Xinyu Zhao

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Executive Summary

I am a PhD candidate at Auburn University expecting to graduate in the summer of 2016. Currently I am working applying various unsupervised clustering algorithms on functional MRI data. In the past, I've worked on projects regarding to lithography simulation and optimization, as well as image processing. I love programming and find it exciting to implement useful stuff. I am looking for full-time software engineer positions related to machine learning.

Skills

WORKING KNOWLEDGE

Programming Languages: C++11 (expert), MatLab (expert), R (experienced), Shell (intermediate)
Clustering Algorithms: Center-based [K-Means], Hierarchical, Model-based [Expectation-Maximization], Density-based [OPTICS, DBSCAN, DPC]
Other: Linux/Unix, HPCC, Statistics, Image Processing [registration, filtering, edge detection], Optimization, Simulation, Genetic Algorithms

BASIC KNOWLEDGE

MapReduce, MPI, Python

Project Experience

FUNCTIONAL MRI BASED CLASSIFICATION OF DIFFERENT MENTAL DISORDERS – JAN. 2015 - PRESENT

- For each subject, extract fMRI signals from different region of interests (ROI) in the whole brain.
- Compute functional connectivity (correlation between two ROIs) and effective connectivity (Causal relationship between two ROIs).
- Apply group level t-test on computed connectivities and select significant connectivities based on p-value.
- Use selected connectivities as input, apply different unsupervised clustering methods, particularly, hierarchical clustering, density based clustering, and model based clustering algorithms.
- Identify the most effective clustering method by analyzing similarity between obtained clustering results and symptom-based diagnosis.
- Extract brain networks from clustering results, which can be used to identify mental disorders.

SIMULATION AND OPTIMIZATION OF LINE EDGE ROUGHNESS AND CRITICAL DIMENSION ERROR IN ELECTRON-BEAM LITHOGRAPHY – JAN. 2012 - DEC. 2014

- Improved simulation speed by significantly reducing number (about 0.1% of original) of point spread function (PSF) used for simulating exposure using statistical analysis and stochastic procedure.
- Proposed two methods to determine the optimal dose required in e-beam lithography, one adopting an iterative procedure which is time-consuming but can achieve high accuracy, while the other estimating the optimal dose directly by convert non-linear relationship between exposure and developing rate to piece-wise linear, which reduces computation time while slightly scarifying accuracy.
- By using Genetic Algorithm (GA), simulated scanning electron microscope (SEM) images were matched to real SEM images taken from the experiments with less than 5% error.

IMAGE REGISTRATION BASED ON IMAGE MOMENT – JAN. 2011 - DEC. 2011

- Used image moment to calculate image transformation parameters from geometric distortion.
- Applied point-to-point mapping to locate deformed part (e.g., tumor) in medical images.

Education

Auburn University, Auburn, AL, U.S. — PhD. Jan. 2013 - Jun. 2016 (expected) GPA: 3.82/4.0
Electrical and Computer Engineering | Graduate Research Assistant

Auburn University, Auburn, AL, U.S. — Master. Jan. 2011 - Dec. 2012 GPA: 3.82/4.0
Electrical and Computer Engineering | Graduate Research Assistant / Graduate Teaching Assistant

East China University of Science and Technology, P.R. China — B.E. Sep. 2006 - Jun. 2010
Information Engineering

Publications

[2015] X Zhao, SY Lee, J Choi, SH Lee, IK Shin, CU Jeon: *Dependency analysis of line edge roughness in electron-beam lithography*, Microelectronic Engineering.

[2014] X Zhao, Q Dai, SY Lee, SH Lee, BG Kim, HK Cho: *Determination and analysis of minimum dose for achieving vertical side-wall in electron-beam lithography*, Journal of Vacuum Science & Technology B 32 (6), 06F508.

[2014] X Zhao, SY Lee, J Choi, SH Lee, IK Shin, CU Jeon, BG Kim, HK Cho: *Minimization of line edge roughness and critical dimension error in electron-beam lithography*, Journal of Vacuum Science & Technology B 32 (6), 06F505.

[2012] X Zhao, SY Lee, SH Lee, BG Kim, HK Cho: *Fast simulation of stochastic exposure distribution in electron-beam lithography*, Journal of Vacuum Science & Technology B 30 (6), 06F308.