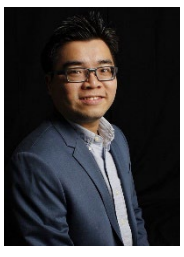
August 2023

IMPact@SUTD is a regular update featuring works by SUTD Faculty, Researchers, Students and Research Centres/Labs. We hope to create awareness of the Research by SUTD within the SUTD community and beyond. Share with us your SUTD works today so that we can include it in our next update.



A Self-Rotary Aerial Robot With Passive Compliant Variable-Pitch Wings

IEEE Robotics and Automation Letters

SUTD Authors: Xinyu Cai, Luke Soe Thura Win, Brian Leonard Suhadi, Hitesh Bhardwaj, Shaohui Foong

"Self-rotary winged aerial robots combine the advantages of rotor-based and fixed-wing aircraft. A passive variable-pitch mechanism is devised to automatically adjust wing angles based on payload weight, minimizing speed increase and enhancing stabilization. A complementary adaptive attitude controller tackles challenges caused by uncertainties and variable angles. Experiments show that the robot achieves 56.8% more power loading and improved flight performance."

--- Shaohui Foong

Constructing time-series momentum portfolios with deep multi-task learning

Expert Systems with Applications

SUTD Authors: Joel Ong, Dorien Herremans

"We leverage the power of multi-task deep learning (MTL) models to create diversified risk-adjusted time-series momentum portfolios. In contrast to existing studies, we consider the momentum signal jointly with different volatility estimators. Detailed experiments confirm that this can indeed outperform existing TSMOM strategies."

--- Dorien Herremans

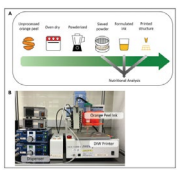
A-DSCNN: Depthwise Separable Convolutional Neural Network Inference Chip Design Using an Approximate Multiplier

Chips

SUTD Authors: Nicholas Phipps, Shang Jin-Jia, Teo Tee Hui

"This text discusses the use of Depthwise Separable CNN (DSCNN) as the preferred architecture for implementing CNNs on edge devices using ASICs. The work introduces a multi-mode approximate multiplier, which utilizes two 4-bit multiplication operations to perform a 12-bit multiplication, optimizing the Processing Element (PE) array in the convolutional layer. The Approximate-DSCNN (A-DSCNN) accelerators were implemented on TSMC 40-nm CMOS process, achieving high power efficiency and occupying small areas at a given clock frequency."

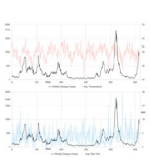
--- Teo Tee Hui



3D printability and biochemical analysis of revalorized orange peel waste

International Journal of Bioprinting

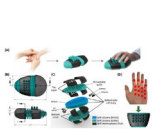
SUTD Authors: Tan Jian Da, Lee Cheng Pau, Sakeena Si Yu Tan, Michinao Hashimoto, Foo Su Yi, Joseph Choon Wee Tan, Eng Shi Ong; Chen Huei Leo



A deep learning based hybrid architecture for weekly dengue incidences forecasting

Chaos Solitons & Fractals

SUTD Authors: Xinxing Zhao, Li Kainan, Cheong Kang Hao



Design and Additive Manufacturing of a Hedgehog-Inspired Soft Robot Companion

2023 IEEE International Conference on Soft Robotics, Robosoft

SUTD Authors: G. Hiramandala, T. Calais, S. Jain, Elgar Vikram Kanhere, P. Valdivia y Alvarado, T. Stalin, A. Chooi, A. R. Plamootil Mathai

Exploiting Radio Fingerprints for Simultaneous Localization and Mapping

IEEE Pervasive Computing

SUTD Authors: Billy Pik Lik Lau, Khairuldanial Ismail, Achala Chathuranga, U-Xuan Tan

GENKL: An Iterative Framework for Resolving Label Ambiguity and Label Non-conformity in Web Images Via a New GENeralized KL Divergence

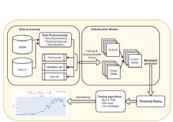
International Journal of Computer Vision

SUTD Authors: Huang Xia, Chong Kai Fong Ernest

Identifying threats, cybercrime and digital forensic opportunities in Smart City Infrastructure via threat modeling

Forensic Science International - Digital Investigation

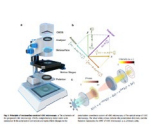
SUTD Authors: Tok Yee Ching, Sudipta Chattopadhyay



PreBit-A multimodal model with Twitter FinBERT embeddings for extreme price movement prediction of Bitcoin

Expert Systems with Applications

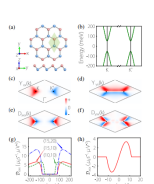
SUTD Authors: Zou Yanzhao, Dorien Herremans



Single-shot isotropic differential interference contrast microscopy

Nature Communications

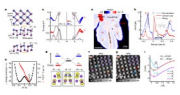
SUTD Authors: Hao Wang, Tan You Sin, Joel K. W. Yang



Time-Reversal-Even Nonlinear Current Induced Spin Polarization

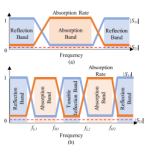
Physical Review Letters

SUTD Author: Wang Hui; Huang Yue-Xin, Feng Xiaolong, Liu Huiying, Yang, Shengyuan A.



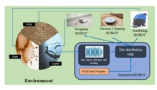
Two-dimensional ferroelectricity in a single-element bismuth monolayer
Nature

SUTD Author: Yang Shengyuan A.



Ultrawideband Dual-Polarized Frequency-Selective Absorber With Tunable Reflective Notch
IEEE Transactions on Antennas and Propagation

SUTD Author: Ang Lay Kee



Vision-based dirt distribution mapping using deep learning
Scientific Reports

SUTD Authors: Ishneet Sukhvinder Singh, I. D. Wijegunawardana, S. M. Bhagya P. Samarakoon, M. A. Viraj J. Muthugala, Mohan Rajesh Elara

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