A Report on IEEE/IFIP NOMS 2022 Conference

Negar Emami: author and presenter of RC-TL paper

The main focus of NOMS 2022 conference was on following topics: security and machine learning, softwarized network management and orchestration, cognitive network techniques, management of sustainable and energy-efficient networks, and future networks. It's interesting to point out that the best paper award issued to Multi-Agent Deep Reinforcement Learning for Slicing and Admission Control in 5G C-RAN paper.

0.1. Security and Machine Learning (ML)

Security-related presentations mainly applied proactive malware detection, intrusion detection, and anomaly detection, e.g., dynamic intrusion detection for IoT devices. Moreover, several federated learning-based applications were proposed in order to increase the security.

Some paper titles of this section: 1. Hybrid Collaborative Architectures For Intrusion Detection In Multi-Access Edge Computing, 2. Adaptive Anomaly Detection for System Logs with Adversarial Learning, 3. Federated Learning Empowered Edge Collaborative Content Caching Mechanism for Internet of Vehicles.

0.2. Softwarized Network Management and Orchestration

Softwarized network-related papers investigated on the shift of management paradigms in light of Cloudification, Softwarization and Artificial Intelligence (AI), e.g., an efficient orchestration of cloud 5G network. Several of these papers were solving challenges on service-defined networks (SDN), e.g., SDN-based dynamic path reconfiguration, automatic distributed In-Network management for SDNs, QoE Management of HTTP/2 traffic in SDNs, and bringing Information Centric Networking (ICN) to SDN infrastructure.

Moreover, other papers' main focus considered optimization of network function virtualization (NFV) and Virtual Network Function (VNF) systems, e.g., anomaly detection and localization in NFV systems, resilient VNF allocation, game theoretic approaches for VNF and routing, and unleashing GPUs for NFV.

Some paper titles of this section: 1. Resilient Virtual Network Function Allocation with Diversity and Fault Tolerance Considering Dynamic Requests, 2. Cloud Native 5G: an Efficient Orchestration of Cloud Native 5G System, 3. Towards SDN-based Dynamic Path Reconfiguration for Time Sensitive Networking, 4. Automatically Distributing and Updating In-Network Management Rules for Software Defined Networks, 5. A Game-Theoretic Algorithm for the Joint Routing and VNF Placement Problem.

0.3. Cognitive Networks

Cognitive Network-related works mainly brought ML and AI tools to optimize the network management applications, e.g., mobile network data clustering, decentralized ML-based network management, heterogeneous transfer learning in dynamic networks, and optimizing Edge-Cloud cooperation for transmission latency and bandwidth congestion optimization. Moreover, our presentation, under the title of RC-TL, was a part of Cognitive Networks section.

Some paper titles of this section: 1. Clustering Mobile Network Data with Decorrelating Adversarial Nets, 2. Decentralized Machine Learning based Network Data Analytics for Cognitive Management of Mobile Communication Networks, 3. RC-TL: Reinforcement Convolutional Transfer Learning for Large-scale Trajectory Prediction.

0.4. Sustainable and Energy-efficient Network Management

Energy-efficient network-related keynotes mainly tried to introduce the concept of reducing carbon footprint and improving energy efficiency by effective management of network technologies, e.g., power down equipment that optimize paths and function placement for energy-efficiency criteria, provide instrumentation to provide greater visibility into power consumption and raise energy- awareness, and on-demand network management with network management as a service strategies.

0.5. Future Networks

Future network-related keynotes mainly introduced future of internet, 6th generation network, and 6G architecture requirements such as network and service management for achieving Immersive Holographic-Type Communication as well, optimized Virtual Reality (VR) technology, 6G opportunities and challenges of emerging networking paradigms such as in-network computing and programmable networks, and the role of AI and digital twin for future networking.