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DATE 2024: Consolidating the New Conference Format

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■ **THE DESIGN, AUTOMATION**, and Test in Europe (DATE) conference is a leading international event providing unique networking opportunities, bringing together designers and design automation users, researchers, and vendors, as well as specialists in hardware and software design, testing, and manufacturing of electronic circuits and systems.

The 27th edition of DATE was held from the 25th to the 27th of March 2024, at the Palacio De Congresos Valencia (Valencia Conference Centre—VCC) in Spain. DATE 2024 adopted the new interaction-centered format, which was first introduced in 2023. Indeed, the conference leveraged, once again, an intensive three-day format, focussing on interaction and further strengthening our already tight-knit community. By using this highly interactive format, we made sure that the attendees could actually spend most of their time in those activities that should be at the core of all research convenings: productive exchanges of ideas, discussions of new advancements in the field, and potential future innovation and research directions. Thanks to this re-centering of the conference structure, the resulting three days offered a comprehensive and exciting program.

Polishing "the diamond from Antwerp"

The three-day format was established at DATE 2023 in Antwerp. To fit the entire event in a three-day period, a new presentation format for research manuscripts was introduced, with the vast majority of regular papers presented using short flash presentations, all followed by poster-supported live interactions. The only exception to this format was made for Best Paper Award (BPA) candidates, who still received a full 25-min presentation. All regular paper presentations were accompanied by a full-length presentation video that was made available before, during, and after the conference. In addition to the regular paper sessions, workshops and tutorials were embedded in the three-day program, and several new program elements were added. An example of the latter was the "unplugged sessions" for brainstorming around a technical theme. In addition, the Young People Program was designed to support PhD students with their career development, with specific engagement by industry representatives. Finally, the "later with the keynote speakers (LKS)" sessions were free-flowing discussions engaging the DATE keynote speakers with the conference attendees interested in the topics they presented.

For the 2024 edition of DATE, we consolidated the three-day format introduced in 2023, leveraging

the successes of the prior year, and modifying a few aspects to further improve participant's experience, based on the extensive feedback received through our attendees' survey (whose participation was incentivized by the popular DATE-mug prize). For example, we extended the research manuscript's pitch presentations from 3 min (in the 2023 format) to 5 min. In addition, we introduced 1-min pitches for extended abstract papers and reduced the number of BPA candidates from 33 papers to 12, slightly shortening their presentation duration (to 20 min) to have more time for discussions at the posters. DATE 2024 also introduced several new awards. First, a new Outstanding Reviewer Award recognizes the most valuable DATE conference reviewers. For each of the four tracks (D—Design Methods & Tools, A—Application Design, T—Test and Dependability, and E—Embedded Systems Design), there were two awardees. The selection criteria were based on individuals who excelled in: 1) contributing insightful and constructive feedback to authors; 2) timely submission of manuscript reviews; and 3) consistent and timely engagement through the selection process, including both online discussion and Technical Program Committee meeting. Two other awards that were newly introduced are the Young People Program University Fair Award and the Autonomous Systems Design (ASD) Outstanding Paper Award.

Program

The Opening Ceremony of DATE 2024 (see Figure 1) took place on Monday morning, kicking off the program with two plenary keynote lectures. The first one was offered by Robert Dimond, a Fellow at Arm (U.K.), who talked about "Chiplet standards: a new route to Arm-based custom silicon." The second plenary keynote lecture was provided by Luc Augustin, CTO of Smart Photonics (NL) on "Enlighten your designs with photonic integrated circuits." Later on, still on Monday, the IEEE CEDA Distinguished Lecturer Lunchtime Keynote was given by Hai "Helen" Li, Clare Boothe Luce professor and Department Chair of the Electrical and Computer Engineering Department at Duke University, on "AI Models for Edge Computing: Hardware-aware Optimizations for Efficiency." As outlined above, each keynote talk was also followed by an LKS session to enable deeper discussion and exchanges between the speakers and the DATE community. These LKS sessions were organized in a "cozy couch" setting, providing an informal environment for inspiring discussions.

The main conference program (see Figure 2) included 29 interactive technical sessions and four sessions dedicated to the presentation of Best Paper Award candidates. All sessions were organized along eight parallel tracks from the four technical

Figure 1. DATE 2024: registration, venue, and opening ceremony. All photographs: DATE 2024. Copyright: Cruz Garcia.
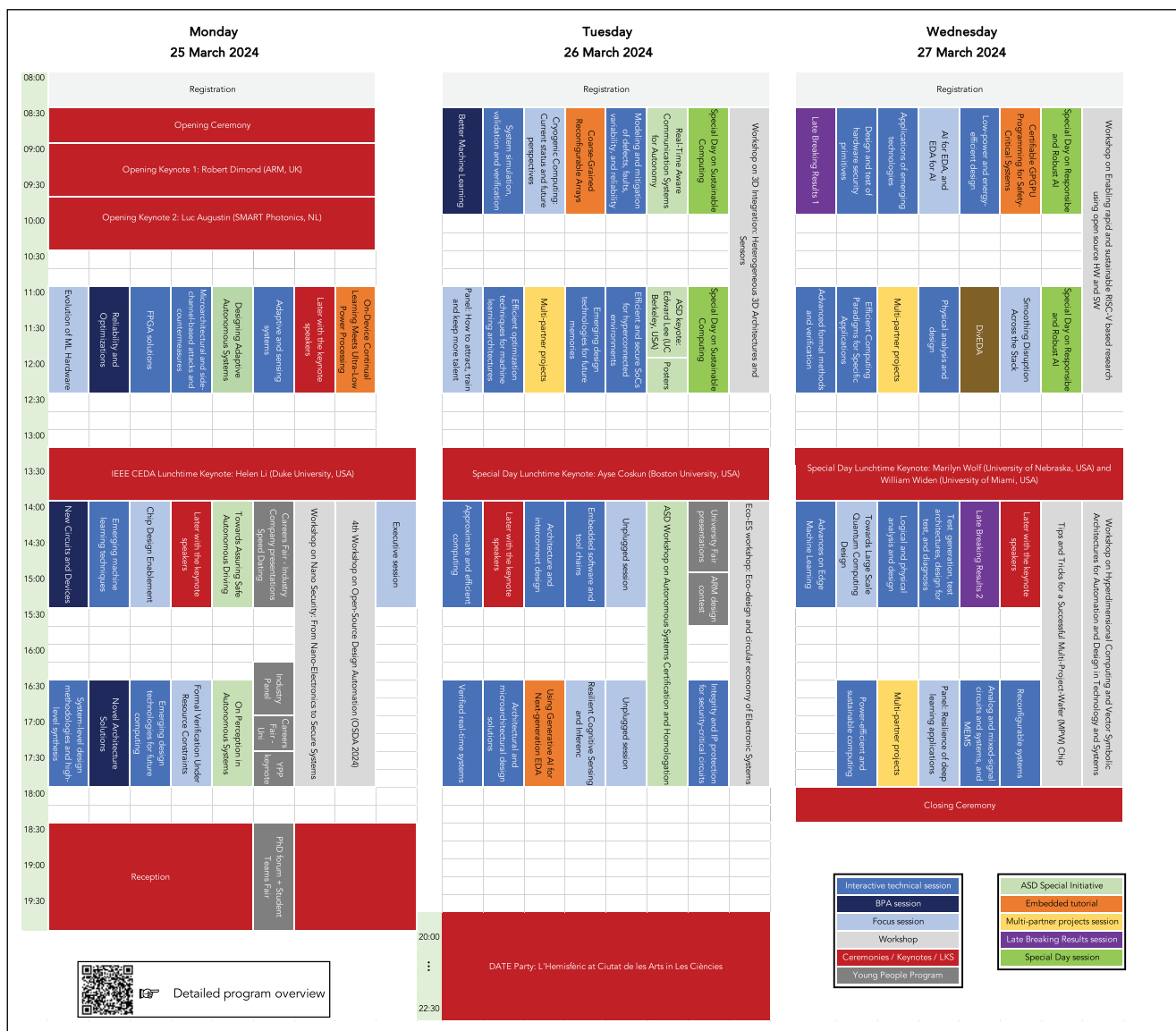
Figure 2. DATE 2024 program at a glance.

areas of the DATE conference and featured poster-supported live interactions (see Figure 3).

This year, we observed a drastic increase in paper submissions, with 19% more research paper submissions than at DATE 2023. Out of a total of 1,314 abstract submissions (a 23% increase over the prior year), 996 full research papers eventually went into review. As always, all these research papers underwent a rigorous review procedure with the help of the 405 members of the Technical Program Committee, who carried out 3,956 reviews. As a result of this process, 244 papers (24.5%) were finally selected for regular presentation, with 60 additional submissions selected for

presentation as extended abstracts. We would like to sincerely thank all the members of the Technical Program Committee for their efforts on this demanding task.

Most importantly, our thanks also belong to all authors and presenters who constitute the very foundation of DATE. The authors from the submitted papers span representatives from the three main world regions: 35% from Europe-Middle East-Africa, 21% from the Americas, and 44% from Asia. Overall, all submissions involved more than 6,100 authors from 51 different countries—a distribution that truly demonstrates DATE's international character, global reach, and impact.

Figure 3. DATE 2024: Keynotes, interactive technical sessions, and PhD forum. All photographs: DATE 2024. Copyright: Cruz Garcia.

The DATE 2024 program also featured a variety of other types of sessions that were organized in parallel to the technical sessions. For example, the program offered a range of focus sessions on hot topics, such as "cryogenic computing: current status and future perspectives"; "smoothing disruption across the stack: tales of memory, heterogeneity, and compilers"; "towards large scale quantum computing design: the quest from automatic methods and tools to integrated EDA frameworks"; a panel on "resilience of deep learning applications: where we are and where we want to go"; "evolution of ML hardware: from technologies to algorithms and architectures"; "resilient cognitive sensing and inference in distributed and dynamic environments"; "formal verification under resource constraints"; a panel on how to attract, train and keep more talent to science & semiconductor; "AI for EDA, and EDA for AI"; and "chip design enablement: how to lower barriers to hardware design with high-level languages, generative AI, and cloud."

Two Late Breaking Results sessions covered novel (orthogonal) research directions and breakthrough results in a variety of DATE subdomains. There were also presentations covering results and lessons learned from multipartner projects, and addressing the full span of DATE topics. Moreover, a DivEDA session aimed at increasing diversity in engineering broadly, and EDA, in particular. And, as was done in 2023, the program again featured two consecutive unplugged sessions to stimulate brainstorming around the theme of "Twinning Paradigm": a session format centered on direct exchanges among the participants, to formulate timely challenges as research problems, and to find inspiration for solution approaches.

Like in previous editions, DATE 2024 hosted two special days, focusing on bringing new challenges to the system design community. This year, the special day topics were sustainable computing and responsible and robust artificial intelligence (AI). Each of these special days had a full program of (lunchtime) keynotes and technical presentations.

The special day on sustainable computing focused on the rapidly increasing concern of energy consumption in the computing ecosystem: as society relies heavily on computing as a tool for science and engineering, administration,

education, and even entertainment, the stark increase in compute resources demand could make traditional information and computing technology infrastructure unsustainable. Thus, the presenters asserted that energy efficiency must become a key design parameter for computing systems and applications, at all scales. To this end, there is an urgent need to design and deploy sustainable (super) computing systems. Despite the urgency of the problem, also highlighted by the European Green Deal policy of 2020, today there is a lack of methods and tools to develop systems that are sustainable by design. It is, therefore, necessary to bring together system designers, tool designers, algorithm designers, domain experts, and policymakers to address sustainability issues holistically. One of the highlights of this special day was the lunchtime keynote given by Ayse Coskun of Boston University (USA), who talked about "Data Center Demand Response for Sustainable Computing: Myth or Opportunity?".

The special day on responsible and robust AI addressed the significant prominence that AI models have gained across various domains in society, particularly in critical applications, such as autonomous vehicles, banking, healthcare, and industry. To be practically and safely applicable to embedded systems, designers must develop responsible and robust AI solutions. This concept has a profound impact on integrating AI into our everyday products. First, since AI will control multiple system functionalities, these AI models must ensure the system's robustness and security. Second, the decisions made by AI models can be subject to blame or credit, thus there is a need to dedicate substantial efforts to explainability and fairness, an aspect that becomes even more complex in the context of embedded systems. The objective of the special day was to showcase the latest advancements in the design and implementation of new models for responsible AI, considering hardware properties, as well as addressing the societal aspects related to responsible AI. As a highlight of the special day, Marilyn Wolf (University of Nebraska, USA) and William Widen (University of Miami, USA), provided a lunchtime duo keynote about "Validation and Verification of AI-Enabled Vehicles: in Theory and Practice."

A now traditional special initiative on autonomous systems design (ASD) was held on Monday and Tuesday, consisting of reviewed and invited papers, as well as working sessions on self-governed and self-adaptive systems that are designed to operate in an open and evolving environment, which has not been completely defined at design time. Monday sessions included a special session on "Perception in Autonomous Systems," as well as two technical sessions on "Designing Adaptive Autonomous Systems for Resource-Constrained Platforms" and "Towards Assuring Safe Autonomous Driving." Tuesday kicked off with a technical session on "Real-Time Aware Communication Systems for Autonomy," followed by an embedded keynote by Edward Lee of UC Berkeley (USA) on "Certainty or Intelligence: Pick One!". The ASD special initiative was concluded with a workshop on "Autonomous Systems Certification and Homologation."

The Young People Program (YPP), an initiative targeting PhD students to support their career development, took place on Monday and Tuesday. Its program kicked off on Monday afternoon with a career fair focused on industry opportunities, during which participating companies introduced themselves and explained their business and working environment. After this, PhD students had the opportunity to introduce themselves to potential employers from EDA and microelectronics companies and arrange interviews during the subsequent speed dating session. An additional panel featured young professionals from companies and startups discussing their experience in transitioning from academia to industry or a startup. During the second career fair, this one focused on academic careers, researchers from academic institutions with open positions met enthusiastic students looking for research positions in academia. Of special note was the YPP keynote, provided by Matt Venn on "Give your CV the edge with open-source EDA." The PhD forum closed the first day of the conference and included 41 selected students who had completed or are about to complete their PhD thesis, showcasing their work to the academic and industrial community. On Tuesday, the Young People Program continued with the university fair, which fosters the transfer of mature academic work to a large audience by showcasing academic prototypes of software and hardware solutions in the different DATE topic fields. The YPP was concluded with the introduction and kick-off session of the Arm design contest.

Figure 4. DATE 2024 Party at L'Hemisfèric (City of Arts and Sciences). All photographs: DATE 2024. Copyright: Cruz Garcia.

Throughout the conference, seven half-day workshops covered several pressing topics, namely: "eco-design and circular economy of electronic systems"; "3-D integration: heterogeneous 3-D architectures and sensors"; "nanosecurity: from nano-electronics to secure systems"; "open-source design automation"; "hyperdimensional computing and vector symbolic architectures for automation and design in technology and systems"; "tips and tricks for a successful multi-project-wafer chip"; and "enabling rapid and sustainable RISC-V based research using open source HW and SW."

Finally, the DATE program included four embedded tutorials, offered by leading experts in their respective fields. The topics spanned: "using generative AI for next-generation EDA"; "on-device continual learning meets ultra-low power processing"; "coarse-grained reconfigurable arrays: modelling and exploration using the open-source CGRA-ME framework"; and "introduction to certifiable general-purpose GPU programming for safety-critical systems using Khronos APIs."

Attendance and feedback

DATE 2024 attracted 860 attendees in total, with 797 full conference registrations and 63 day tickets. Around 550 people attended the wildly successful and enjoyable DATE party on Tuesday evening held at the L'Hemisfèric building in the famous and breathtaking City of Arts and Sciences in Valencia (see Figure 4).

A SURVEY WAS held to gather feedback on the event, to help maintain future DATE conferences at the highest quality and to further increase the relevance of the event in the European Design and Test Community. Highlights of the responses are provided in Figure 5, showing that the format, the contents, and the organization of DATE 2024 were greatly appreciated by the attendees. For example, a vast majority of the surveyed attendees very much appreciated the consolidated three-day format with a focus on interaction, which therefore seems to be the way forward for future DATE editions. ∎

Acknowledgments

Organizing a large event like DATE required the involvement of numerous skilled individuals from the community. It has been both an honor and a delight to collaborate with all the members of the DATE executive committee and the DATE sponsors committee. In addition, we would like to acknowledge the members of the Technical Program Committee, the session chairs, KIT Dresden, who served as the conference secretariat, and, of course, all the authors, speakers, and panelists,
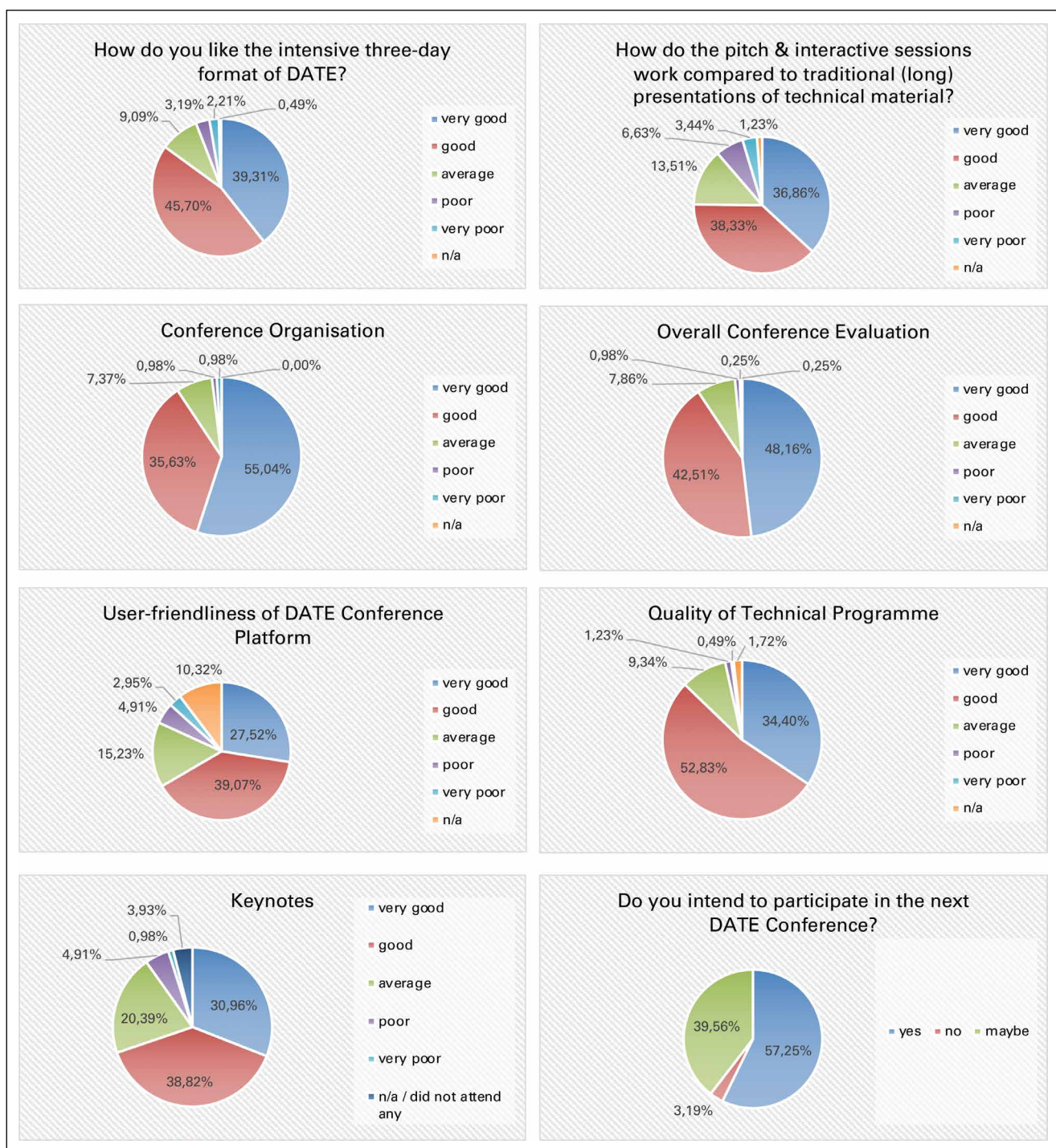
Figure 5. Selection of DATE 2024 survey results.

who developed all the content presented at the conference. We all enjoyed DATE's exciting program and meeting old and new friends and colleagues in such a unique atmosphere; and we now look forward to the next event at DATE 2025, to be held on 31 March–2 April 2025, in Lyon, France.

See https://www.date-conference.com for more details.

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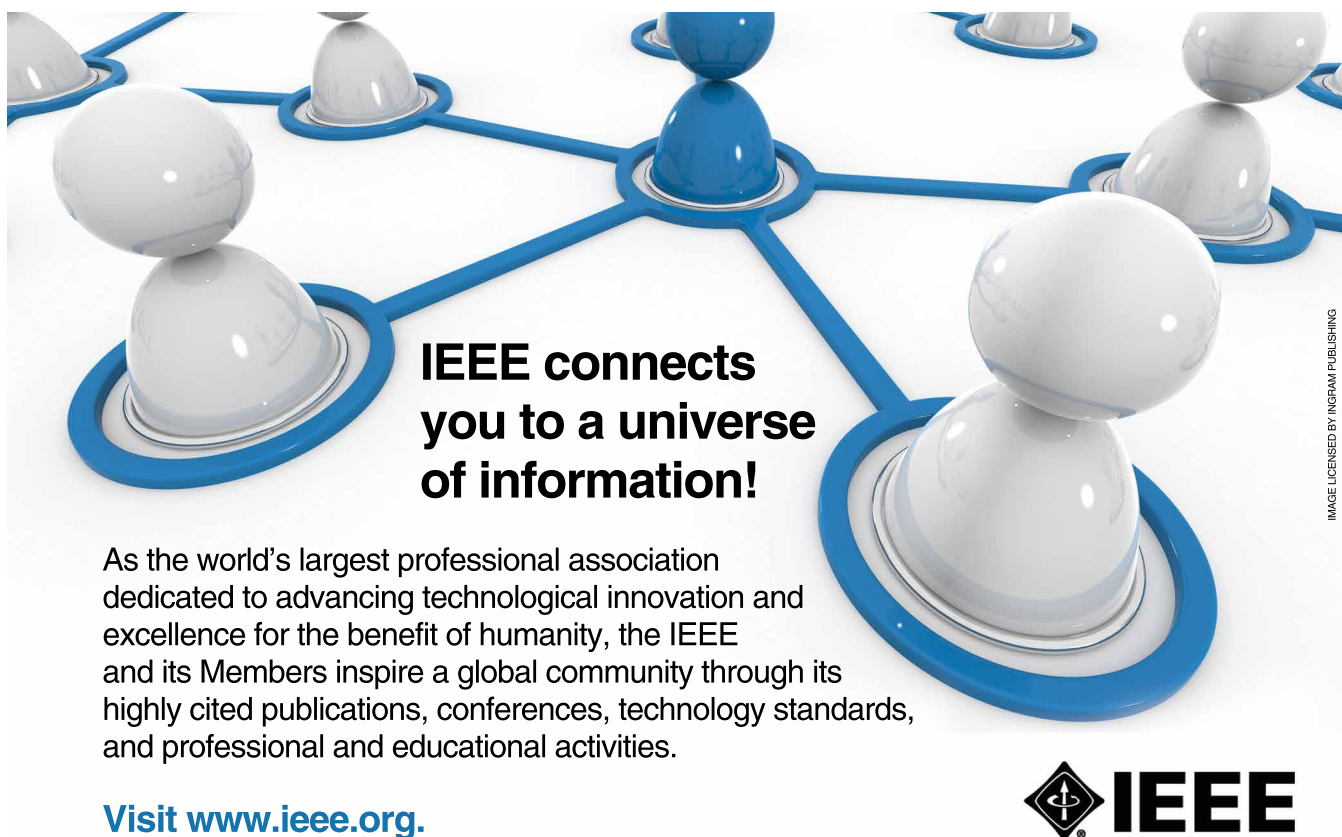
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