Challenge competitions

Data from TCIA collections have and continue to be used for image analysis challenges or competitions, e.g., image segmentation or tumor classification. Specific challenges leveraging our data are described below. Please note that the challenges are not managed by TCIA staff, and in many cases you will be sent to web sites that are not affiliated with TCIA to learn more about them.

Automated Lesion Segmentation in Whole-Body FDG-PET/CT Challenge (autoPET 2022)

To promote research on machine learning-based automated tumor lesion segmentation on whole-body FDG-PET/CT data we host the autoPET challenge and provide a large, publicly available training data set on

TCIA:

Participate in this challenge via the official challenge website: https://autopet.grand-challenge.org/

RSNA Brain Tumor AI Challenge (2021)

From the challenge website: https://www.rsna.org/education/ai-resources-and-training/ai-image-challenge/brain-tumor-ai-challenge-2021

This competition, organized in partnership with the American Society of Neuroradiology (ASNR) and the Medical Image Computing and Computer Assisted Interventions (MICCAI) Society, focused on brain tumor detection and classification, utilizing multi-parametric magnetic resonance imaging (mpMRI) scans. It was the culmination of a decade of Brain Tumor Segmentation (BraTS) challenges and created a large and diverse dataset including detailed annotations and an important associated biomarker.

SIIM-FISABIO-RSNA COVID-19 Detection

From the challenge website (https://www.kaggle.com/c/siim-covid19-detection/overview):

COVID-19 looks very similar to other viral and bacterial pneumonias on chest radiographs, which makes it difficult to diagnose. In this competition, you'll identify and localize COVID-19 abnormalities on chest radiographs. In particular, you'll categorize the radiographs as negative for pneumonia or typical, indeterminate, or atypical for COVID-19. You and your model will work with imaging data and annotations from a group of radiologists.

SPIE-AAPM-NCI DAIR Digital Breast Tomosynthesis Lesion Detection Challenge (DBTex) - Phase 1

The DBTex Challenge (https://spie-aapm-nci-dair.westus2.cloudapp.azure.com/competitions/) requires submitting algorithms for the detection of biopsy-proven breast lesions on digital breast tomosynthesis (DBT) images. The results of the competition will be announced at the special session of the SPIE Medical Imaging 2021 conference. Participants in the first DBTex Grand Challenge are encouraged to submit their work for peer review to the SPIE's Journal of Medical Imaging.

Breast Multiparametric MRI for prediction of NAC Response Challenge (BMMR2 Challenge)

The goal of the BMMR2 challenge was to identify image-based markers derived from DW-MRI, alone or in combination with DCE-MRI, with improved performance over whole-tumor mean ADC for predicting pCR following neoadjuvant chemotherapy (NAC) for invasive breast cancer. The challenge was run by the Breast Imaging Research Program of UCSF through the NCI Quantitative Imaging Network (QIN). The challenge opened on June 1, 2021 and closed on December 1, 2021.

ISBI 2018 - Lung Nodule Malignancy Prediction Challenge

This challenge (http://isbichallenges.cloudapp.net/competitions/15) intends to advance methods development on the current clinical impediment to assess nodules status for lung cancer screening subjects with consecutive scans. We invite ISBI 2018 participants to develop algorithms or re-package computational methods with potential clinical utility to identify malignancy. We will provide sequential low-dose CT (LDCT) scans at two screening intervals from the National Lung Screening Trial (NLST), with matched identified nodules from the same subject. We would like the participating teams to provide estimated nodules dimensions (longest diameter, volume) in the screening interval and the probability of malignancy. The teams are open to use any radiomic descriptors for nodules across time points and or change in size measurements including doubling time (DT) toward their assessment.

IEEE VIP Cup 2018: Lung Cancer Radiomics-Tumor Region Segmentation

Segmentation and prediction are considered as critical steps among different processing tasks within the Radiomics pipeline, and are the focus of this competition. The 2018 VIP-CUP challenge is on segmentation and prediction of Lung Cancer Tumor region via screening Computed Tomography (CT) scans using an updated version of NSCLC-Radiomics data from TCIA. Images from several patients along with the annotations will be provided for training and validation purposes. The evaluation will be performed based on test sets provided closer to the submission deadline.

Multimodal Brain Tumor Segmentation Challenge 2018 (BraTS)

BraTS 2018 utilizes multi-institutional pre-operative MRI scans and **focuses on the segmentation of** intrinsically heterogeneous (in appearance, shape, and histology) **brain tumors**, namely gliomas. Furthemore, to pinpoint the clinical relevance of this segmentation task, BraTS'18 also focuses **on the prediction of patient overall survival**, via integrative analyses of radiomic features and machine learning algorithms. More information can be found at http://www.med.upenn.edu/sbia/brats2018.html. This challenge utilizes subsets of The Cancer Genome Atlas Glioblastoma Multiforme Collection (TCGA-GBM) and The Cancer Genome Atlas Low Grade Glioma Collection (TCGA-LGG) primary data set, and has resulted in multiple TCIA Analysis Results data sets.

MICCAI 2018 – Computational Precision Medicine

The Computational Precision Medicine (CPM) 2018 will be held on September 16, in Granada (Spain), in conjunction with **MICCAI 2018**. It will consist of a morning workshop and afternoon challenges. (further details will be provided in early June)

Data Science Bowl 2017

In the United States, lung cancer strikes 225,000 people every year, and accounts for $12 billion in health care costs. Early detection is critical to give patients the best chance at recovery and survival. Using a data set of thousands of high-resolution lung scans from the National Lung Screening Trial (NLST) provided by the National Cancer Institute, participants developed algorithms that accurately determine when lesions in the lungs are cancerous. This will dramatically reduce the false positive rate that plagues the current detection technology, get patients earlier access to life-saving interventions, and give radiologists more time to spend with their patients. The challenge was hosted on Kaggle at: https://www.kaggle.com/c/data-science-bowl-2017.

PROSTATEx-2 Challenge 2017

The American Association of Physicists in Medicine (AAPM), along with the SPIE (the international society for optics and photonics) and the National Cancer Institute (NCI), will conduct a part 2 “Grand Challenge” on the development of quantitative multi-parametric magnetic resonance imaging (MRI) biomarkers for the determination of Gleason Grade Group in prostate cancer. As part of the 2017 AAPM Annual Meeting, the PROSTATEx-2 Challenge will provide a unique opportunity for participants to compare their algorithms with those of others from academia, industry, and government in a structured, direct way using the same data sets. To learn more about the challenge please visit http://www.aapm.org/GrandChallenge/PROSTATEx-2/default.asp. To register for the challenge visit http://spiechallenges.cloudapp.net/. Data from TCIA that was used by this challenge is available at SPIE-AAPM-NCI PROSTATEx Challenges (PROSTATEx).

PROSTATEx Challenge 2017

SPIE, along with the support of the American Association of Physicists in Medicine (AAPM) and the National Cancer Institute (NCI), will conduct a “Grand Challenge” on quantitative image analysis methods for the diagnostic classification of clinically significant prostate lesions. As part of the 2017 SPIE Medical Imaging Symposium, the PROSTATEx Challenge will provide a unique opportunity for participants to compare their algorithms with those of others from academia, industry, and government in a structured, direct way using the same data sets. To learn more about the challenge, and for researchers interested to participate in ongoing performance evaluation, visit https://prostatex.grand-challenge.org. Data from TCIA that was used by this challenge is available at SPIE-AAPM-NCI PROSTATEx Challenges (PROSTATEx).

MICCAI 2016 – Computational Precision Medicine

The Computational Precision Medicine (CPM) will be a full-day satellite event held on October 21 in Athens, Greece at MICCAI 2016, composed of short workshops on advances in radio-path-omics and radiomics, and innovative challenges in CT radiomics, classification and nuclei segmentation in digital pathology, and mammographic CAD detection.

MICCAI 2015 – Computational Brain Tumor Cluster of Events (CBTC)

The Computational Brain Tumor Cluster of Event (CBTC) 2015 will be held on Oct 9 in Munich, Germany, in conjunction with **MICCAI 2015**. It will consist of a morning workshop and afternoon challenges. (see preliminary program here)

LUNGx SPIE-AAPM-NCI Lung Nodule Classification Challenge

As part of the 2015 SPIE Medical Imaging Conference, SPIE – with the support of American Association of Physicists in Medicine (AAPM) and the National Cancer Institute (NCI) – will conduct a "Grand Challenge" on quantitative image analysis methods for the diagnostic classification of malignant and benign lung nodules. The LUNGx Challenge will provide a unique opportunity for participants to compare their algorithms to those of others from academia, industry, and government in a structured, direct way using the same data sets.

QIN Lung CT Segmentation Challenge

The goal of the CT segmentation challenge was to compare the bias (where possible) and repeatability of automatic, semi-automatic and manual segmentations for lung CT studies. Investigators from Columbia, MGH, Moffitt and Stanford identified 52 lung CT nodules and made available the data in DICOM format. Algorithm developers and users were requested to submit at least 4 repetitions of their algorithm for each nodule. A variety of image formats for the segmentation volumes were utilized including NIFTI, NRRD, JPG, PNG, DICOM-SEG, DICOM-RT, AIM, and LIDC-XML. The results were ultimately converted into DICOM-SEG format and uploaded back to TCIA.

MICCAI 2014 Grand Challenges

MICCAI 2014 will provide an excellent opportunity for a day long cluster of events in brain tumor computation (September 14, 2014). It will be composed of a workshop and radiologic and pathology image processing challenges that discuss and showcase the value of open science in addressing some of the challenges of Big Data in the context of brain cancer.

NCI-MICCAI 2013 Grand Challenges in Image Segmentation

The National Cancer Institute's (NCI's) Cancer Imaging Program in collaboration with the 16th international conference on Medical Image Computing and Computer Assisted Interventions (MICCAI) 2013 has launched two grand segmentation challenges involving clinically relevant prostate structures and brain tumor components based on magnetic resonance imaging (MRI) data. The event will take place at MICCAI 2013 meeting (http://www.miccai2013.org/) on September 22 in Nagoya,Japan.

NCI-ISBI 2013 Challenge - Automated Segmentation of Prostate Structures

The National Cancer Institute’s (NCI's) Cancer Imaging Program in collaboration with the International Society for Biomedical Imaging (ISBI) has launched a grand challenge involving prostate gland magnetic resonance imaging (MRI) data. The challenge will take place at the ISBI Symposium, April 7-11, 2013 in San Francisco, CA.