NJIT

Department of Computer Science

Solving the Test Oracle Problem with Program Analysis and Generative AI

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Hosted by: Martin Kellogg

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Coffee: 11:15 AM – 11:30 AM
Time: 11:30 AM – 12:30 PM (Eastern Time (US and Canada)
Location: GITC 4402 (4th floor Seminar Lecture Hall)

Zoom Link: https://njit-edu.zoom.us/j/99622470540?pwd=b6jhcalKcFHAUz4iHudOMhQYDbRaYk.1

Abstract:

Software impacts nearly every aspect of our lives, and software bugs are costly. Bugs can cause system failures, create security vulnerabilities, and, in extreme cases, lead to loss of life—not to mention the massive economic impact they impose globally. Testing is essential to detect these bugs early in the software development phase, ensuring software quality and reliability. Despite significant advancements, automated testing still faces critical challenges.

In this talk, I will present my research on addressing **the test oracle problem**—an open research problem in software testing that involves distinguishing correct outputs from incorrect ones for a given input. I will discuss how I have utilized program analysis (PA) and generative AI (GenAI) to enhance the adequacy, correctness, and strength of automated test oracles, thereby enabling more effective bug detection. Finally, I will outline my vision for future research, focusing on developing methods to effectively leverage documentation, PA, and GenAI to advance automated testing, generate formal specifications, and tackle broader challenges in software quality assurance.

Bio:

Soneya Binta Hossain is a Ph.D. candidate in the Department of Computer Science at the University of Virginia, advised by Professor Matthew Dwyer. Her research interests lie at the intersection of Software Engineering (SE)—particularly Software Testing—and the application of Generative AI (GenAI) in SE (GenAI4SE). Her work has been published in top-tier venues, including ICSE, FSE, and NeurIPS. She has gained industry experience through multiple internships at Amazon Web Services (AWS) and has received several prestigious honors, including the John A. Stankovic Outstanding Research Award and the Copenhaver Charitable Trust Bicentennial Fellowship.