Talk Title: How We Read UML Class Diagrams: An Eye Tracking Testimonial

Speaker: Dr. Huzefa Kagdi

Affiliation: Dept. of Comp. Sci., Missouri S&T

Venue: 209, Comp. Sci. Bldg

Time: Sep' 25th Thursday, 12:30 to 1:30pm

Abstract:

The presentation will describe a user study that was conducted on UML class diagrams with eye-tracking equipment. The objective of the work was to evaluate the effectiveness of different diagram-layout strategies and stereotype labeling. Identifying traits as to how humans navigate, explore, and examine diagrams was also investigated. Eye tracking equipment was used to collect eye-gaze activities while a human subject performed a series of assigned tasks. These gaze activities are captured quite precisely with modern eye-tracking equipment in a non-obtrusive manner; thus, providing a unique opportunity to include measures of exactly how humans read a diagram and ratiocinate their conclusions. This differs from methods such as think aloud, and traditionally prescribed measures such as accuracy and performance time that are typically collected after the conclusion of an assigned task. The results show that layouts incorporating the semantic information about the design were found to be more effective and the use of class stereotypes appears to be of importance in the comprehension of these diagrams. Also, there is evidence for the variation in the eye movements (e.g., in diagram navigation) depending on a subject's UML expertise and software-design ability to solve the given task. The basic premise of eye-tracking measures for comprehension issues lies in the strong eye-mind hypothesis, which states that human gazes directly correspond to their thinking and cognitive process. Inclusion of such measures is a promising step towards developing objective metrics for software comprehension and cognitive load. The measures can be used synergistically with the traditional measures in the empirical assessments.