixeira, M. Coimbra, "**A New Active Contours Approach for Finger Extensor Tendon Segmentation in Ultrasound Images using Prior Knowledge and Phase Symmetry**", (early access publication) in IEEE Journal of Biomedical and Health Informatics (DOI: 10.1109/JBHI.2017.2723819)

Advances in
Multimedia
(2015)
N. Qadeer, D. Hu, X. Liu, S. Anwar, **M.S. Sultan**, "**Improving Shape Retrieval by Integrating AIR and Modified Mutual NN Graph**", Advances in Multimedia, (DOI:10.1155/2015/372172)

Book Chapter

Springer CCIS
(2017)
M.S. Sultan, N. Martins, E. Costa, D. Veiga, M.J. Ferreira, S. Mattos, M. Coimbra, "**Tracking Anterior Mitral Leaflet in Echocardiographic videos using Morphological Operators and Active Contours**", Communications in Computer and Information Science, Biomedical Engineering Systems and Technologies, 881, Chapter 9, (DOI:10.1007/978-3-319-94806-5_9)

Conference publication

IEEE ENBENG
(2019)
E. Costa, N. Martins, **M.S. Sultan**, D. Veiga, M.J. Ferreira, S. Mattos and M.T. Coimbra, "**Mitral Valve Leaflets Segmentation in Echocardiography using Convolutional Neural Networks**", in Proc. IEEE 6th Portuguese Meeting on Bioengineering (ENBENG), Lisbon, Portugal, Feb 2019.

IEEE EMBC
(2018)
M.S. Sultan, N. Martins, E. Costa, D. Veiga, M.J. Ferreira, S. Mattos and M.T. Coimbra, "**A New Method for the Anterior Mitral Leaflet Segmentation in Echocardiography Videos using the Virtual M-mode Space**", in Proc. IEEE EMBC, Honolulu, Hawaii, Jul 2018.

IEEE EMBC
(2018)
L. Pires, **M.S. Sultan**, N. Martins, E. Costa, D. Veiga, M.J. Ferreira, and M.T. Coimbra, "**Extracting Thickness Profiles of Anterior Mitral Leaflets in Echocardiography Videos**", in Proc. IEEE EMBC, Honolulu, Hawaii, Jul 2018.

IEEE EMBC
(2018)
N. Martins, **M.S. Sultan**, D. Veiga, M. Ferreira, Miguel Coimbra, "**Fully Automatic Finger Extensor Tendon Segmentation in Ultrasound Images of the Metacarpophalangeal Joint**", in Proc. IEEE EMBC, Honolulu, Hawaii, Jul 2018.

IEEE BHI
(2018)
N. Martins, M.S. Sultan, D. Veiga, M. Ferreira, Miguel Coimbra, "**Joint Capsule Segmentation in Ultrasound Images of the Metacarpophalangeal Joint using a Split and Merge Approach**", in Proc. IEEE BHI, Nevada, USA, March 2018.

IEEE EMBC
(2017)
M.S. Sultan, N. Martins, E. Costa, D. Veiga, M. Ferreira, S. Mattos, and M. Coimbra, "**Tracking Large Anterior Mitral Leaflet Displacements by Incorporating Optical Flow in an Active Contours Framework**", in Proc. IEEE EMBC, Jeju Island, South Korea, Jul 2017, (DOI: 10.1109/EMBC.2017.8037548)

BIOSTEC
(2017)
M.S. Sultan, N. Martins, E. Costa, D. Veiga, M. Ferreira, S. Mattos, and M. Coimbra, "**Real-time Anterior Mitral Leaflet Tracking using Morphological Operators and Active Contours**", in Proc. Int. Joint Conf. on Biomedical Engineering Systems and Technologies, BIOSTEC, Porto, Portugal, Feb 2017, (DOI: 10.5220/0006244700390046)

BIOSTEC
(2017)
E. Costa, N. Martins, M.S. Sultan, D. Veiga, M. Ferreira, S. Mattos, and M. Coimbra, "**A Preliminary Approach for the Segmentation of Mitral Valve Regurgitation Jet in Doppler Ecocardiography Images**", in Proc. Int. Joint Conf. on Biomedical Engineering Systems and Technologies, BIOSTEC, Porto, Portugal, Feb 2017, (DOI: 10.5220/0006248900470054)

WCPCCS
(2017)
E. Costa, D. Veiga, N. Martins, M.S. Sultan, M. Ferreira, M. Coimbra and S. Mattos, "**Doppler echocardiography for subclinical rheumatic heart disease evaluation of a computerised diagnosis of the mitral valve apparatus**", 7th World Congress of Pediatric Cardiology & Cardiac Surgery, Vol. 27, P2077, July 2017, (DOI:10.1017/S104795111700110X)

IEEE EMBC
(2016)
M.S. Sultan, N. Martins, D. Veiga, M.J. Ferreira, and M. Coimbra, "**Tracking of the Anterior Mitral Leaflet in Echocardiographic Sequences using Active Contours**", in Proc. IEEE EMBC, Orlando, USA, Aug 2016, (DOI: 10.1109/EMBC.2016.7590889)

IEEE EMBC
(2016)
N. Martins, M.S. Sultan, D. Veiga, M.J. Ferreira, and M. Coimbra, "**Segmentation of the metacarpus and phalange in musculoskeletal ultrasound images using local active contours**", in Proc. IEEE EMBC, Orlando, USA, Aug 2016, (DOI: 10.1109/EMBC.2016.7591627)

BIOSTEC
(2016)
M.S. Sultan, N. Martins, D. Veiga, M. Ferreira, M. Coimbra, "**Automatic segmentation of extensor tendon of the MCP joint in ultrasound images**", in Proc. Int. Joint Conf. on Biomedical Engineering Systems and Technologies, BIOSTEC, Rome, Italy, Feb 2016, (DOI: 10.5220/0005692500710076)

IEEE EMBC
(2015)
J. Oliveira, C. Oliveira, B. Cardoso, M.S. Sultan, M. Coimbra, "**A multi-spot exploration of the topological structures of the reconstructed phase-space for the detection of cardiac murmurs**", in Proc. IEEE EMBC, Milan, Italy, Aug 2015, (DOI: 10.1109/EMBC.2015.7319319)

IEEE EMBC (2015) — M.S. Sultan, N. Martins, M. Ferreira, M. Coimbra, "**Segmentation of Bones and MCP Joint Region of the Hand from Ultrasound Images**", in Proc. IEEE EMBC, Milan, Italy, Aug 2015, (DOI: 10.1109/EMBC.2015.7319023)

IEEE ICMA (2013) — M.S. Sultan, X.g Chen, G. Ma, J. Xue, W. Ni, T. Zhang, W. Zhang, "**Hand-eye 3D pose estimation for a drawing robot**", in Proc. IEEE ICMA, Takamatsu, Japan, Aug 2013, (DOI: 10.1109/ICMA.2013.6618105)

IEEE ROBIO (2013) — G. Ma, H. Qiang, Z. yu, X. Chen, L. Meng, M.S. Sultan, W. Zhang, Y. Liu, "**Hand-eye servo and flexible control of an anthropomorphic arm**", in Proc. IEEE ROBIO, Shenzhen, China, Dec 2013, (DOI: 10.1109/ROBIO.2013.6739667)

IEEE ROBIO (2013) — M.S. Sultan, X. Chen, N. Qadeer, T. Zhang, H. Qiang, "**Vision guided path planning system for vehicles using infrared landmark**", in Proc. IEEE ROBIO, Shenzhen, China, Dec 2013, (DOI: 10.1109/ROBIO.2013.6739455)

IEEE ICMA (2012) — A. Yasin, Q. Huang, Q. Xu, M.S. Sultan, "**Humanoids Robot Push Recovery through Foot Placement**", in Proc. IEEE ICMA, Chengdu, China, Dec 2012, (DOI: 10.1109/ICMA.2012.6282737)