MICCAI 2014- Workshop Proposal

Workshop Title - COMPUTATIONAL CLINICAL DECISION SUPPORT AND PRECISION MEDICINE IN BRAIN CANCER: THE VALUE OF OPEN SCIENCE GRAND CHALLENGES

Goal: To present and discuss requirements and resources for open science development of systems for clinical decision support and precision medicine in brain cancer diagnosis and therapy based on Big Data, including genomics, pathology, and imaging.

The increase in multi modal data, including genomics, biomarkers, pathology and various imaging data, together with advances in computational power and analytics have given rise to challenges and opportunities in determining the best strategies in making use of such resources in cross correlation of such data in support of clinical decision making and advancement of precision medicine. The proposed half-day workshop (8:30 am – 12:30 pm) will present this subject in the context of brain tumors, specifically glioblastoma multiforme (GBM) tumors, the deadliest of all brain tumors. Presentation topics (please see Page 3) will include a report of a recent National Cancer Institute (NCI) workshop on imaging and genomics by organizers of that workshop; invited presentations by leading experts; open science approaches, including Grand Challenges, for assessment of technologies in computer-aided interventions; and discussion of NCI computational resources available to the science community. The workshop will also include a 1-hour session for oral presentation of proffered papers, selected by the organizers. Other meritorious paper submissions may be presented at a poster session.

This workshop is closely connected to two computational Challenges (BRATS and Digital Pathology in Brain Tumors), sharing in scientific goals and organizing committee members. Upon acceptance, it is our plan to offer the three events as a cluster of activities related to imaging and computational aspects related to brain tumors. The advantage of clustering these events is four-fold: (1) To demonstrate the link between computational aspects and clinical implication of such technologies, (2) To showcase Challenges as case examples of topics discussed in the workshop, (3) To lay the foundation for future expansion of Challenges to link various aspects of diagnosis and treatment planning, including genomics, digital pathology, and imaging, and (4) To offer a comprehensive full day activity to interested participants.

Announcements and Anticipated Number of Participants

We will publicize the event through appropriate email distributions, including imageworld, machine-learning, visionlist, and NCI Cancer Imaging Program website and listserv. Based on past experience with similar workshops we expect participation of 40-60 persons at this workshop.

MICCAI Resources Needed

Space for 60+ people with one projector and one screen (or multiple large screen display monitors), wireless Internet access. Due to the clinical relevance of topics in the Brain Tumor Workshop and Challenge Cluster we request holding these events at the Harvard Medical School. This will encourage participation by clinicians and their research staff.

List of Speakers (subject to final confirmation):

Larry Clarke, National Cancer Institute
Keyvan Farahani, National Cancer Institute, and Johns Hopkins University
Robert Gillies, Moffitt Cancer Center
Carl Jaffe, Boston University
Ron Kikinis, Harvard Medical School
Simon Mercer, Microsoft Research
Joel Saltz, Stony Brook Cancer Center
Alex Szalay, Johns Hopkins University

Workshop Organizing Committee:

Larry Clarke, National Cancer Institute (lclarke@mail.nih.gov)
Keyvan Farahani, National Cancer Institute, and Johns Hopkins University (Farahani@nih.gov)
John Freymann, Leidos Biomedical Res, Inc. (freymanj@mail.nih.gov)
Carl Jaffe, Boston University (carljaffe@gmail.com)

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MICCAI 2014- Workshop and Challenges in Brain Tumors

8:30 am – 12:30 pm Workshop

[Chairs: Clarke (NCI), Farahani (NCI), Jaffe (BU)]

8:30-8:45 am	Introduction
8:45-10:00 am	Invited talks (3-4) – on computation and/or path correlation, plus • Report: NCI 2013 Workshop on Imaging and Genomics • Open science platforms for assessment of technologies
10:00-10:20 am	Break
10:20-11:50 am	Proffered papers
11:50 am-12:30 pm	Presentation of NCI resources: TCGA, TCIA, HubZero, etc.

1:00 pm – 5:30 pm	**Brain Tumor Challenges**
1:00 – 3:00 pm	**Brain Tumor Image Segmentation Challenge (BRATS)** [Chairs: Kalpathy-Cramer (MGH), Menze (ETH), Reyes (Bern)]
1:00 – 1:30 pm	Presentation of results by chairs and discussion of results
1:30 – 2:15 pm	Presentations by top 3 challenge winners (12 min each + 3 min discussion)
2:15 – 3:00 pm	General discussion
3:00 – 3:30 pm	Break
3:30 – 5:30 pm	**Brain Tumor Digital Pathology Challenge** [Chairs: Saltz (Stony Brook), Brat (Emory), Gilbertson (MGH)]
3:30 – 4:00 pm	Presentation of results by chairs and discussion of results
4:00 – 4:45 pm	Presentations by top 3 challenge winners (12 min each + 3 min discussion)
4:45 – 5:30 pm	General discussion and wrap-up
5:30 pm	Adjourn

Scientific Committee: D. Brat, L. Clarke, J. Davis, K. Farahani, J. Freymann, J. Gilbertson, C. Jaffe, J. Kalpathy-Cramer, J. Kirby, T. Kurc, B. Menze, S. Mercer, M. Reyes, J. Saltz