

# SHIRISH SINGH

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## EDUCATION

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- Johns Hopkins University, USA** Dec 2017  
Master of Science in Security Informatics
- The LNM Institute of Information Technology, India** Jul 2015  
Bachelor of Technology in Computer Science and Engineering

## RESEARCH EXPERIENCE

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- United Technologies Research Center, USA** Jun 2017 - Aug 2017, Jan 2018 - Present  
*Research Engineer (Cyber System Security Group)*
- CASTRA [Funded by DHS]
    - Aimed at providing a friction-less multifactor authentication mechanism for secure access using subliminal characteristics [Patent pending]. I developed a mobile application to perform real-time gait analysis by utilizing passive smartphone sensors. Achieved user authentication within 6 seconds of walking with TPR of 99.90% and TNR of 99.95% using LSTM. Applied real-time Dynamic Time Warping (DTW) on magnetometer sensor values to perform indoor localization.
  - COMBAT [Funded by DHS]
    - COMBAT is a behavior-based intelligent mobile malware detection system. I developed programs to collect 4 million mobile application samples from online repositories and extract features and patterns from the samples. Applied random forest and SVM to build models for malicious URL detection. We achieved 98.9% detection accuracy using Adversarial learning.
  - Warfighter Analytics using Smartphones for Health (WASH) [Funded by DARPA]
    - WASH is a research project aimed at detecting PTSD by unobtrusively leveraging human interactions with smartphone. I designed experiments and developed mobile applications to collect the smartphone sensory data associated with 45 different physical activities.
  - Software Assurance Testbed
    - Established an organization-wide software assurance infrastructure. I deployed and integrated multiple analysis tools to find vulnerabilities in application code. I leveraged NIST Software Assurance Reference Dataset (SARD) for evaluating the performance of the tools. This application analysis environment will support the projects of UTC business units.

- Johns Hopkins University - Information Security Institute, USA** Jan 2017 - Dec 2017  
*Graduate Research Assistant*

- Conducted an empirical study on the impact of multitasking and monetary incentive on participant's ability to identify phishing emails. I developed a framework to trace user's interaction pattern with the email client. The research discovered that monetary incentive positively affects performance. Multitasking, on the other hand, has a negative effect on identifying phishing email.

## PUBLICATIONS AND PATENTS

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### Peer-Reviewed Journal Publications

- **Singh, Shirish**, and Praveen Kumar. "User specific context construction for personalized multimedia retrieval." *Multimedia Tools and Applications* (2017): 1-28, Springer.

### Short Papers and Poster Presentations

- Zhang, Haoruo, **Shirish Singh**, Xiangyang Li, Anton Dahbura, and Meng Xie. "Multitasking and monetary incentive in a realistic phishing study." In *British Human Computer Interaction Conference*. 2018.

- Manikantan, Devu, Emeka Eyisi, Xiaojun Zhao, **Shirish Singh**, and Qiqing Huang. “Learning Safe to Resist Android Malware Evasion Attacks.” Paper presented at 2018 UTRC Analytics Conference, East Hartford, CT, May 2018.
- **Singh, Shirish**, and Meng Xie. “Learning context-content similarity for image retrieval.” In Proceedings of the 2017 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2017 ACM International Symposium on Wearable Computers, pp. 201-204. ACM, 2017.

### Peer-Reviewed Conference Papers

- **Singh, Shirish**, and Praveen Kumar. “Context based image retrieval framework for smartphones.” In Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), 2015 Fifth National Conference on, pp. 1-4. IEEE, 2015.
- **Singh, Shirish**, Bharavi Mishra, and Saket Singh. “Detecting intelligent malware on dynamic Android analysis environments.” In Internet Technology and Secured Transactions (ICITST), 2015 10th International Conference for, pp. 414-419. IEEE, 2015.
- **Singh, Shirish Kumar**, Bharavi Mishra, and Poonam Gera. “A Privacy Enhanced Security Framework for Android Users.” In IT Convergence and Security (ICITCS), 2015 5th International Conference on, pp. 1-6. IEEE, 2015.
- **Singh, Shirish**, and Praveen Kumar. “CFS performance improvement using Binomial Heap.” In Advances in Computing, Communications and Informatics (ICACCI), 2015 International Conference on, pp. 1822-1824. IEEE, 2015.

### Patents

- Shila, Devu M., Emeka Eyisi, and Shirish Singh. Systems and Methods for Authenticating User Based on Path Location. US Patent 102152US01, filed July 24, 2018. [Pending]

### TEACHING EXPERIENCE

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#### Johns Hopkins University, USA

Sept 2016 - Dec 2017

- Graduate Course Assistant - 600.621 Object-Oriented Software Engineering (Prof. Scott Smith)
- Teaching Assistant - 600.250 User Interfaces & Mobile Applications (Prof. Joanne Selinski)

#### The LNM Institute of Information Technology, India

Jan 2015 - May 2015

- Teaching Assistant - Software Engineering and Project Management (Prof. Ravi Gorthi)
- Teaching Assistant - IT Workshop (Prof. Sunil Kumar)

### TALKS AND PRESENTATIONS

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**Context Aware Security Technology for Responsive and Adaptive Protection** Sep 2018

*Mobile World Congress Americas 2018, Los Angeles, USA*

**COMBAT - Dissection to Detection of Malicious Mobile Apps** Aug 2018

*UTRC Inter-Department Seminar, East Hartford, CT*

**Adversarial Gait Detection On Mobile Devices Using RNN** Jul 2018

*IEEE TrustCom-18, New York, USA*

**Guest Lecturer - CYB 223 Cybersecurity Select Topics** Nov 2017

*Hagerstown Community College, USA*

### PROFESSIONAL EXPERIENCE

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#### SapientNitro, India

Aug 2015 - Aug 2016

*Associate, Technology*

- Led a team of six engineers to build the back-end service for an e-commerce web application.
- Used a combination of Java, JavaScript, and JSP to build analytics system for developing targeted marketing advertisements.

## PROJECTS

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### Secure Autonomous UAVs

Sep 2016 - Dec 2016

*Johns Hopkins University, USA*

- Designed algorithm and developed mobile application to control UAV's waypoint for automated video surveillance system for DJI Phantom 4 drones.
- Analyzed the USB traffic flow between the hand-held device controlling the UAV and controller for developing strategies to discover security vulnerabilities in DJI Phantom 4 drones.

### Honeypot: Intelligent Dynamic Android Analysis Environment

Jan 2015 - Jul 2015

*The LNM Institute of Information Technology, India*

- Developed add-on for Droidbox (Open source dynamic analysis tool for Android) to automate and emulate artificial user behavior on Android emulator to evade emulator detection by malware.
- Compiled Android emulator and goldfish kernel v3.10 images to incorporate the changes in the system calls such that the emulator cannot be detected by the applications by checking the file system for emulator specific artifacts. Tested against Morpheus application (Emulator Detector).

## TECHNICAL SKILLS

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- **Programming and Scripting Languages:** Java, Python, C, PHP, JavaScript, SQL, Matlab
- **Web Frameworks:** Spring Boot, Hibernate
- **Tools and Packages:** Eclipse IDE, Git, JUnit, Maven, RoundCube Email Client, hMailServer

## AWARDS AND SERVICES

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- Reviewer for IEEE Internet of Things Journal.
- Reviewer for ICACCI 2017 conference.
- Awarded "Great Job Award" for COMBAT and WASH projects at UTRC.
- Awarded Client Focused Delivery award for completion of an internal project in SapientRazorfish.
- President, Innovation and Incubation Cell, The LNM Institute of Information Technology, India.