

SACHIN KUMAR SINGH

Research Assistant | Flux Research Group | University of Utah

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EDUCATION

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- Jan 2021 - Aug 2022* **Master in Science (Thesis) | Major - Computer Science | Current CGPA - 3.7/4.0**
School of Computing, University of Utah, Salt Lake City, Utah, USA
Thesis* - Deep Dive into SSH logs
Advisor - Prof. Robert Ricci, FLUX RESEARCH GROUP
- Aug 2016 - Sep 2020 **Bachelor of Technology | Major - Computer Science and Engg. | CGPA - 8.31/10.0**
Rajkiya Engineering College Sonbhadra, Uttar Pradesh, India
Thesis - A (k, n) Audio Secret Sharing with Share Authentication [PDF]
Advisor - Prof. Mainejar Yadav, COMPUTER SCIENCE AND ENGG. DEPARTMENT

RESEARCH EXPERIENCE

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- May 2021 **Graduate Research Assistant, FLUX RESEARCH GROUP, School of Computing University of Utah**
Present
- > Currently working on SSH logs and developing a method that can identify anomalies, ssh scanners and intrusions based on times series.
 - > Worked on Deep-Sec, an anomaly- detection system that leverages LSTM network to model a system log as a natural language sequence.
- [Log-parsing](#) [Timeseries](#) [LSTM](#) [Natural Language Processing](#) [Neural Net](#) [Python](#)
- November 2018 **Research Scholar, ADVISOR - PROF. MAINEJAR YADAV, Rajkiya Engineering College Sonbhadra, India**
September 2020
- > Developed a method for verification of received shares in VSS (Visual Secret Sharing). Extended principles of VSS to audio and developed a system for (k, n) secure Audio Secret Sharing (ASS).
 - > Developed an Audio Quality Control Method based on ASS.
- [MATLAB](#) [Secret Sharing](#) [Audio Processing](#) [Visual Cryptography](#)

PUBLICATIONS UNDER REVIEW

[1*] Rufaida Ahmed, **Sachin Kumar Singh** and Robert Ricci, *Deep-Sec: Finding Malicious Needles in Logfile Haystacks*, under review at 31st USENIX Security Symposium, Boston, MA, USA, August 10–12, 2022.

PUBLICATIONS

- [1] **Sachin Kumar Singh** and Mainejar Yadav, *A (k, n) Audio Secret Sharing with Share Authentication*, International Journal of Computing and Digital Systems, University of Bahrain Scientific Journals, January-01-2021.[LINK]
- [2] **Sachin Kumar Singh** and Mainejar Yadav, *Audio Quality Control Method based on ASS* 25th International Symposium on Frontiers of Research in Speech and Music (FRSM 2020) October 8-9, 2020, National Institute of Technology Silchar, India.[LINK]

INTERN/ SUMMER SCHOOL/ TEACHING

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- June 2019 **ACM Summer School, DETECTION AND ANALYSIS OF MALWARE, College Of Engineering Pune, India**
- > Attended ACM Summer School focused on detection and analysis of malware. Consisted of several sessions on malware analysis techniques and tools, attack vectors used by malware and malware in modern domains.
- [Attack vectors](#) [Buffer Overflow](#) [Meltdown](#) [Spectre](#) [Memory based exploit](#) [Error based exploit](#) [OS-level threats](#)
- June 2018 **Web Development Intern, GTECH SOLUTION PVT LIMITED, Lucknow, India**
July 2018
- > Responsible for developing and maintaining the front end functionality of websites, creating graphics and devising SEO strategies.
- [JavaScript](#) [jQuery](#) [Bootstrap](#) [SEO](#) [Google Analytics](#)

January 2017
February 2017

Data Science and Analytics Intern, PROF. SAMEER MATHUR, IIM Lucknow, India

> Reviewed a number of case studies from Harvard Business Review. Performed analysis of various aspects and parameters which impact hotel room pricing in the Indian market (Using R).

R Python Dean's Dilemma MBA Starting Salaries Store24(A): Managing Employee Retention

TECHNICAL SKILLS

Programming	Python, C++, C, Bootstrap, Javascript, jquery, Django, Go, R, Java
Development Tools/Softwares	MATLAB, Jupyter, Visual Studio Code, Pycharm, Git, Sublime, JFLAP
Operating Systems	Mac OS, Windows Server, Windows 10, Linux Redhat, Linux Centos

PROJECTS

DEEP DIVE INTO SSH LOGS

PROF. ROBERT RICCI | 2021 - PRESENT

For senior thesis, working on SSH logs, trying to understand intruder behaviour. Developing a model for classifying SSH scanners and intruders, based on time series. Using Source port number and timestamp as features for the model.

Timeseries Python Data Mining LogParsing

DEEP-SEC

RUFAIDA (PH.D.*), PROF. ROBERT RICCI | APRIL 21 - OCT 21

Contributed to Deep-Sec, an anomaly detection system for weblogs. Responsible for data engineering, data labelling and log parsing of the raw apache server logs to a fixed structure that can be feed to Deep-Sec.

LSTM NueralNet PyTorch Python LogParsing

AUDIO QUALITY CONTROL METHOD BASED ON ASS

PROF. MAINEJAR YADAV | MAY 2020

Developed a method which divides an audio into certain number of predefined units and as the number of units combined together increases the audio quality improves.

Python Audio Secret Sharing

A (K, N) AUDIO SECRET SHARING WITH SHARE AUTHENTICATION

PROF. MAINEJAR YADAV | JAN 2020 – APR 2020

Designed and developed a novel algorithm for Audio Secret Sharing, which divides an audio into n units possessing a minimum threshold k ; and it can be reconstructed when k units are available. The n unit independently doesn't leak any information.

Matlab Visual Cryptography Audio Secret Sharing

PROGRESSIVE VSS WITH CHEATING DETECTION

NOV 2019 - FEB 2020

Deployed Progressive Visual Cryptography (PVC) on color images. For ensuring secure transmission, deployed a cheating detection system on top of it, which was based on diagonal parity and the distribution of 0 and 1 in a black and white image.

Image Security Matlab

PEERSHARE : A SECURE SYSTEM FOR SHARING BLACK AND WHITE IMAGES

NOV 2019

Designed a Peer Share System based on one time pad that provide secure transaction for black and white images. It can be further extended for color images but as the pixel dimension increases, computation time also increases.

Matlab Andriod Java

+ TEACHING/ EXTRACURRICULAR/ INVOLVEMENT/

- Graduate Teaching Assistant (Spring 21) - Guided and graded 160 students as a Teaching Assistant for COMP1020: Programming for All 2 under Prof. David Johnson School of Computing, University of Utah.
- Secured team rank 789 in ACM-ICPC Online Qualifier Round 2018 India and qualified Facebook HackerCup 2019.
- As a senior year undergrad, mentored a team of three Junior Year students for participation in Design Hackathon 2019 India. They secured 1st position by designing "Smart Dustbin".

REFERENCES

- PROF. ROBERT RICCI, Flux Research Group, School of Computing, University of Utah, Salt Lake City, USA
EMAIL : ricci@cs.utah.edu
- PROF. MAINEJAR YADAV, Department of Computer Science and Engg., Rajkiya Engg. College Sonebhadra, UP, India
EMAIL : mkyadav@recsonbhadra.ac.in