

Computer Science and Upsilon Pi Epsilon
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PRESENT

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Computational Biomedicine: From Big Data to Smart Data

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ABSTRACT

The global size of “Big Data” in Biomedicine stands at roughly 200 Exabytes in 2012. Such big data have fundamentally changed the healthcare practice and biomedical research/education. Understanding the big data and thereby transforming big data into smart data at the semantic level is the key to explore the full potential of biomedical data and to unravel complex biomedical phenomena. Due to the common challenges of big data and unique characteristics of big biomedical data, the task of smart data analysis presents a number of compelling computational and analytical challenges. In this talk, I will introduce a data-driven, multi-layered system for transforming big data into smart data. I will briefly describe each component of the proposed system. Then the third component (smart data indexing, retrieval, and analysis) will be discussed in details. Both the theoretic framework and the application of the theory to biomedical data will be discussed. Our proposed approaches, which have been employed and used in the practice at Mayo Clinic, University of Tennessee: College of Medicine, Harvard Medical School, and a few leading biological labs (California Institute of Technology, and University of Groningen (Netherlands)), are first and necessary steps toward a systematic computing solution that is capable of transforming large-volume and heterogeneous data into smart data.

BIO

Dr. Yu Cao has been a faculty at the department of computer science, The University of Massachusetts Lowell since August 2013. His research interests span a variety of aspects of algorithms and software infrastructure for data-intensive computational intelligence and biomedical/healthcare informatics, with a particular focus on scientific domains including: (1) data-intensive analytics for pervasive healthcare monitoring to assist aging population and patients with chronic diseases; (2) scalable deep learning from extremely complex biomedical multimedia data; and

(3) user-centered knowledge discovery and decision support from clinical data to evaluate and improve the quality of health care. Dr. Cao has authored and co-authored more than 50 peer-reviewed papers appeared in various prestigious journals, book chapters, and refereed conference proceedings. His research is supported by NSF. He was a guest editor for two special issues of Multimedia Tools and Applications (MTAP) by Springer. He serves/served on Organizing Committees or Programming Committees of more than 15 international conferences and workshops. He is a senior member of IEEE, member of ACM and Upsilon Pi Epsilon (UPE).