Special Issue on Mobile Computing and Ubiquitous Networking for Smart Society

Preface





Sensing, mobile computing, and networking technologies have become deeply embedded in our daily lives, and they form the foundation of a smart society where people, networked sensors, connected devices, and environments are seamlessly integrated. Such technologies are now applied to a wide range of domains, including transportation, healthcare, industry, workplace, and environmental monitoring. In addition, we are now living in an era shaped by artificial intelligence (AI), which is reshaping these domains and providing us with new opportunities for greater convenience, efficiency, and effectiveness. Realizing their full potential requires the integration of diverse technologies such as wireless communications, sensor devices, positioning, machine learning (ML), and data analytics, together with careful consideration of human-centric aspects such as usability, privacy, and well-being.

This special issue, entitled "Mobile Computing and Ubiquitous Networking for Smart Society," covers a broad range of topics from the perspectives of AI-driven mobile computing, sensing, and networking. The issue mainly consists of extended versions of selected papers presented at the 15th International Conference on Mobile Computing and Ubiquitous Networking (ICMU 2025). ICMU has been held since 2004 and has addressed research and development in mobile communications, applications, algorithms, and systems, as well as ubiquitous networking, computing, and services. Under the theme "AI-Driven Mobile Computing and Ubiquitous Networking for Human Welfare," ICMU 2025 featured twenty full papers and twelve short papers in eight technical sessions, together with a poster/demo session. In addition to the extended ICMU 2025 papers, this special issue includes papers submitted in response to the open call for papers within its scope. All the papers were rigorously reviewed by experts according to the standards of *Sensors and Materials*.

In this special issue, seven papers are presented, many of which employ AI and ML as central approaches. In the first paper, a layout optimization method is proposed for pseudo-satellites to provide positioning in tunnel environments, where signals from Global Navigation Satellite Systems (GNSS) are obstructed. In the second paper, a context-aware blink monitoring and feedback system that supports healthy blinking during screen use to reduce digital eye strain is presented. In the third paper, a vision-based method is introduced for detecting shredded tobacco and measuring its width for quality inspection in manufacturing. In the fourth paper, origin–destination estimation is addressed for fixed-route buses by tracking MAC address carry-over in randomized Bluetooth Low Energy (BLE) advertising packets. In the fifth paper, the effect of incorporating long-term data into training sets for gait authentication using insole-type gait sensors is analyzed. In the sixth paper, an explainable multimodal approach is proposed for detecting cerebral atrophy using computed tomography (CT) images and psychological risk factors (e.g., depression). In the final paper, a method for predicting microclimate air temperature based on difference prediction and transfer learning is presented. Although each paper addresses a specific problem, they collectively demonstrate how sensing and ubiquitous networking technologies can contribute to building a smarter, safer, and healthier society.

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