

Intelligent Internet of Vehicular Things—Part II

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■ **I WELCOME THE** readers to the first issue of the year 2023, the January/February issue of the IEEE Consumer Electronics Magazine (*MCE*).

INTELLIGENT INTERNET OF VEHICULAR THINGS

This issue of *MCE* is dedicated to the Intelligent Internet of Vehicular Things (IIoVT).

In recent years, IIoVTs, such as unmanned aerial vehicles (UAVs), attracted significant interest and research in the consumer domain. However, due to the lengthy process of obtaining commercial operation permits and the unclear nature of operational regulations, civilian UAV use was only in current years confined. The recent ease of rules allowed large-scale UAV adoption for commercial and consumer use. Here, agricultural inspection, public safety, aerial surveillance, real estate photography, and transportation management are worth mentioning due to their high degree of mobility and the quality of their cameras. UAVs can also provide disaster warnings on time, speed up recovery and rescue operations, and carry medical supplies in case of a disaster or the absence of public communication. These applications rely on real-time data to inform UAV operators and increase their situational awareness during operations. This has been made

possible by the emergence of consumer technologies and the Internet of Things (IoT), which enabled large amounts of data to be collected, stored, and analyzed without the need for bulky computers. Ubiquitous UAV deployment still faces significant challenges. One such challenge is ensuring the safe operation of all UAVs—both piloted and autonomous. The other major safety issue facing UAVs is ensuring that they are conspicuous to their surroundings during operation. Conspicuousness during flight is essential for ensuring the safety of humans and ensuring the success of future UAV operations, both piloted and autonomous. Although the UAVs have various benefits mentioned above, it still has numerous challenges, including Big Data, scalability, security, trust, and privacy in the present infrastructure with IoT networks.

Research & development from academia and industry are underway to address many of these challenges. Therefore, it is my pleasure to introduce a collection of high-quality articles dedicated to IIoVT in this issue.

COLUMNS

Ethics & Standards—Artificial Reality: Immersive But Factually Dishonest AR Experience: This article raises concerns and promotes awareness of the use of Augmented Reality (AR) in mass media, particularly in newspapers that aspire to report facts. The authors' main message is that the standard workflow for creating AR content, albeit having no mala fide intent, might lead to artificial reality.

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FEATURE ARTICLES

Interface-Driven Customer Experience—Redefining User Interface (UI) Design for Automotive Infotainment System: This article discusses how advanced consumer technologies have transformed driving experiences into interface-driven user experiences. While the innovation offers exciting new driving experiences, many issues need to be urgently addressed, reconsidered, and resolved through collaborative work between government organizations and the automobile industry.

Toward Blue Skies—City-Scale Air Pollution Monitoring Using UAVs: Dangers associated with poor air quality are driving deployments of air quality monitoring technology worldwide. A comprehensive understanding of the health effects of pollutants requires understanding both the distribution and dispersion of pollutants in the environment. Still, this information is complicated to capture. This article presents a vision for city-scale air pollution monitoring that uses UAVs to complement ground and infrastructure-based measurements with the vertical profile of pollutants.

Deep Learning-Based Autonomous UAV-BSs for NGWNs—Overview and a Novel Architecture: This article presents an overview of the UAV base stations (UAV-BS) trajectory optimization problem for next generation wireless networks (NGWNs). It is shown that a convolutional neural network model can be trained to infer the location of a UAV-BS in real time. Future research challenges and highlighting key issues are also discussed.

An SDN-Based Framework for Load Balancing and Flight Control in UAV Networks: This article proposes a software-defined networking (SDN)-based framework for UAV elements that monitors frequent changes in the network topology. Based on this monitoring, an algorithm is designed that distributes traffic load evenly on different links of multi-UAV systems. Extensive simulation results show that the traffic load is distributed evenly on multiple links connecting different systems with less battery consumption.

DewDrone—Dew Computing for Internet of Drone Things: Unstable internet connectivity in aerial interconnection is challenging for the Internet of Drone Things. This article proposes a dew-cloud computing framework amalgamated with the UAV networks known as *DewDrone*. The authors

introduced a low-power edge device and caching methodology, which opens a new challenge to developing an independent computing and communication application for smart cities, the rural sector, and Industry & Society 4.0.

Increasing Consumer Drone Safety Through an IoT-Based Custom Illumination System: Consumer-based drone applications have been increasing rapidly in recent years. Most of these applications, such as aerial surveillance, crop dusting, and real-estate photography, rely on IoT frameworks. This article proposes an illumination system that can adapt to different weather conditions using an IoT framework. Through this prototype, the authors aim to guide designers on how to consider illumination for safer drone operations.

SPECIAL SECTION

This Special Section on Security, Trust and Privacy Solutions for Intelligent Internet of Vehicular Things presents the selected second set of articles to cover the scope. I would like to thank the guest editors, professors Uttam Ghosh, Hellen Maziku, Hari Prabhat Gupta, Biplab Sikdar, and Joel J. P. C. Rodrigues, for all their sincere effort and hard work for this strong Special Section that will be excellent reading for the readers of the *MCE* as well as the researchers around the globe.

LOOKING FORWARD

I hope that the current issue dedicated to *IIoVT* becomes a good read for a broader set of the consumer technology community to advance their knowledge. *MCE* will continue the trend of covering more themes for enthusiastic and dedicated readers in future issues on the current and emerging topics with the active support from the editorial board members, reviewers, and authors worldwide.

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