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IEEE Transactions on Big Data

Special Issue on Biomedical Big Data: Understanding, Learning and Applications

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TOPIC SUMMARY:

Biomedical imaging is an essential component in various fields of biomedical research and clinical practice. Biologists quantitatively study cell behavior and generate high-throughput microscopy data sets. Neuroscientists detect regional metabolic brain activity from positron emission tomography (PET), functional magnetic resonance imaging (MRI), and magnetic resonance spectrum imaging (MRSI) scans. Virologists generate 3D reconstructions of viruses from micrographs, and radiologists identify and quantify tumors from MRI and computed tomography (CT) scans. Advanced imaging equipment and diverse applications have driven the generation of biomedical big data. The main challenge and bottleneck for the related research is the conversion of “biomedical big data” into interpretable information and hence discoveries. Computer vision theory has a huge potential in many aspects for automated understanding of biomedical data and has been used successfully to speed up and improve applications such as large-scale cell image analysis (image preconditioning, cell segmentation and detection, cell tracking, and cell behavior identification), image reconstruction and registration, organ segmentation and disease classification. Moreover, when it comes to the new era of machine learning, deep learning has revolutionized multiple fields of computer vision, significantly pushing the state of arts of computer vision systems in a broad array of high-level tasks.

This special issue serves as a forum to bring together active researchers all over the world to share their recent advances in this exciting area. We solicit original contributions in three-fold: (1) present state-of-the-art theories and novel application scenarios related to biomedical big data analytics; (2) survey the recent progress in this area; and (3) build benchmark datasets.

The topics of interest for this special issue include, but are not limited to:

- Biomedical Big Data Representation
 - Robust feature extraction
 - Data-driven feature learning

- Large-scale biomedical data acquisition
- Novel datasets and benchmark for specific biological applications (e.g. cell image analysis, image segmentation, shape analysis)
- Biomedical Big Data Understanding
 - Image restoration
 - Image segmentation
 - Image Registration
 - Object detection & tracking
 - Event Detection
 - Biomedical big data organization, retrieval and indexing
 - Health, economics and other applications over biomedical big data
- Biomedical Big Data Learning
 - Time-series modeling
 - Transfer learning
 - Multi-task learning
 - Sparse Coding
 - Weakly supervised learning

IMPORTANT DATES:

Open for submissions in ScholarOne Manuscripts: 1 January 2017

Closed for submissions: 15 March 2017

Results of first round of reviews: 15 May 2017

Submission of revised manuscripts: 15 July 2017

Results of second round of reviews: 15 September 2017

Publication materials due: 15 October 2017

Tentative publication date: Late 2017

SUBMISSION GUIDELINES:

Prospective authors are invited to submit their manuscripts electronically after the “open for submissions” date, adhering to the *IEEE Transactions on Big Data guidelines* (<http://www.computer.org/portal/web/tbd/author>). Please submit your papers through the online system (<https://mc.manuscriptcentral.com/tbd-cs>) and be sure to select the special issue or special section name. *Manuscripts should not be published or currently submitted for publication elsewhere.* Please submit only full papers intended for review, not abstracts, to the ScholarOne portal. If requested, abstracts should be sent by e-mail to the Guest Editors directly.