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

October 2026

In the spotlight



Decentralized Federated Learning over Time-Varying and Heterogeneous Mobile Computing Networks

IEEE Transactions on Mobile Computing

SUTD Authors: Deng Xiumei, Marie Siew

Decentralized federated learning (DFL) enables collaborative model training among distributed devices without relying on a central server. However, in mobile computing networks, dynamic network connectivity caused by devices moving, and heterogeneous local data, pose challenges to efficient and stable model convergence. Our paper proposes a topology-learning-enhanced DFL framework (DFL-TL) that jointly addresses these challenges through adaptive topology optimization and resource allocation.

Specifically, we introduce a bounded neighborhood heterogeneity metric that captures both statistical heterogeneity among devices and the spectral properties of network topologies. A mixed-integer nonlinear programming problem is formulated to jointly optimize learning costs and neighborhood heterogeneity, enabling adaptive selection of local training windows and model mixing matrices. Theoretical analysis establishes convergence guarantees, while extensive experiments demonstrate that DFL-TL achieves faster convergence and shorter wall-clock training times compared with existing approaches.

"Decentralized federated learning (DFL) enables collaborative model training among distributed devices without relying on a central server."

- Marie Siew



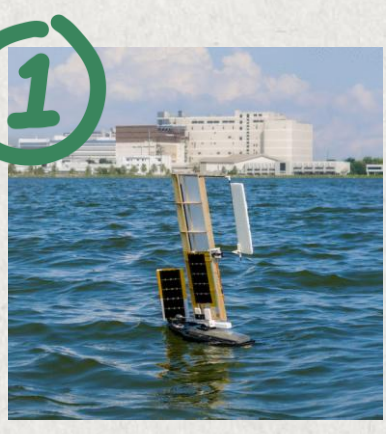
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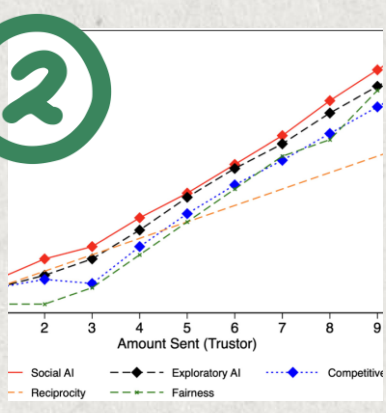
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SUTD Authors: Shane Kyi Hla Win, Danial Sufiyan, Brian Leonard Suhadi, Luke Soe Thura Win, Cai Xinyu, Ang Wei Jun, Foong Shaohui

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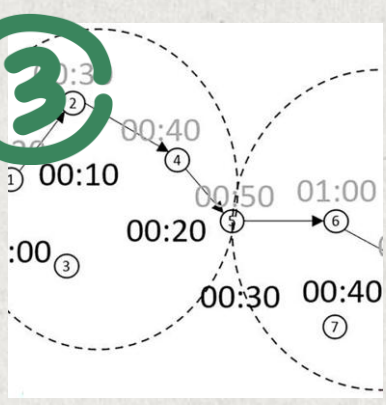
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SUTD Authors: Dinithi Nilanga Jayasekara, Deng Ruotong, Ho Jun Quan, Benjamin Prissé

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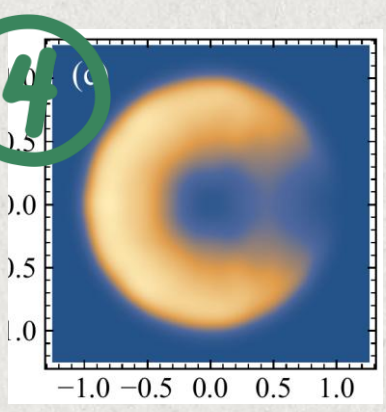
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SUTD Authors: Darryl Teo, Rakesh Nandi, Dai Gengling, Peter Jackson, Nuno Antunes Ribeiro

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SUTD Authors: Wang Dingzu, Dario Poletti

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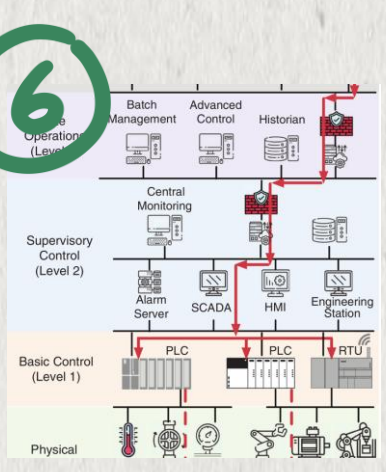
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Advanced Intelligent Systems

SUTD Authors: Naresh Kumar Thanigaivel, Thileepan Stalin, Elgar Kanhere, Aby Raj Plamootil Mathai, Hirusha Madhuwantha Loku Hettige, Gumawang Hiramandala, Pablo Valdivia Y Alvarado

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Contextualizing Cybersecurity of Industrial Control Systems With System Invariants

IEEE Security & Privacy

SUTD Authors: Yang Zeyu, Zhou Jianying

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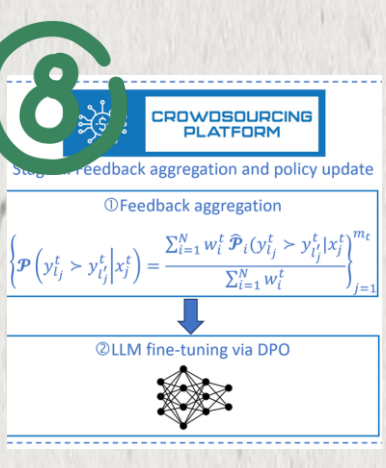
MagTetris+ : A fast simulator for magnetic field and force calculation for ferromagnetic materials and permanent magnets

Journal Of Magnetic Resonance

SUTD Authors: Heng Jing Han, Huang Shao Ying

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IEEE Transactions On Mobile Computing

SUTD Author: Hao Shugang

Singapore Wireless Innovation Centre

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