CSCE 747 - Literature Survey Overview

Due Date: Tuesday, May 3rd, 11:59 PM

Overview/Structure

Throughout the course, we will introduce a number of testing topics. Many of these topics could fill their own courses. Therefore, part of your task for the semester will be to choose one of the topics we are covering and become an expert on it.

You will choose one of the topics listed in the next section, and will be responsible for writing a 12 page literature survey. This survey must summarize trends and cutting-edge research in that area, and you must provide original commentary on the work. You must address the strengths and weaknesses of different techniques to solving particular challenges in your chosen topic, and contrast the different approaches. You will be expected to propose possible directions for future research in your topic.

The document should be written in 12-point, single-spaced font, with standard margin sizes. You are highly encouraged to use Latex to write the document (as a graduate student, you are very likely to have to use it at some point). A template and tutorial will be provided on the course site.

Feel free to ask questions at any time. We will not read multiple drafts of your entire paper, or respond to “is this good?” questions without qualification on what you’re looking for, but you may send targeted questions to figure out if you’re on the right track.

This paper will be due at the end of the semester. During the last two weeks of classes, all students will present their findings in a 12-minute talk. APOGEE students will be responsible for either presenting in person, presenting live through a screen-sharing or video chat service (Skype/Google Hangouts/etc), or filming their presentation. Attendance for in-class students will be required for all presentation days, even if you have already presented.

Topics

You must choose one of the following topics as the subject of your literature survey:
Topics in bold have already been chosen.

- **Functional/Requirements-Based Testing**
- Pairwise Combination Testing/Combinatorial Interaction Testing
- **Structural Coverage Criteria**
- **Data-Flow Coverage Criteria**
- **Data-Flow-based Analyses**
- **Model-Based Testing/Model-Based Test Generation**

- **Test Oracles**
- **Testing Object-Oriented Software**
- Model Checking/Finite-State Verification
- **Symbolic Execution**
- **Dynamic Symbolic Execution**
- Invariant Generation
- **(Automated) Theorem Proving**
- **Mutation/Fault-based Testing**
- **Adaptive Random Testing**
- **Search-Based Testing**
- **Code Inspections**
- **Regression Testing**
- **Alpha/Beta/Acceptance Testing**
- **Statistical Testing/Reliability Measurement**
- **Fault Localization**
- **Testing of Nondeterministic Systems**
- **Security/Penetration Testing**
- **Testing of Graphical User Interfaces**
- **Testing Concurrent/Parallel Systems**
- **Testing as part of Continuous Integration**

Only one student will be allowed to sign up for a topic. Please e-mail your top **three** preferences to the instructor. If possible, you will be assigned one of these three. If all three have been taken, you will be informed of the remaining topics.

If there is a topic you would like to study that does not appear on this list, you may propose the topic to the professor, who may or may not approve the alternative based on the soundness of the proposal.

Resources

You may find the following resources helpful in identifying research material.

- Google Scholar - https://scholar.google.com/
    - Easiest way to access papers - either search for relevant keywords or by title (if you are seeking a particular paper).
    - Click “cited by” to see more recent papers that have referenced the papers you have read. This is a good way to find newer work.
- University of South Carolina Library - http://library.sc.edu/p/Research/Resources/ComputerScience
    - Allows you to log into and access papers from multiple publishers. In particular, many papers can be found in the ACM and IEEE electronic libraries.

The following are some of the top conferences and journals in software engineering. You can look at lists of published papers on their webpages. There are other conferences and journals out there that may be helpful, but these should get you started.

Top Software Engineering Conferences/Workshops:

- International Conference on Software Engineering (ICSE)
- International Symposium on Software Testing and Analysis (ISSTA)
- International Conference on Software Testing, Verification, and Validation (ICST)
- International Symposium on Software Reliability Engineering (ISSRE)
- Google Test Automation Conference (GTAC)
- International Conference on Automated Software Engineering (ASE)
- International Symposium on Foundations of Software Engineering (FSE)
- Symposium on Search-Based Software Engineering (SSBSE)
- International Workshop on Search-Based Software Testing (SBST)
- International Workshop on Automation of Software Testing (AST)

Top Software Engineering Journals:

- IEEE Transactions on Software Engineering (TSE)
- ACM Transactions on Software Engineering and Methodology (TOSEM)
- IEEE Computer
- IEEE Software
- Automated Software Engineering (ASE)
- Software Testing, Verification, & Reliability (STVR)
- Software Practice and Experience (SPE)

There will also often be commercial or open-source software related to your research topic. You should examine (to the extent that you can) the approaches these tools take to solving the problem. If you can, download and run the tools, examine their documentation and source code, and figure out how they work.