# 2022 TRON Symposium (TRONSHOW 2022)

Tokyo, Japan 7 – 9 December 2022



IEEE Catalog Number: CFP2264X-POD ISBN: 978-1-6654-5553-4

## Copyright © 2022, TRON Forum All Rights Reserved

\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP2264X-POD

 ISBN (Print-On-Demand):
 978-1-6654-553-4

 ISBN (Online):
 978-4-89362-376-8

#### **Additional Copies of This Publication Are Available From:**

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA

Phone: (845) 758-0400 Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



#### Proceedings of 2022 TRON Symposium -TRONSHOW-

### **Table of Contents**

TRON Symposium Outliı	ne
-----------------------	----

Greeting from the Chair of Technical Program Committee (13:00 – 13:10)

IoT Architecture Session (13:10 – 14:30) chaired by Fahim Khan (Toyo University, Japan)

- Evaluating the Performance of Ascon Lightweight Authenticated Encryption for Al-Enabled IoT Devices Safiullah Khan (Gachon University, Korea (South)); Wai Kong Lee (Gachon University, Korea (South)); Seong Hwang (Gachon University, Korea (South))...1
- SINR of Machine-Type Communication in HetNets: Interference Avoidance and CoMP Schemes Se-Jin Kim (Chosun University, Korea (South)); Ilhak Ban (Chosun University, Korea (South)); Jaeeun Park (Chosun University, Korea (South)); Younghye Na (Chosun University, Korea (South))...7
- The Building Operating System (BOS): IoT Devices and Systems Aggregator
   Keiichi Nakamura (YRP Ubiquitous Networking Laboratory, Japan); Takeshi Yashiro (Toyo University & YRP
   Ubiquitous Networking Laboratory, Japan); Jee-Eun Kim (Toyo University, Japan); Satoshi Asano (Faculty of Information Networking for Innovation and Design and Other Facilities, Toyo University, Japan); Ken Sakamura (Toyo University, Japan)...12

IoT Application Session (14:45 – 15:45) chaired by Takeshi Yashiro (Toyo University, Japan)

- Remote-Controlled Flying Canopy Umbrella
   Mohamed zied Chaari (Qatar University & Qatar, Qatar)...21
- IoT Communications for Distributed Urban Farms
   Qi Qi Oh (Singapore Institute of Technology, Singapore); Isaac Ibrahim (Singapore Institute of Technology, Singapore);
   Arthur Meng Yao Tay (Singapore Institute of Technology, Singapore);
   Wen Shao Kennard Ko (Singapore Institute of Technology, Singapore);
   Muhamed Fauzi Bin Abbas (Singapore Institute of Technology, Singapore)...27
- Investigating Bluetooth Low Energy Advertisements in Urban Public Space for Street-level Crowd Density Sensing

Masahiro Bessho (Toyo University, Japan); Ken Sakamura (Toyo University, Japan)...34

#### **Appendix**

Technical Program Committee, and other staff members
The total program of 2022 TRON Symposium -TRONSHOW-