

# 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*

☎ +852 - 5530 7949

✉ [enr.saadsultan@gmail.com](mailto:enr.saadsultan@gmail.com)

✉ [maliksaadsultan@astri.org](mailto:maliksaadsultan@astri.org)



Malik Saad Sultan is a Associate Principal Engineer at ASTRI Company Ltd, Hong Kong's largest RD 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

### Associate Principal Engineering – Software System (AI)

**Projects Lead at  
ASTRI LTD**  
[www.astri.org](http://www.astri.org)

- 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.
- Privacy Preserved Dynamic Vision Sensing System with Static Capturing Mode via Optical Approach.

Privacy preserved behaviour analysis

2014

2018

### Senior Researcher – Medical Image Processing

**Projects Lead at  
Neadvance LTD**  
[www.neadvance.com](http://www.neadvance.com)

- 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](http://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 AGENCY** 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 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 AGENCY** 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, <i>ASTRI – CTO/IOTSAI/ESDT</i>
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), <b>1st Prize</b>
2013	Distinguished Student Award from Beijing Institute of Technology (BIT), <b>1st Prize</b>

## 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	<i>1 Year Language Course at BIT, Beijing, China</i>
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

<b>US, China Patent</b> (2022)	Alwin Tam, <b>M.S. Sultan</b> , Xiuling Zhu, Kenny Chan, “ <b>An Artificial Intelligent Action Recognition Dynamic Vision Sensing System with Static Capturing Mode via Optical Approach</b> ” ( <b>Submitted</b> )
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### Journal publication

- IEEE JBHI** **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** 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** 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** **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** 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** **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** 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** 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** 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)