<Computer_Systems_Technology_Colloquium/>

AYDIN SARIBUDAK

- March 10, 2016
- 300 Jay St. Brooklyn, NY • Namm 928
- Noon - 1:00pm

Bio-inspired Computation Approach for Tumor Growth with Spatial Randomness Analysis of Kidney Cancer Xenograft Pathology Slides

In our research, we analyze digitized images of Hematoxylin-Eosin (H&E) slides equipped with tumorous tissues from patient derived xenograft models to build our bio-inspired computation method, namely Personalized Relevance Parameterization of Spatial Randomness (PReP-SR). Applying spatial pattern analysis techniques of quadrat counts, kernel estimation and nearest neighbor functions to the images of the H&E samples, slide-specific features are extracted to examine the hypothesis that existence of dependency of nuclei positions possesses information of individual tumor characteristics. These features are then used as inputs to PReP-SR to compute tumor growth parameters for exponential-linear model. Differential evolution algorithms are developed for tumor growth parameter computations, where a candidate vector in a population consists of size selection indices for spatial evaluation and weight coefficients for spatial features and their correlations. Using leave-one-out-cross-validation method, we showed that, for a set of H&E slides from kidney cancer patient derived xenograft models, PReP-SR generates personalized model parameters with an average error rate of 13.58%. The promising results indicate that bio-inspired computation techniques may be useful to construct mathematical models with patient specific growth parameters in clinical systems.

Aydin Saribudak received his Bachelor of Science degree, in 2005, from Electrical and Electronics Engineering Department of Middle East Technical University (METU), Turkey. After his graduation, he worked as software developer and researcher in telecommunication field for more than 5 years. Aydin is currently a Ph.D. candidate at the City College of the CUNY. His interests include biologically inspired computation algorithms, artificial intelligence, and their applications to personalized mathematical models for tumor growth and anti-cancer therapy.

Light refreshments will be served.

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