

The Innovation Informatics: An international journal of informatics science

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The conceptual evolution of information mirrors the developmental trajectory of human civilization. Throughout civilizational advancement, humanity's understanding of information has transitioned from perceiving natural signals (e.g., weather patterns) to constructing anthropogenic symbols (e.g., language, writing systems), and subsequently to manipulating abstract data (e.g., binary 0-1). This evolutionary trajectory not only reflects the deepening of human cognition but also propels the abstraction and complication of civilization itself.

From the perspective of the long course of human history, the conceptualization of information has been far from static; rather, it has dynamically evolved in tandem with humanity's deepening comprehension of its nature and role. During prehistoric epochs, information dissemination primarily relied on oral communication and gestural cues, while stone tools and cave paintings served as early repositories of collective knowledge. The advent of formalized writing systems during agrarian civilizations—for example, oracle bone script in ancient China and cuneiform in Mesopotamia—facilitated the



systematic recording and preservation of information, thereby enabling the intergenerational transmission of religious rituals, agricultural methodologies, and societal norms. The Industrial Revolution catalyzed transformative innovations. The mechanized printing presses, the electric telegraph, and the telephone collapsed transmission delays from weeks to seconds and expanded the radius of reachable audiences from local to global, laying the technological

groundwork for the subsequent transition to mass media and, ultimately, to the digital paradigm.

The digital revolution, marked by the proliferation of computers, the internet, and artificial intelligence (AI), has increased the rate of information generation, the velocity of processing, and the density of storage by orders of magnitude. Consequently, information has emerged as a critical production factor in

modern socioeconomic systems. Yet, this progression has precipitated a paradigm shift: humanity has transitioned from an era of acute information scarcity to one characterized by exponential information proliferation. However, we have to rethink two critical challenges: How to efficiently process the current scale and multi-modality of information? How to unlock the inherent interconnections among the various information?

Informatics, as an interdisciplinary field, underpins the scientific study of information by focusing on the systematic collection, storage, processing, and utilization of data to generate actionable knowledge and inform decision-making. Driven by advancements in theoretical frameworks, technological innovations, and hardware tools, informatics has not only uncovered the intrinsic principles governing information dynamics but also developed sophisticated methodologies for information processing. These achievements stem from its integrative nature, drawing on insights across mathematics, computer science, electrical engineering, communication theory, cognitive science, linguistics, aerospace engineering, and other disciplines. Consequently, informatics has seen widespread applications in domains such as electronic communication, industrial systems, biomedicine, and business operations. These deployments ensure the usability of technology while enhancing human-system collaboration, thereby optimizing efficiency and functionality across sectors. Critically, the significance of informatics lies in its focus on understanding human-information-technology interactions: professionals in this applied science investigate how individuals engage with information and technology, then translate these insights into solutions for real-world complex challenges. What are the emerging trends shaping the future of informatics?

With the development of the Internet of Things (IoT), biological-based intelligence and quantum computing, information technology will expand from "human-created content" to "digital twins of the physical world". The integration of cognitive science and AI (e.g., brain-inspired computing and embodied intelligence) will drive information technology to transition from "data processing" to "intelligence simulation." Advancements in quantum computing and quantum communication technologies will break through the computational power and security limits of classical information theory, redefining the

physical boundaries of information processing. Multimodal interactions—such as voice, gestures, brain-computer interfaces (BCI), and eye tracking—will replace traditional screens and keyboards, enabling "what you think is what you get." Spatial computing will dissolve the boundaries between the physical and digital worlds, anchoring digital content in real-world spaces and empowering humans and machines to interact with spatial information and objects in more natural ways. Overall, the enhancement of information processing capabilities serves as the engine driving the progress of civilization, determining the level of complexity a civilization can achieve. From primitive signals to digital intelligence, information has always been the "gene" of civilization (carrying knowledge and culture) and its "nervous system" (connecting individuals and society), profoundly influencing the lives and destinies of every individual.

There is increasing cross-disciplinary integration that will unlock deeper understandings of complex real world and blur the lines between physical and digital world. Because of this, it is more important than ever to provide a platform for promoting and disseminating studies that cut-edge Informatics Science. In response to this urgent need, we are launching a new journal, **The Innovation Informatics**, to provide a collaborative, inclusive, and open platform for informatics scientists all over the world. The newly established journal aims to drive breakthroughs in information science by bridging computer science, artificial intelligence, and domain-specific scientific applications. The journal seeks to empower data-driven discovery and foster interdisciplinary collaboration across fields such as biomedical, biology, materials science, earth science, chemistry and physics for researchers worldwide to share their findings. In summary, **The Innovation Informatics** aims to become one of the leading journals in the information sciences, including AI for Science, electronic Informatics, computer science, automation and control systems, semi-conductors and information devices, optical and optoelectronic information, biomedical informatics, cheminformatics, materials informatics, brain science, cognitive science, psychology et al. Its publication will be a valuable resource for scholars across different fields who are interested in contributing to information science.

Let us see the unseen and change the unchanged.