Challenges and opportunities in healthcare and biomedical Big Data: Role of Cloud computing infrastructure

Workshop
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Federal and industry sponsors have announced multiple initiatives to fund high performance computing infrastructure projects to meet current and projected needs of the scientific research community in managing and leveraging Big Data. For example, in 2014 NSF announced $20 million in funding to create two cloud computing testbeds, called Chameleon and CloudLab (1). Through the Big Data to Knowledge (BD2K) initiative, NIH has funded a growing portfolio of projects that propose to generate, collect, and analyze large quantities of heterogeneous biomedical data (2). It is important to evaluate how these projects are meeting the requirements of managing biomedical and healthcare Big Data, which are characterized by multi-modality, large volume, rigorous privacy and data security requirements. Are there specific requirements of the biomedical and healthcare community, such as specialized data management middleware consisting of customized data structures, storage and data retrieval techniques? Similarly, how to integrate these Big Data computing infrastructure with clinical workflows used daily for patient care and research studies?

These challenges motivate the development of new approached for high performance and cloud computing platforms that are flexible to different application and algorithm requirements, secure and HIPAA-compliant, integrated with existing biomedical data sources, and user friendly. These features will enable these platforms to meet diverse needs of the biomedical and healthcare community as well as support a wide range of users. The special session will cover the following aspects of healthcare and biomedical Big Data:

- How can we facilitate greater sharing of healthcare data in a multi-institution research environment by leveraging the capabilities of Big Data informatics platforms?
- Do current institutional procedures, such as Institutional Review Board (IRB) approvals, adequate for research projects to use external cloud computing infrastructure for data management? If no, what need to be changed in current IRB practices?
- Metadata plays an important role in medical informatics tools to ensure data quality and reproducibility. How do we ensure that relevant metadata and domain semantics are captured and propagated with healthcare data in a distributed cloud computing environment?

In this special session, we will bring together researchers working on high performance computing infrastructure at the San Diego Supercomputing Center (SDSC), management of large imaging datasets for computer aided diagnosis, establishment of a translational informatics platform, and development of data provenance platform as part of the NIH BD2K initiative. The special session will review the data management and informatics challenges faced in three healthcare domains and whether they can leverage new initiatives such as the NSF CloudLab program to address them.

Call for Papers:
Authors are invited to submit a paper up to 4 pages (in English) in double-column IEEE format following the submission guidelines available at the ICSC2016 web page (http://www.ieee-icsc.org). Papers must be original and not be submitted to or accepted by any other conference or journal. An electronic version (PDF format) of the full paper should be submitted by the deadline to EasyChair. (**https://easychair.org/conferences/?conf=icsc2016workshop**).

All submissions will be acknowledged. More information is available on the ICSC 2016 web page. Each paper will be peer-reviewed by at least two experts in the topic area. Papers accepted by the workshop will be published in the conference proceedings published by IEEE Computer Society Press.

Important Dates:

Paper submission deadline: December 15, 2015.
Date of Notification: January 15, 2016

References:

1. Enabling a new future for cloud computing. NSF; 2014
   http://nsf.gov/news/news_summ.jsp?cntn_id=132377.
2. Big Data to Knowledge (BD2K) Program: NIH. https://datascience.nih.gov/bd2k