

# ELSEWHERE IN THE CS

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## Computer Highlights Society Magazines

The IEEE Computer Society's lineup of 13 peer-reviewed technical magazines covers cutting-edge topics ranging from software design and computer graphics to Internet computing and security, from scientific applications and machine intelligence to cloud migration and microchip design. Here are highlights from recent issues.

### computing in SCIENCE & ENGINEERING

#### HPC Opens a New Frontier in Fuel-Engine Research

An industry-led research team at the US Department of Energy's Argonne National Laboratory recently conducted a computationally guided combustion system optimization on the IBM Blue Gene/Q Mira supercomputer. The team used a high-fidelity simulation approach to optimize the fuel spray and combustion bowl geometry of a heavy-duty diesel engine using a gasoline-like fuel. The accelerated simulation time allowed the team to evaluate an unprecedented number of design variations and improve the production design using a new fuel. Read more in the September/October 2018 issue of *Computing in Science & Engineering*.

### IEEE Annals of the History of Computing

#### Common Language: Business Programming Languages and the Legibility of Programming

The English-like business programming language COBOL saw widespread use from its introduction in 1960 well into the 1980s, despite being disdained by computer science academics. This article, from the April-June 2018 issue of *IEEE Annals of the History of Computing*, traces out decisions made during COBOL's development and argues that its

English-like appearance was a rhetorical move designed to make the concept of code itself more legible to nonprogramming management at computer-using companies.

### IEEE CLOUD COMPUTING

#### House in the (Biometric) Cloud: A Possible Application

This article, which appears in the July/August 2018 issue of *IEEE Cloud Computing*, presents a novel approach to extending cloud computing from company services to consumer biometrics. The proposed system recognizes the person at the door, allowing entrance or denying it according to the recognition result. Very little processing is required locally, and biometrics is implemented as a service.

### IEEE Computer Graphics AND APPLICATIONS

#### VitalVizor: A Visual Analytics System for Studying Urban Vitality

Creating lively places with high urban vitality is an ultimate goal for urban planning and design. In this article from the September/October 2018 issue of *IEEE Computer Graphics and Applications*, the authors present VitalVizor, a visual analytics system that employs well-established visualization and interaction techniques to facilitate user exploration of spatial physical entities and nonspatial urban design metrics when studying urban vitality.

### IEEE Intelligent Systems

#### Ensemble Algorithms for Microblog Summarization

In this article from the May/June 2018 issue of *IEEE Intelligent Systems*, the authors investigate whether off-the-shelf

summarization algorithms can be combined to produce better summaries. To this end, the authors propose ensemble schemes that can combine the outputs of multiple base summarization algorithms to produce summaries that are better than what is generated by any of the base algorithms.

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## IEEE Internet Computing

### Serverless Is More: From PaaS to Present Cloud Computing

In the late 1950s, leasing time on an IBM 704 cost hundreds of dollars per minute. Today, cloud computing—that is, using IT as a service, on demand, and as pay per use—is a widely used computing paradigm that offers large economies of scale. Born from a need to make platform as a service (PaaS) more accessible, fine grained, and affordable, serverless computing has garnered interest from both industry and academia. This article from the September/October 2018 issue of *IEEE Internet Computing* provides an overview of serverless computing: what it is, where it comes from, its current status, and its main obstacles and opportunities.

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## IEEE micro

### SPARC64 XII: Fujitsu's Latest 12-Core Processor for Mission-Critical Servers

The SPARC64 XII 12-core processor, developed for high-performance, mission-critical servers, runs at speeds of up to 4.35 GHz and achieves a peak performance of 417 GIPS and 835 Gflops. SPARC64 XII realizes a 2.3–2.9-times improvement in core performance over the previous-generation SPARC64 X+. Read more in the September/October 2018 issue of *IEEE Micro*.

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## IEEE MultiMedia

### Visual Nonverbal Behavior Analysis: The Path Forward

Social signal processing (SSP) is a promising automated technology that aims to provide computers with the ability to sense and understand human social behaviors. Representative SSP applications include novel human–computer interaction mechanisms that enhance machine sensitivity of users' emotional and mental states, more engaging games, ambient intelligence systems that are responsive to social context, and new quantitative psychological evaluation tools for coaching or diagnosis. Based on adopted cues, existing SSP methods can be categorized as verbal or

nonverbal. Over the last decade, significant progress has been accomplished in visual nonverbal behavior analysis (VNBA). However, several emerging issues, such as fusion of multimodal cues, context estimation, and user privacy protection, still need to be addressed adequately. In this article from the April–June 2018 issue of *IEEE MultiMedia*, the authors present an overview of VNBA and describe various research challenges and proposed solutions.

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## IEEE pervasive COMPUTING

### Learning from Our Mistakes: Identifying Opportunities for Technology Intervention against Everyday Cognitive Failure

There is a growing opportunity for technologies to augment human memory and other cognitive processes, but systems to date typically either address known cognitive impairments, such as autism and Alzheimer's disease, or look to enhance one's general capacity for a specific task. In contrast to these approaches, the authors of this article from the April–June 2018 issue of *IEEE Pervasive Computing* argue that recognition and quantification of human error are key to the design of future computing systems for augmenting the human mind. By focusing on cognitive errors, the authors argue that we can first identify frequent, persistent, or severe failures as targets for such systems and then go on to measure the success of any interventions.

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## IEEE SECURITY & PRIVACY

### When the Crypto in Cryptocurrencies Breaks: Bitcoin Security under Broken Primitives

Digital currencies such as Bitcoin rely on cryptographic primitives to operate. However, past experience shows that cryptographic primitives do not last forever; increased computational power and advanced cryptanalysis cause primitives to break and motivate the development of new ones. It is therefore crucial for maintaining trust in a cryptocurrency to anticipate such breakage. The authors of this article from the July/August 2018 issue of *IEEE Security & Privacy* present the first systematic analysis of the effect of broken primitives on Bitcoin. They analyze the ways in which Bitcoin's core cryptographic building blocks can break and the subsequent effect on the main Bitcoin security guarantees. Their analysis reveals a wide range of possible effects, depending on the primitive and type of breakage, ranging from minor privacy violations to a complete breakdown of the currency. Their results lead to several suggestions for the Bitcoin migration plans and insights for other cryptocurrencies in case of broken or weakened cryptographic primitives.


## IEEE Software

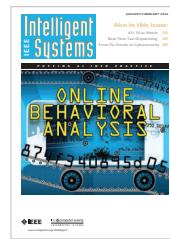
### Yesterday, Today, and Tomorrow: 50 Years of Software Engineering

In 2018, we're now 50 years after the famous groundbreaking conference on software engineering in Garmisch, organized by its chair, F.L. Bauer, and his cochairs, L. Bolliet and H.J. Helms. This conference introduced the notion and discipline of software engineering. This is a moment to look back at what we've achieved, what we haven't achieved, where we are today, and what challenges lie ahead. This article is part of the September/October 2018 issue of *IEEE Software* on software engineering's 50th anniversary.

## IT Professional

### How Do You Create an Internet of Things Workforce?

This article, published in the July/August 2018 issue of *IT Professional*, argues that it is time for a new engineering and computer science discipline to emerge that is focused on the Internet of Things and cyber-physical systems. 



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