Halimah Badioze Zaman · Peter Robinson ·
Alan F. Smeaton · Renato Lima De Oliveira ·
Bo Nørregaard Jørgensen · Timothy K. Shih ·
Rabiah Abdul Kadir · Ummul Hanan Mohamad ·
Mohammad Nazir Ahmad (Eds.)

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Advances in Visual Informatics

8th International Visual Informatics Conference, IVIC 2023
Selangor, Malaysia, November 15–17, 2023
Proceedings

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Preface

The International Visual Informatics Conference (IVIC) 2023 once again brought together experts from academia and industries in a multidisciplinary field that encompasses Computer Science, Information and Communications Technology and Computing Engineering. The conference took place amidst tremendous challenges of the post-COVID-19 pandemic, Energy Transition, Climate Change, Digital Transformation, Wars, Security, low education standards, unemployment and corruption. Despite these challenges, nations are braving it through and embracing opportunities that come their way. Emphasizing its multidisciplinary nature, this time the conference returned to its original home, Universiti Kebangsaan Malaysia (UKM) and was hosted once again by the Institute of Visual Informatics (IVI). Together with other institutional partners of this conference, research findings in various specialized areas of Visual Informatics integrated into various fundamental domains were shared together at this conference. We have seen the areas of Visual Informatics grow since the conference first began in 2009. We are grateful to all our partners, locally and internationally, for making this 8th IVIC a specially exciting and meaningful one.

The Eighth International Visual Informatics Conference (IVIC 2023) was conducted for the first time face-to-face after more than three years of not being able to have physical meetings but only virtual ones. For the first time after a long time too, participants could meet co-researchers from different institutions and different countries; and interact with potential partners from different institutions and industries physically. Participants were also able to appreciate exhibitions and discuss with the respective researchers the works exhibited to get first-hand explanations on matters that they did not understand or were concerned about. Like the previous conferences, the main objective of this conference was to bring together experts and researchers from academia and industry to discuss and share new knowledge, ideas and innovations through internationalization and industrialization. Like the previous IVIC conferences, this conference was organized collaboratively by the Visual Informatics fraternity from various public and private universities, professional institutions and industry players from various parts of the world (their names are listed in the proceedings). The conference was co-sponsored by the Malaysian Information Technology Society (MITS), Malaysia Chapter MyAIS, Institute of Informatics and Computing for Energy (IICE), UNITEN, ARB Berhad and MatrixStreams Sdn. Bhd. The conference was co-chaired by six (6) Professors from Cambridge University, MIT Sloan Management School/ABS, Dublin City University, University of Southern Denmark, National Central University and Universiti Tenaga Malaysia (UNITEN).

The theme of the conference mentioned earlier reflects the importance of the need for organizations and nations to create innovations to achieve Energy Transition efforts and digital transformation for societal well-being. All these innovations were undertaken at a time when disruptive technologies, Climate Change, Sustainability and Generative

AI had brought about interesting emerging visual technologies such as Electric Vehicles; Autonomous and semi-autonomous vehicles, Smart Energy Efficient Chat-bots, as well as Internet of things (IoT) and Blockchain for various domains such as smart buildings, healthcare, agriculture and education. The human-centric future smart society and citizenry of the various nations required new digital innovations that were adopting advanced AI such as Generative Artificial Intelligence (GAI) and data-driven AI and secured AI; they also required digital transformation through strategic digital adoption and sustainable technologies for better technological and economic growth of their respective countries. Thus, the theme of the conference was relevant, apt and timely.

The conference focused on six (6) tracks: *Modeling & Simulation, Mixed Reality & HCI, Systems Integration & IoT, Cybersecurity, Energy Informatics* and *Intelligent Data Analytics,* which lasted for two days (15th and 16th November 2023) and ended with four (4) half-day workshops (17th November 2023) that ran concurrently online entitled: *Data Development for Information Visualisation; Designing Questionnaires for Product, Process, Organizational & Marketing Innovation; Introduction to Deep Learning;* and *Advanced Techniques in Cybersecurity- Safeguarding your Digital Assets* respectively. There were five keynote speakers and 51 paper presentations based on topics covered by the six (6) main tracks. The reviewing of the papers was conducted by experts who represented the Programme Committee locally and internationally from Asia, Europe, and Oceania. Each paper was single-blind by three reviewers and the acceptance rate was 50%. The reviewing process was managed using the system Conference Bay. The conference also included an exhibition portraying research and innovations by academia and industry.

On behalf of the organizing and program committee of IVIC 2023, we thank all authors for their submissions and camera-ready copies of papers, and all participants for their thought-provoking ideas and active participation at the conference. We also thank the Vice-Chancellor of UKM (host university), and Vice-Chancellors and Deans of all Computer Science & IT and Business faculties and Research Institutes of the IHLs and Industry for their support in organizing this conference. We also acknowledge the sponsors, members of the organizing committees, program committee members, support committees and individuals who gave their continuous help and support in making the conference a success. We believe that IVIC will grow from strength to strength and will one day be hosted by not only different institutions in Malaysia but also in different host countries around the world.

November 2023

Halimah Badioze Zaman
Peter Robinson
Alan F. Smeaton
Renato Lima De Oliveira
Bo Nørregaard Jørgensen
Timothy K. Shih
Rabiah Abdul Kadir
Ummul Hanan Mohamad
Mohammad Nazir Ahmad

Organization

The 8th International Visual Informatics Conference (IVIC 2023) was organized by the Institute of Visual Informatics, Universiti Kebangsaan Malaysia (UKM), in collaboration with local public and private Universities in Malaysia, Multimedia Development Corporation (MDEC), and ICT Cluster of the National Professors' Council (MPN).

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