

In the spotlight

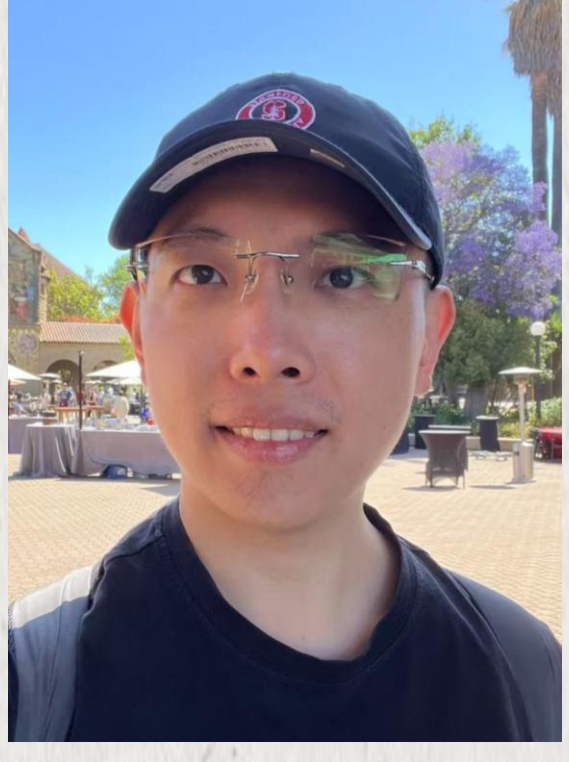
Age of Information Diffusion on Social Networks

IEEE Transactions on Networking

SUTD Authors: Li Songhua, Duan Lingjie

Major social platforms, such as Facebook Marketplace and Pinduoduo, employ viral marketing strategies by dynamically selecting and inviting some users (as seeds) to share fresh product information with their friends. This practice motivates us to optimize a multi-stage seeding process for viral marketing in social networks, leveraging the concepts of peak and average age of information (AoI) to evaluate the timeliness of promotions received by users. As a theoretical foundation, we establish that this multi-stage seeding problem is generally NP-hard.

For peak AoI minimization, we propose a novel polynomial-time algorithm that guarantees strong performances. To minimize the average AoI, we introduce a new framework for approximation analysis, connecting it to a simplified sum-distance minimization problem. This connection inspires the development of another polynomial-time algorithm with competitive approximation performance for average AoI minimization. Additionally, our theoretical findings are well corroborated through experiments on a real-world social network.

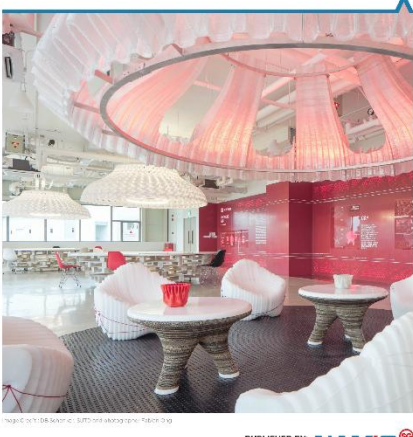


“To minimize the average AoI, we introduce a new framework for approximation analysis, connecting it to a simplified sum-distance minimization problem. This connection inspires the development of another polynomial-time algorithm with competitive approximation performance for average AoI minimization.”

- Li Songhua

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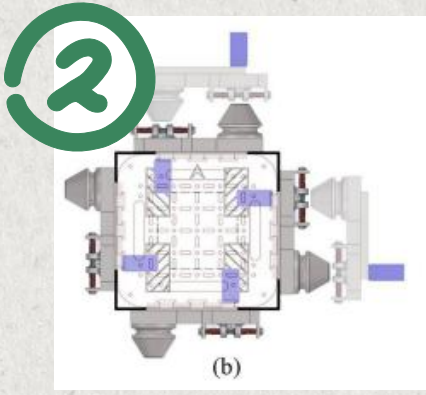
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Effectiveness Of Dual-Language Cognitive Intervention In Cognitive Healthy And Dementia Bilingual Older Adults

Innovation In Aging

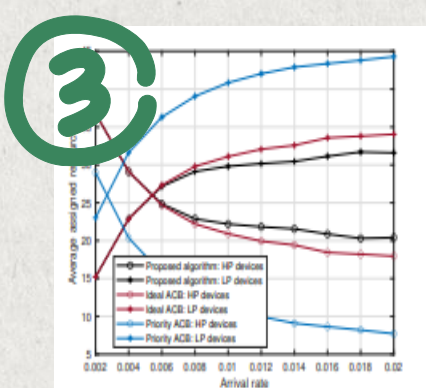
SUTD Authors: Yow W. Quin, Ang Chi Shuen, Li Xiaoqian
Humanities, Arts and Social Sciences (HASS)



Determining optimum assembly zone for modular reconfigurable robots using multi-objective genetic algorithm

Scientific Reports

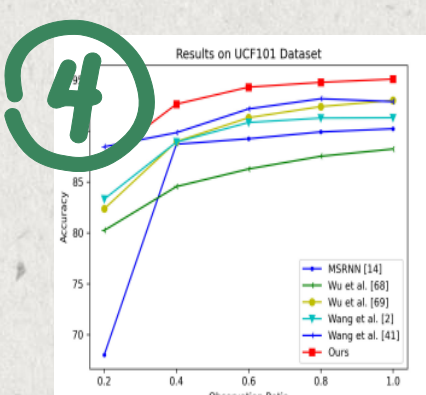
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A random access protocol for mixed-traffic in LEO satellite-based IoT communication

2024 IEEE 99th Vehicular Technology Conference

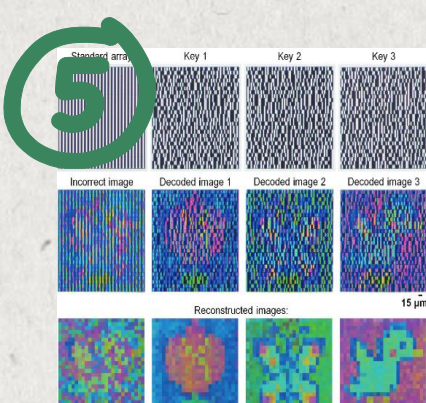
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IEEE Transactions On Circuits And Systems For Video Technology

SUTD Authors: Li Tianjiao, Liu Jun
Information Systems Technology and Design (ISTD)



Spatially Selective Imaging in Color: What You See is What You Want

Advanced Science

SUTD Authors: John Chan You En, Akshaya Rajesh, Lin Xiaoyu, Wang Hongtao, Zhou Xiaoyan, Joel Yang K. W.
Engineering Product Development (EPD)

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$$\left(\frac{1}{\sqrt{n}} \sum_{i=1}^n c_i (X_i, U) - \frac{1}{\sqrt{n}} \sum_{i=1}^n c_i (z_i, \beta) \right)^2 + \left(\frac{1}{\sqrt{n}} \sum_{i=1}^n c_i (X_i, U) - \frac{1}{\sqrt{n}} \sum_{i=1}^n c_i (z_i, \beta) \right)^2 + \lambda_n \left(\frac{1}{\sqrt{n}} \sum_{i=1}^n c_i (X_i, U) - \frac{1}{\sqrt{n}} \sum_{i=1}^n c_i (z_i, \beta) \right)^2$$

By direct computation, we have that

$$\frac{1}{\sqrt{n}} \sum_{i=1}^n c_i (X_i, U) + (z_i, \beta) = (\text{vec}(U))^T \beta \left(\frac{1}{\sqrt{n}} \sum_{i=1}^n c_i \text{vec}(X_i) \right), \text{ where}$$

$$\mathbb{E} \left[\left(\frac{1}{\sqrt{n}} \sum_{i=1}^n c_i \text{vec}(X_i) \right) \right] = 0, \text{ and } \text{Var} \left[\left(\frac{1}{\sqrt{n}} \sum_{i=1}^n c_i \text{vec}(X_i) \right) \right] = \sigma^2 S_n.$$

With the above results, the first term of F_n

$$\sum_{i=1}^n \left[\left(c_i - \frac{1}{\sqrt{n}} \sum_{i=1}^n c_i \right)^2 - c_i^2 \right]$$

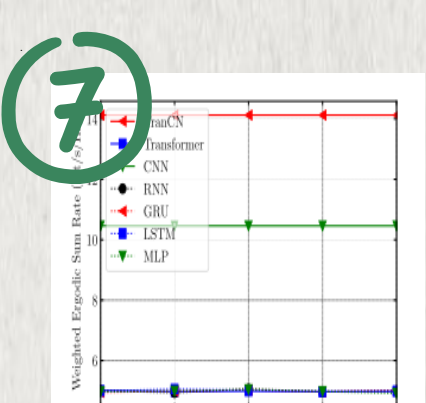
$$= \frac{1}{n} \sum_{i=1}^n (X_i, U)^2 + \frac{1}{n} \sum_{i=1}^n (z_i, \beta)^2 - \frac{2}{n} \sum_{i=1}^n c_i (X_i, U) + (z_i, \beta)$$

$$= \text{vec}(U)^T C_n \text{vec}(U) + \beta^T D_n \beta + 2 \text{vec}(U)^T H_n \beta - \frac{2}{\sqrt{n}} \sum_{i=1}^n c_i (X_i, U) + (z_i, \beta)$$

Multiple regression for matrix and vector predictors: Models, theory, algorithms, and beyond

Electronic Journal Of Statistics

SUTD Author: Lin Meixia
Engineering Systems and Design (ESD)



Transformer-Empowered Predictive Beamforming for Rate-Splitting Multiple Access in Non-Terrestrial Networks

IEEE Transactions On Wireless Communications

SUTD Authors: Zhang Shengyu, Tony Quek, Q. S.
Information Systems Technology and Design (ISTD)



Properties of Maxentropic DNA Synthesis Codes

Entropy

SUTD Author: Kui Cai
Science, Mathematics and Technology (SMT)