LENS UTD

A look into SUTD's learning, exploration, notable achievements and success

March 2025

In the spotlight

A Smart City Infrastructure ontology for threats, cybercrime, and digital forensic investigation

Forensic Science International: Digital Investigation
SUTD Authors: Yee Ching Tok, Davis Yang Zheng, Sudipta Chattopadhyay

Cybercrime and the market for cyber-related compromises are becoming attractive revenue sources for state-sponsored actors, cybercriminals and technical individuals affected by financial hardships. Cyber-attacks on future technological advancements such as smart city infrastructure (SCI) will introduce new challenges to digital forensic investigators and law enforcement agencies. These challenges include a lack of standardised SCI contexts, information sharing, collaboration and tool interoperability.

We propose the Smart City Ontological Paradigm Expression (SCOPE), an expansion profile of Unified Cyber Ontology (UCO) and Cyber-investigation Analysis Standard Expression (CASE) that implements SCI threat models, digital forensic evidence, and MITRE attack techniques, patterns and classifications. SCOPE is technology-agnostic while adhering to several ISO standards. Additionally, it contains enough granularity to allow users to pinpoint key information while ensuring it can capture abstract definitions covering emerging technologies. We showcase how SCOPE could present complex data such as SCI-specific threats, cybercrime, investigation data and incident handling workflows via an incident scenario modelled after publicly reported real-world incidents attributed to Advanced Persistent Threat (APT) groups.

"The Smart City Ontological Paradigm Expression (SCOPE) is technology-agnostic while adhering to several ISO standards. Additionally, it contains enough granularity to allow users to pinpoint key information while ensuring it can capture abstract definitions covering emerging technologies."

- Tok Yee Ching

TRAILBLAZERS

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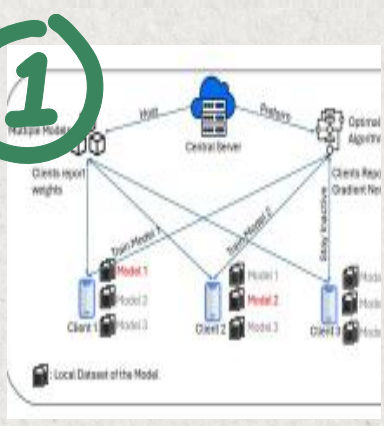

Optimal Variance-Reduced Client Sampling for Multiple Models Federated Learning

IEEE International Conference on Distributed Computing Systems (ICDCS) 2024
SUTD Authors: Marie Siew
Information Systems Technology and Design (ISTD)

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Chicken from the soil: qualifying local chicken amidst food distrust in southwestern China

Agriculture and Human Values
SUTD Authors: Lyle Fearnley
Humanities, Arts and Social Sciences (HASS)

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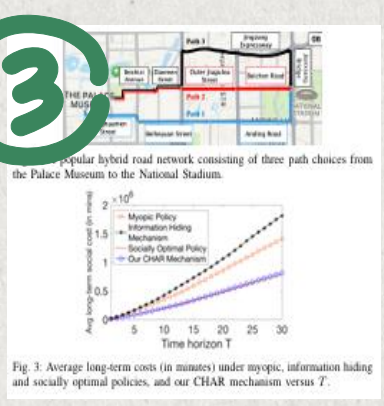

Fig. 3: Average long-term costs (in minutes) under myopic, information hiding and socially optimal policies, and our CHAR mechanism versus T.

Distributed Learning for Dynamic Congestion Games

2024 IEEE International Symposium On Information Theory, ISIT 2024
SUTD Author: Li Hongbo, Duan Lingjie
Engineering Systems and Design (ESD)

4

Visualizing the Ruling Class in Meiji Japan: A Case Study of *Meiji 12 nen jinbutsu shashinchō*

Japanese Studies
SUTD Author: Takahiro Yamamoto /
Humanities, Arts and Social Sciences (HASS)

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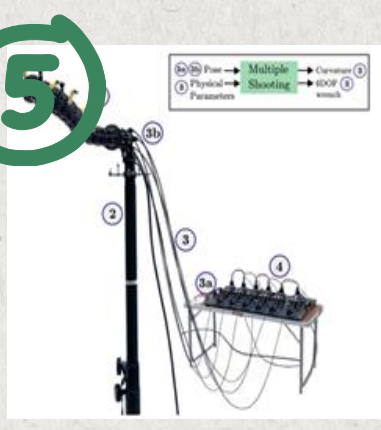

Wrench Estimation and Friction Compensation Using Multiple Shooting Method for Tether Units Augmented to Remote Tendon-Driven Continuum Robots

Journal Of Mechanisms And Robotics-Transactions Of The Asme
SUTD Authors: Chien Jer Luen, Leong Clarissa, Liu Jingmin, Foong Shaohui
Engineering Product Development (EPD)

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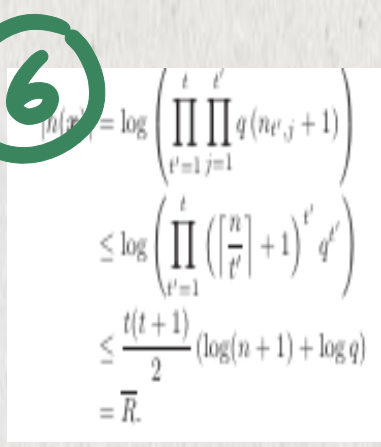

New Construction of q-ary Codes Correcting a Burst of at most t Deletions

IEEE International Symposium On Information Theory, ISIT 2024
SUTD Authors: Song Wentu, Cai Kui, Tony Quek Q. S.
Science, Mathematics and Technology (SMT), Information Systems Technology and Design (ISTD)

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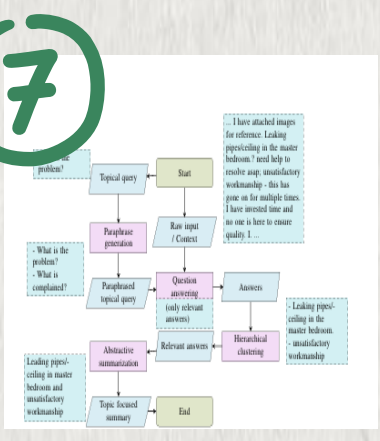

Label-Free Topic-Focused Summarization Using Query Augmentation

2024 International Joint Conference On Neural Networks, IJCNN 2024
SUTD Authors: Mu Wenchuan, Lim Kwan Hui
Information Systems Technology and Design (ISTD)

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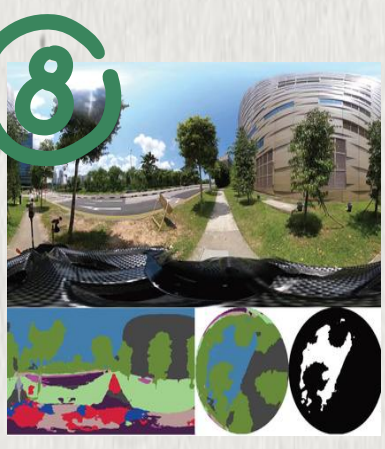

Enhancing Outdoor Comfort: Leveraging Sky View Factor Analysis

Technology-Architecture + Design
SUTD Author: Daniel Wong K. H., Thomas Schroepfer
SGP Cities, Architecture and Sustainable Design (ASD)