Demonstration Project Update

Demonstrate and evaluate feasibility of integrative Radiology and Pathology image feature analysis

Stony Brook and MGH

On-demand analysis of Radiology and Pathology images

Extraction and storage of imaging features

Feature-based exploration and integration with genomics and clinical data
Demonstration Project Update

- Containers
- Cloud computing platforms
- On-demand processing
- Data storage, management, and access
Pilot project for containers & API WG

- Specific tasks
  - Identify cases from TCGA that have radiology, pathology, and genomics data (done)
  - Select a small number of cases for this demonstration (done)
    - 21 Cases: 7 GBM, 7 LGG Astro, 7 LGG Oligo
  - Work with SBG to load the radiology and pathology images to the Amazon cloud. (in progress)
    - Pathology images loaded.
  - Containerize (via Docker) radiology and pathology feature extraction tools.
    - Pathology (done)
    - Radiology (in progress)
Pilot project for containers & API WG

- Deploy these containers to the SBG Cloud Pilot.
  - In progress
- Create a simple database (MongoDB?), containerize, populate with extracted features.
  - Schema defined
- Explore pushing the result data to BigQuery
  - Enable access and analytics through BigQuery APIs
- Expose through a REST API (query by patient ID).
- Return JSON document containing aggregate features for that patient.
Patient level aggregated feature JSON model

{
    "patient_id" : "TCGA-12-1098",
    "analysis_id" : "analysis-v1",
    "visit_id" : "visit-1",
    "imaging_domain" : "pathology",
    "imaging_sequence" : "h&e:tissue",
    "imaging_features" : [
        { "feature_name" : "physical_size_mean", "value" : 30.6, "feature_type" : "size_feature" },
        { "feature_name" : "principle_moments0_mean", "value" : 0.7, "feature_type" : "shape_feature" },
        { "feature_name" : "red_mean", "value" : 0.8, "feature_type" : "intensity_feature" },
        { "feature_name" : "entropy_mean", "value" : 0.8, "feature_type" : "texture_feature" }
    ]
}