



**Brain Informatics 2022 Workshop on  
Multi-Source Information Fusion for Smart Health with AI  
(MIFSHAI' 22)**

**Introduction**

Information fusion is the process of integrating multiple information sources to obtain more complex, reliable, consistent and accurate information for decision-making support. The process can be divided into three levels; data-level, feature level and decision level. Data level fusion fuses original data from each resource. Feature level fusion extracts features and their associated data for comprehensive analysis. Decision level fusion is the high information fusion level for detection, control and decision-making. To achieve the goal, inference is essential, which comes from combination of data from multiple sources and transformation of multi-source information into discrete, actionable format for analysis. The adoption of such fused information and related references has enhanced the performance of expert systems. Such enhancement will continue, especially with the recent advancements we have witnessed in Artificial Intelligence – newly developed techniques in pattern recognition and image/natural language processing, such as deep learning, have largely improved the performance of processing massive data from multiple resources and leveraged the power of references because of more accurate and meaningful patterns being discovered.

Smart Health, deemed as the revolutionary form of traditional health, is promised by recent advancement of science and technology, such as Internet of Things (IoT), Wisdom Web of Things (W2T), Brain Informatics, Big Data, Artificial Intelligence, and mobile Internet like 5G. Smart Health uses wearable devices, IoT, and mobile Internet to dynamically access information, connect people, materials and infrastructures related to healthcare, and then manages and responds to medical ecosystem demands actively and intelligently. Specifically, the core of Smart Health lies on the concept of P4 (predictive, preventive, personalized and participatory) medicine, which will make healthcare and medical systems to be evidence-based instead of traditional experience-based. The P4 medicine's development roadmap follows the architecture of Wisdom Web of Things (W2T), from the theoretical perspective. The evidence base will be built up from massive data collected from multi-resources from the connected world (DaaS) and fused to a united, superior form of information (InaaS), and the adoption of evidence comes from the knowledge discovered from the fused information (KaaS) and the wisdom of knowing what knowledge to be used

to predict and prevent what diseases for whom with what personalized demands with participatory feasibility (WaaS). The articulation of each level up, from data to information, from information to knowledge, and from knowledge to wisdom, demands effective and efficient techniques to process, analyze, and logically infer with data, information and knowledge. Information Fusion with the three-level (data-feature-decision) mapping the architecture of W2T has the potential technology and methodology to answer the demand, especially with the super accessibility to data and knowledge, as a power granted from the recent advances of Artificial Intelligence.

### **Topics of Interest**

While the world is suffering from the COVID-19 pandemic, the workshop will discuss the theories, methodologies and possible breakthroughs designed and adopted information fusion for smart health adopting recent Artificial Intelligence advances (e.g., learning models, representations, reasoning and metrics). It aims to address the following interesting questions:

- How to achieve and benefit Smart Health from a multi-disciplinary balance between research and disruptive technologies from the perspectives of Information Fusion and Artificial Intelligence for articulation of healthcare and medical systems and services from data-basis to information basis, then knowledge-basis and wisdom-basis?
- How to utilize the power of Big Data collected from the connected world to achieve Smart Health with multi-source information fusion leveraged by Artificial Intelligence?
- How to achieve and realize human-level intelligence reflected in Smart Health systems and services by developing intelligent technologies using collective and fused information from multi-sources?
- How to utilize emerging areas of Artificial Intelligence and collective intelligence in Brain Informatics related research?

Similar to the main conference of Brain Informatics 2022 (bi2022.org), there are 2 types of paper submissions that are possible:

**Type 1:** Full Paper Submissions (Long paper: 10-12 pages; Short paper: 6-9 pages). Papers need to be edited in LNCS format using our online submission system. All full (Long and Short) papers accepted will be published by Springer as a volume of the series of LNCS/LNAI.

**Type 2:** Abstract Submissions. Abstracts have a word limit of 500 words. Experimental research is particularly welcome. Accepted abstract submissions will be included in the conference program.

Workshop and Special Session full papers will be published at the same **BI'22 main conference proceedings at the Springer-Nature LNAI Brain Informatics book series** (<https://link.springer.com/conference/brain>).

Accepted full papers will be selected to publish in **Brain Informatics Journal** (Springer-Nature, <https://braininformatics.springeropen.com/>) upon significant revision.

[On-line Submission]

**Workshop Chairs**

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**Important Dates:**

30 April 2022: Paper submission deadline

20 May 2022: Abstract submission deadline

20 May 2022: Paper acceptance notification

30 May 2022: Notification of abstract acceptance

15 June 2022: Accepted paper and abstract registration deadline

15 July 2022: Workshop (Half Day)