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This blog hosts weekly news about the Texas A&M University Sketch Recognition Lab. SRL is directed by Dr. Tracy Hammond, an associate professor in the Computer Science and Engineering Department. More information about the lab can be found at <http://srl.tamu.edu>

Tuesday, March 1, 2016

SRL Dissertation Defense: Folami Alamudun Monday, February 29

Title: Analysis of Visuo-cognitive Behavior in Screening Mammography

SRL Dissertation Defense:

Folami Alamudun
Monday, February 29

Title: Analysis of Visuo-cognitive Behavior in Screening Mammography

Folami Alamudun
12:00pm Monday, February 29, 2016
Room 323 Teague Building

Abstract

Improved precision in modeling and predicting human behavior and the underlying metacognitive processes is now possible thanks to significant advances in bio-sensing device technology and improved technique in machine intelligence. Eye tracking bio-sensors measure psycho-physiological response through changes in configuration of the human eye. These changes include positional measures such as visual fixation, saccadic movements, and scanpath, and non-positional measures such as blinks and pupil dilation and constriction. Using data from eye-tracking sensors, we can model human perception, cognitive processes, and responses to external stimuli.

In this study, we investigate visuo-cognitive behavior in screening mammography under clinically equivalent experimental conditions. We examined the behavior of 10 image readers (three breast-imaging radiologists and seven Radiology residents) during the diagnostic decision process for breast cancer in screening mammography. Using a head-mounted eye tracking device, we recorded eye movements, pupil response, and diagnostic decisions from each image reader for 100 screening mammograms. Our corpus of mammograms comprised cases of varied pathology and breast parenchyma density.

We proposed algorithms for extraction of primitives, which encode discriminative patterns in positional and non-positional measures of the eye. These primitives capture changes correlate with individual radiologists, radiologists' experience level, case pathology, breast parenchyma density, and diagnostic decision. We evaluated the effectiveness of these primitives through performance measures using ten-fold cross-validation for training and testing a simple learning algorithm.

Our results suggest that a combination of machine intelligence and new bio-sensing modalities is an adequate predictor for the characteristics of a mammographic case and image readers' diagnostic performance. Our results also suggest that primitives characterizing eye movements can be useful for biometric identification of radiologists. These findings are impactful in real-time performance monitoring and personalized intelligent training and evaluation systems in screening mammography.

Biography

Folami Alamudun is a doctoral candidate in the Department of Computer Science and Engineering at Texas A&M University working directly with Dr. Tracy Hammond in the Sketch Recognition Laboratory (SRL) and in collaboration with Dr. Georgia Tourassi at the Oak Ridge National laboratory's (ORNL) Biomedical Sciences and Engineering Center.

His research focuses on machine intelligence and bio-sensing device applications in user behavior modeling.

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Advisor: Dr. Tracy Hammond

Posted by [Anna Stepanova](#) at [12:02 PM](#)



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Congrats Dr. Alamudun!

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