Lannan Luo

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RESEARCH INTERESTS

My research interests focus on software security, software analysis and mobile security. I am also interested in machine learning and data mining. I have worked on the SPLAD project to develop binary-oriented, obfuscation-resilient software plagiarism detection approach.

EDUCATION

Penn State University, University Park, PA 2012 – present
Ph.D., Information Science & Technology.

University of Electronic Science and Technology of China, Chengdu, China 2009 – 2012
M.Sc., Communication and Information Systems, advised by Dr. Lemin Li.
GPA: 87.8/100 (Ranked: 2/276)

Xidian University, Xi'an, China 2005 – 2009
Bachelor, Telecommunications Engineering.
GPA: 3.75/4; Major GPA: 3.91/4 (Top 3%)

WORK EXPERIENCE

Software Systems Security Lab, PSU, Research Assistant 2012 – present
Led research projects of software plagiarism detection.

College of Information Science and Technology, PSU, Teaching Assistant 2013 – present
Prepared and given lectures to facilitate students' understanding toward fundamental concepts and theories. Organized and prepared network security experiments. Courses: IST451 (Network Security), IST 220 (Networking and Telecommunications)

Department of Open Platform, Shanda Interactive Entertainment Limited Company, Shanghai, China, Research Intern 07/2010 – 12/2010
Worked with other colleagues on the development of Distributed Storage Access System (DSAS), including data format transformation, protocol converter, and database access interface, etc.

Key Lab of Optical Fiber Sensing and communications, University of Electronic Science and Technology of China, Graduate Research Fellow 2009 – 2012
Participated in the project of Network Traffic Abnormal Intrusion Detection.

State Key Lab of Integrated Services Network, Xidian University, Undergraduate Research Fellow 10/2008 – 05/2009
Led the project of UAV (Unmanned Aerial Vehicle) flight path planning model. Formalized the problem, designed the algorithm and proved its correctness.

HONORS AND AWARDS

Best Paper Nomination. ACM SIGSOFT/FSE. 2014.

First-class scholarship, Excellent Graduate Student, University of Electronic Science and Technology of China, 2010 and 2009.

First-class scholarship, Excellent Student, Xidian University, 2006, 2007, and 2008.

RESEARCH PROJECTS

Binary-Oriented Obfuscation-Resilient Software Plagiarism Detection 01/2013 – 03/2014
Existing code similarity comparison methods, whether source or binary code based, are mostly not resilient to obfuscations. In this project, we propose a binary-oriented, obfuscation-resilient method based on a new concept, longest common subsequence of semantically equivalent basic blocks, which combines rigorous program semantics with longest common subsequence based fuzzy matching. We have developed a prototype and our experimental results show that our method is effective and practical when applied to real-world software. Our work was published in FSE'14 [2] and nominated for the best paper award. *Techniques and tools: C++; Python; Symbolic execution; theorem proving; IDA; BAP; STP; Obfuscators (e.g., Diablo, Loco); CIL.*

Integrating BIMserver and OpenStudio for Energy Efficient Building, PSU 08/2012 – 08/2013
This project proposes an integrated approach at the data level to combining BIMserver and OpenStudio to build a unified EEB data exchange model. We build an information exchange bridge between BIMserver and OpenStudio, which enables different design and simulation tools that are connected to them to interoperate and exchange data. The integrated approach, organizing the data flow in a unified model, and enabling effective exchange of data, is currently in a beta-testing phase. Our work was published in ASCE'13 [3]. *Techniques and tools: Java; Python; BIMserver; OpenStudio; CONTAM; EnergyPlus.*

A Distributed Storage Access System for Huge Data 07/2010 – 12/2010
To efficiently handle huge user data, we propose a Distributed Storage Access System (DSAS) with a 3-tier architecture. The testing results of performance show the average response time is less than 100ms and the shortest response time is 3.86ms. Our work was published in ICCSIT'11 [4]. *Techniques and tools: C/C++; XML; Coroutine concurrent; Serialization/deserilization; MySQL.*

UAV (Unmanned Aerial Vehicle) Flight Path Planning Model 05/2007
This project aims to determine the optimal flight path of an UAV based on two or three dimensions. We construct a total cost function via Voronoi diagram, generate an optimal path using Dijkstra algorithm, and then smooth this path by B-spline curve. Our work obtained the first prize in the Mathematical Modeling Contest of Shaanxi, 2007. *Techniques and tools: C/C++; MATLAB.*

TEACHING

IST 451 Network Security, Graduate Teaching Assistant Spring 2014, Fall 2014, and Fall 2015
IST 220 Networking and Telecommunications, Graduate Teaching Assistant Spring 2015

PUBLICATIONS

[1] **Lannan Luo**, Jiang Ming, Dinghao Wu, Peng Liu, and Sencun Zhu. "Semantics-Based Obfuscation-Resilient Binary Code Similarity Comparison with Applications to Software Plagiarism Detection." In *Proceedings of the 22nd ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2014)*, Best Paper Nomination, Hong Kong, China, November 16-22, 2014.

[2] Nan Yu, Yufei Jiang, **Lannan Luo**, Sanghoon Lee, Abdou Jallow, Dinghao Wu, John Messner, Robert Leicht, and John Yen. "Integrating BIMserver and OpenStudio for Energy Efficient Building." In *Proceedings of the 2013 ASCE International Workshop on Computing in Civil Engineering (ASCE 2013)*, Los Angeles, CA, USA, June 23-25, 2013.

[3] **Lannan Luo**, Gang Sun, and Wei Yu. "A Distributed Storage Access System for Mass Data using 3-tier Architecture." In *IEEE International Conference on Computer Science and Information Technology*, June 2011.

TALKS

- "Semantics-Based Obfuscation-Resilient Binary Code Similarity Comparison with Applications to Software Plagiarism Detection," the *22nd ACM SIGSOFT International Symposium on the Foun-*

dations of Software Engineering (FSE 2014), Hong Kong, China, November, 2014.