

Editorial

Preface of 2024 IEEE 4th International Conference on Electronic Communications, Internet of Things and Big Data (IEEE ICEIB 2024) [†]

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This volume presents the proceedings of the 2024 IEEE 4th International Conference on Electronic Communications, Internet of Things, and Big Data (IEEE ICEIB 2024). This conference was organized by Tamkang University, the Institute of Electrical and Electronics Engineers (IEEE), and the International Institute of Knowledge Innovation and Invention (IIKII), and was held at Tamkang University, New Taipei City, Taiwan, on 19–21 April 2024. The conference provided a unified communication platform for researchers in a wide range of topics, such as Big Data and Cloud Computing, Technologies and Applications of Artificial Intelligence, Robotics Science and Engineering, the Internet of Things and Sensor Technology, Intelligent Big Data Analysis and its Applications, and other related fields. In recent years, the rapid development of electronic and microelectronic technologies has brought about a new fundamental and universal revolution in technology. The continuous revolution of electronic technology not only limited to very large-scale integrated (VLSI) circuits and computers but also extends to the development of modern communication technologies. Electronics and communication engineering involve information and communication systems, electronic science and technology, communication and information systems, signal and information processing, circuits and systems, electromagnetic fields and microwave technology, physical electronics and optoelectronics, microelectronics, and solid-state electronics, just to name a few. Related research contents include information transmission, information exchange, information processing, signal detection, integrated circuit design and manufacture, electronic components, microwave and antenna, instrumentation technology, computer engineering, applications, and others. The analysis and application of big data improve the efficiency of existing products and allow new products to be developed. Recent technological breakthroughs have greatly reduced the cost of data storage and computing, making the storage of huge amounts of data considerably less complicated and expensive than in the past. With the increasing volume of data being stored day-by-day and coupled with lower costs and easier access, using big data helps to make more precise business decisions that have been difficult previously.

IEEE ICEIB 2024 was held in a hybrid form, with both on-site and online presentations. Figure 1 shows a group photo of the conference opening. Figure 2 shows the first keynote speech, entitled “Bahasa Rojak: A Research Journey”, presented by director and Professor Lim Tong Ming from the Centre of Business Incubation and Entrepreneurial Ventures, Tunku Abdul Rahman University of Management and Technology (TARUMT), Malaysia. He emphasized that Bahasa Rojak is a form of coded mixed language used by internet users



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to post text on social media platforms. This talk shares the different research methods used and outcomes generated. Challenges faced by the researchers are highlighted. The solutions and remedies produced in the works conducted for the past few years will be presented.



Figure 1. Group photo at the opening ceremony of IEEE ICEIB 2024.

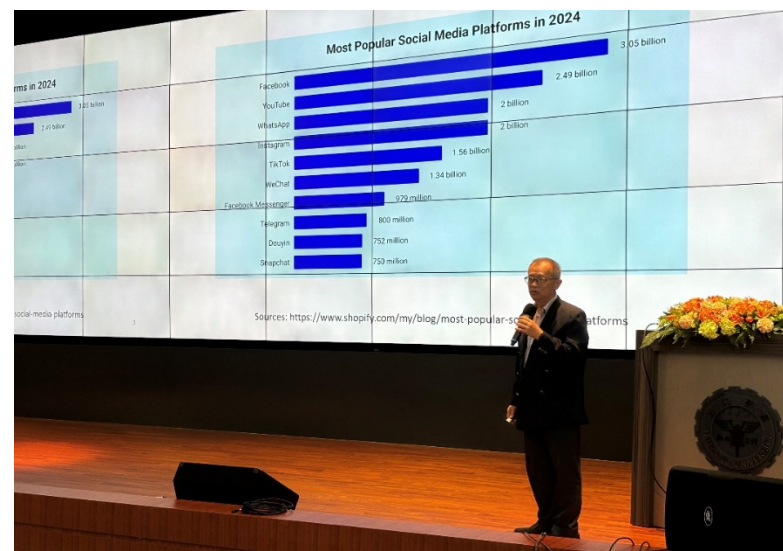


Figure 2. The photo of the first keynote speech at IEEE ICEIB 2024.

Figure 3 shows the second keynote speech entitled “Future Semiconductor IC Technologies for Enabling B5G/6G and AI Revolutions” presented by Chair Professor Donald Y.C. Lie, an IEEE fellow from the Department of Electrical and Computer Engineering, Texas Tech University, United States. He briefly introduced how fifth-generation (5G) mobile network technologies promise to deliver 10 Gbps peak data rates for 5G eMBB (enhanced Mobile Broadband) applications, sub-1ms latency and ultra-reliability for 5G mMTC (ultra-reliable machine type communication), and massive network capacity with increased availability to enable IoE (Internet-of-Everything) with x100 more wireless connected devices compared to 4G for 5G mMTC (massive machine type communication). To accomplish these challenging goals, it is imperative to move up from the sub-6 GHz 5G FR1 band to the higher-frequency bands, which has propelled massive R&D efforts and commercial investments into research on the millimeter-wave (mm-Wave) 5G FR2 band and product developments (i.e., mostly from 24.25 to 52.6 GHz). However, the design requirements of mm-Wave 5G hardware are considerably tougher and consume a bit more power compared to their sub-6 GHz 5G counterparts, especially challenging regarding

their power-added efficiency (PAE), linearity, bandwidth, and cost. For the next-generation 6G that utilizes Terahertz (THz) communication (e.g., using D-band), its hardware design specs are expected to be even more challenging, putting a tremendous amount of pressure on IC (integrated circuit) semiconductor device technologists, as well as on the RF/mm Wave hardware IC design and system design communities. The performance and cost of RF hardware will become even more challenging and differentiating as the industry evolves into the AI (artificial intelligence)-centric 6G technologies.

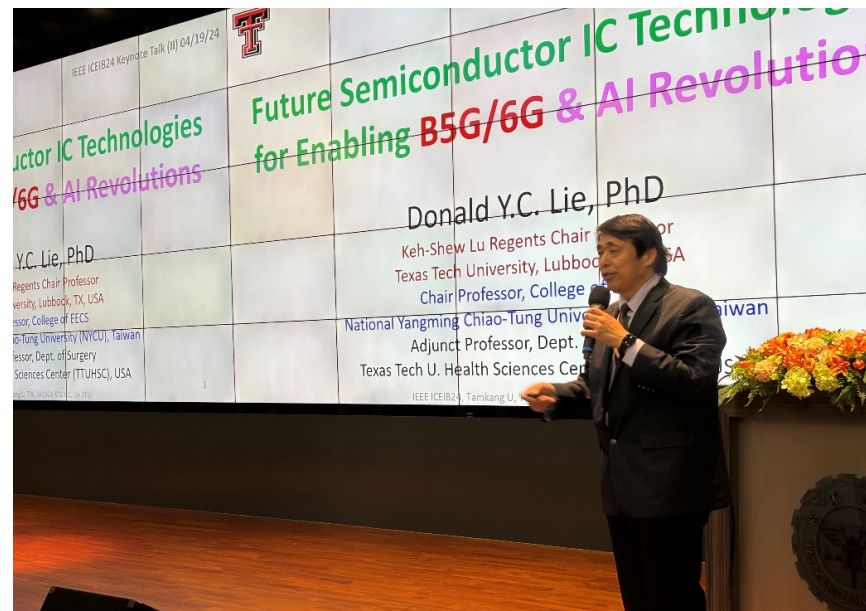


Figure 3. Photo of the second keynote speech at IEEE ICEIB 2024.

IEEE ICEIB 2024 provided eight Regular Sessions including 183 papers, covering Big Data and Cloud Computing, Technologies and Application of Artificial Intelligence, Robotics Science and Engineering, the Internet of Things and Sensor Technology, Intelligent Big Data Analysis and Applications, and other related fields. Figures 4 and 5 show on-site and online oral presentation sessions.

Many substantial results were shared at IEEE ICEIB 2024 by enthusiastic participants and 80 excellent papers about relevant engineering fields to the conference were selected through peer review for publication in *Engineering Proceedings* (ISSN: 2673-4591, indexed by Scopus). The proceedings of IEEE ICEIB 2024 are expected to accelerate the interdisciplinary collaboration of science and engineering technologists in the academic and industrial fields, as well as promote international networking.



Figure 4. Presentation at an on-site session of IEEE ICEIB 2024.

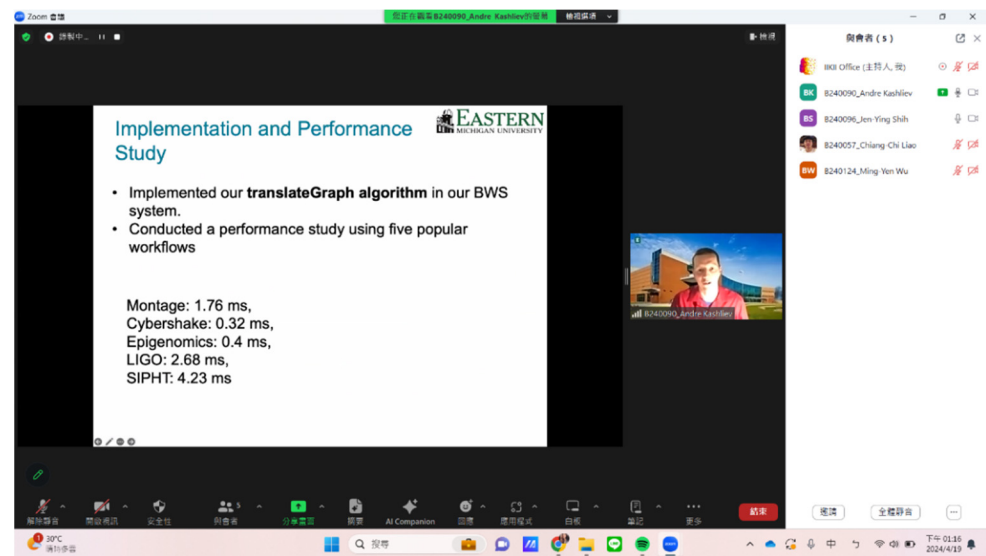


Figure 5. Online presentation at IEEE ICEIB 2024.

Conflicts of Interest: The authors declare no conflicts of interest.

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