Julia Cluceru

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Summary

Adept at data science applications in medicine, particularly in radiology, using a combination of statistical and machine learning techniques. Currently seeking research-oriented data science internships for Summer, Fall, or Winter 2019, or Summer 2020.

Education

- **University of California - San Francisco** — San Francisco, California
  Ph.D. in Pharmaceutical Sciences and Pharmacogenomics — *Sept. 2015 – 2020 (exp)*
- **University of North Carolina - Chapel Hill** — Chapel Hill, NC
  B.A. Mathematics, B.A. Chemistry, GPA 3.53 — *Sept. 2009 – May 2013*

Research Projects

- **Using MRI to predict patient-level tumor status** — UCSF
  Image processing, Pytorch, Python data science stack — *03/2019 - Pres.*
  - **Machine Learning**: Responsible for designing convolutional neural networks (CNNs) for the detection and classification of tumor status in recurrent brain tumor patients.
  - **Data processing**: Responsible for designing fully automated MR image pre-processing pipeline for cropping to irregular regions of interest, normalization, and data augmentation.

- **Prediction of anatomy and contrast of MR images** — UCSF
  Pytorch, Python data science stack, Big data, radiomics — *01/2019 - Pres.*
  - **Machine Learning**: Responsible for designing both Radiomics (quantitative texture features)+ support vector classifiers and CNN experiments for the classification of both anatomy and contrast of MR images. Preliminary CNN experimentation results: 82% classification into 5 contrasts. Ongoing work for contrast and anatomic classification improvement.
  - **Data processing**: Responsible for designing fully automated MR image pre-processing pipeline for extracting center slices from volumes, normalizing and transformation.

- **Using MRI to predict tissue sample outcome in brain tumor patients** — UCSF
  Clustered data analysis, R, Python ML stack — *04/2017 - Pres., pub. pending*
  - **Machine learning**: Responsible for building 5-fold CV experiments to assess ability of MRI to classify tissue sample cancer status, while controlling for clustered data. Built thresholding and logistic regression experiments with average accuracy of 69% on 5th fold. Discovered a novel MR biomarker to classify tumor status. Other models used: KNN, Random Forest, Gradient boosting machines, Naive Bayes, Generalized linear mixed models, support vector classifier.
  - **Statistics**: Used Generalized estimating equations to analyze clustered data and discovered novel associations of MR parameters with outcome.
  - **Data processing and cleaning**: Automated batch processing and statistics retrieval for magnetic resonance imaging (MRI) data to increase efficiency and reproducibility for UCSF Radiology [some code available on github.]

Skills

- **Programming Languages**: Proficient: R, python; Some experience: Matlab, HTML, CSS; Learning: SQL
- **Selected Python libraries**: pandas, numpy, fast.ai, pytorch, scikit-learn
- **Selected R libraries**: randomForestSRC, randomForest, multgee, lmer, glmnet
- **Technologies**: Git, Gihub, Jupyter NOtebook, R Studio, R Markdown
- **Image Processing concepts**: Fourier transform, wavelet transform, normalization, SIVIC

Publications

- **Nesmith JE, Chappell JC, Cluceru JG, Bautch VL.**: "Blood vessel anastomosis is spatially regulated by flt-1 during angiogenesis", Development. 2017 Mar 1;144(5):889-896.

- **Chappell JC, Cluceru JG, Nesmith JE, Mouillesseaux KP, Bradley VB, Hartland CM, Hashambhoy-Ramsay YL, Walpole J, Peirce SM, Mac Gabhann F, Bautch VL.**: "Flt-1 (VEGFR-1) coordinates discrete stages of blood vessel formation", Cardiovasc Res. 2016 Jul 1;111(1):84-93

- **Walpole J, Chappell JC, Cluceru JG, Mac Gabhann F, Bautch VL, Peirce SM.**: "Agent-based model of angiogenesis simulates capillary sprout initiation in multicellular networks", Integr Biol (Camb). 2015 Sep;7(9):987-97

Distinctions & Honors

- **Invited speaker**: "The association of MR imaging parameters with pathology of recurrent high grade glioma and treatment-induced effects"; InSight Symposium, Stockton, CA., Feb. 2019

- **University of San Francisco Deep Learning Diversity Fellowship**: $5000 Award

- **Ruth L. Kirschstein Predoctoral Institutional Research Training Grant (T32)**: $23,844.00 for research-related expenses.

- **Test scores**: MCAT: 36 - 97th percentile; PCAT: 442 - 99th percentile; GRE: 166 - 94th percentile; SAT: 2260 - 99th percentile