Exploring My Research Area

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1 My research area within computer science.

My research area within computer science is security in software engineering. Specifically, how the a software system can be made more secure. This can be done by analyzing the various coding practices, employed by the development team and then finding and analyzing the most common flaws. There are security scanning tools that crawl and audit the software system to find loopholes and generate risk assessment reports. Security level of a software product can also be improved by incorporating a phase or practice into the software development cycle itself.

2 Three most important open research problems in my area of research.

2.1 Complex Systems

Despite heavy investments in finding flaws in a complex software system, reliability and security issues still remain the major concern for business organizations. And apart from finding, fixing these vulnerabilities could prove be very costly for the organization. Hence, it is still an open problem of how to efficiently make such complex system more robust and secure.

2.2 The inability to tightly bound aliasing statically means

It's hard to statically prove that data does not leak from one part of a program to another. It would be assuring if this could be proven for a system. And this is difficult as each system is different from the other and hence, there is no general way of proving that data leakage does not happen from one component to another.

2.3 Open Source Software Projects

Open source systems have their code for everybody else to see, which makes it easier for a hacker to a flaw and use it for their own advantage which may prove

harmful for the organization. But making this open source code private would mean that a person who genuinely wants to help the association by contributing to this project would have a hard time in doing so. Hence, it is very difficult to incorporate security in open source systems.

3 Description of my research that I would use if I was talking to a lay person.

Huge amount of digital data gathered and stored by various businesses, if this data goes into the wrong hands, it could result in a major loss for the organization. It may suffer huge financial loss and the reputation of the organization may take a hit. Hence, security of the software system is of utmost important. And my research work will contribute to this, by finding ways by which a software product can be made more secure. I am working on analyzing the software development process of a software system and finding loopholes that degrade the security and robustness of the system, or the level of ease by which a hacker can successfully attack the software system. The research work will include various insecure coding practices employed by software developers. It will also look into how and which security tools are used by the development team to check the system for any security issues. I am also looking at various software development methodologies which are employed by the organization to deliver the software product, and how they implement strategies that contribute towards the level of security of the system.

4 Classifying my research according to the research types we discussed last week in lecture.

My research work falls under the Applied Research category as it solves a particular problem i.e. improving the security and robustness of a software system. It has a direct application in the Information Technology industry wherein the results and conclusion from the research work can be employed in the software development process to improve the level of security of a software system.
The research work will be of Qualitative type. The research work will consist of a survey of software developers. This survey would require inputs based on the different criteria, such as 'How frequently in a week do you use the security scanning tool'. These types of answers would be numerical values and hence the work comes under Qualitative research.

5 Three candidate faculty members here at VT who are working on something related to my research.

Name : Chris Brown
Department : Computer Science
Title : Assistant Professor
Number of citations and h-index: 5
Number of papers published in the last 2 years related to your topic: 5

Name : Muhammad Ali Gulzar
Department : Computer Science
Title : Assistant Professor
Number of citations and h-index: 12
Number of papers published in the last 2 years related to your topic: 5

Name : Bob Edmison
Department : Computer Science
Title : Collegiate Assistant Professor
Number of citations and h-index: 4
Number of papers published in the last 2 years related to your topic: 2