Abdullah Al Ishtiaq
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RESEARCH INTERESTS

Systems Security, Wireless Communication Protocol Security, Natural Language Processing

EDUCATION

Pennsylvania State University — University Park, PA
Ph.D. in Computer Science and Engineering — August 2021 – Present
Advisor: Dr. Syed Rafiul Hussain

Pennsylvania State University — University Park, PA
M.S. in Computer Science and Engineering — August 2021 – May 2024
Thesis: Towards Automating the Generation of Finite State Machines from Natural Language Specifications: A Focus on Cellular Network Security
Advisor: Dr. Syed Rafiul Hussain

Bangladesh University of Engineering and Technology — Dhaka, Bangladesh
B.Sc. in Computer Science and Engineering — February 2016 – February 2021
Thesis: Towards Bridging the Gap between Natural Language and Source Codes
Supervisor: Dr. Rifat Shahriyar

PROFESSIONAL EXPERIENCE

Pennsylvania State University — University Park, PA
- Graduate Research Assistant — January 2022 – Present
- Graduate Teaching Assistant — August 2021 – December 2021

AT&T Services, Inc. — Bedminster, NJ
- Sr Associate Student Intern Technical II — June 2024 – August 2024

Dynamic Solution Innovators Limited — Dhaka, Bangladesh
- Junior Software Engineer — December 2020 – May 2021

Bangladesh University of Engineering and Technology — Dhaka, Bangladesh
- Research Assistant, Applied Machine Learning Lab — September 2019 – November 2020

HONORS AND AWARDS

- "Logic Gone Astray: A Security Analysis Framework for the Control Plane Protocols of 5G Basebands" received distinguished paper award at the 33rd USENIX Security Symposium [C5] — 2024

- Samsung Bug Bounty Reward of $2,800 for reporting moderate severity vulnerabilities in BLE [C6] — 2024

- Inducted in the Samsung Product Security Update (6 times), and Unisoc Product Security Acknowledgements (2 times) for identifying security issues in 5G Implementations [C5] — 2024

- Google Bug Bounty Reward of $3,000 for reporting a high severity vulnerability in 4G implementation — 2024

- Samsung Bug Bounty Reward of $5,700 for reporting several vulnerabilities in 5G implementation [C5]   2024
- Google Bug Bounty Reward of $14,250 for high severity vulnerabilities in 5G implementation [C5]   2024
- Inducted 3 times in the GSMA Mobile Security Research Acknowledgements (formerly known as Hall of Fame) for identifying security and privacy issues in 4G and 5G networks [C5, C4, C2]   2023-2021
- Google Bug Bounty Reward of $10,000 for reporting a high severity issue in BLE implementation [C3]   2023
- Google Bug Bounty Reward of $5,000 for reporting a high severity vulnerability in 4G protocol implementation [C2]   2022
- Samsung Bug Bounty Reward for reporting a high impact and a medium impact vulnerability in 4G protocol implementation [C2]   2022
- Inducted in the Qualcomm Product Security (3 times), Samsung Mobile Security, and MediaTek Product Security Acknowledgements for identifying high and moderate severity security issues [C2]   2021-2022

PUBLICATIONS

Conference

[C6] S. M. M. Rashid, T. Wu, K. Tu, **A. A. Ishtiaq**, R. H. Hasan, Y. Dong, O. Chowdhury, and S. R. Hussain, "State Machine Mutation-based Testing Framework for Wireless Communication Protocols," *accepted* at ACM SIGSAC Conference on Computer and Communications Security (CCS), 2024.

[C5] K. Tu, **A. A. Ishtiaq**, S. M. M. Rashid, Y. Dong, W. Wang, T. Wu, and S. R. Hussain, "Logic Gone Astray: A Security Analysis Framework for the Control Plane Protocols of 5G Basebands," in Proceedings of the 33rd USENIX Security Symposium, Philadelphia, PA, US, 2024.
Distinguished paper award

[C4] **A. A. Ishtiaq**, S. S. S. Das, S. M. M. Rashid, A. Ranjbar, K. Tu, T. Wu, Z. Song, W. Wang, M. Akon, R. Zhang, and S. R. Hussain, "Hermes: Unlocking Security Analysis of Cellular Network Protocols by Synthesizing Finite State Machines from Natural Language Specifications," in Proceedings of the 33rd USENIX Security Symposium, Philadelphia, PA, US, 2024.

[C3] I. Karim, **A. A. Ishtiaq**, S. R. Hussain, and E. Bertino, "BLEDiff: Scalable and Property-Agnostic Noncompliance Checking for BLE Implementations," in Proceedings of the 2023 IEEE Symposium on Security and Privacy (SP), San Francisco, CA, US, 2023.

[C2] S. R. Hussain, I. Karim, **A. A. Ishtiaq**, O. Chowdhury, and E. Bertino, "Noncompliance as Deviant Behavior: An Automated Black-Box Noncompliance Checker for 4G LTE Cellular Devices," in Proceedings of the 2021 ACM SIGSAC Conference on Computer and Communications Security (CCS), Virtual Event, Republic of Korea, 2021.

[C1] M. Hasan, T. Muttaqueen, **A. A. Ishtiaq**, K. S. Mehrab, M. M. A. Haque, T. Hasan, W. Ahmad, A. Iqbal, and R. Shahriyar, "CoDesc: A large code-description parallel dataset," in the Findings of the Association for Computational Linguistics: ACL-IJCNLP 2021, (Online), Association for Computational Linguistics, Aug. 2021.

Preprints

[Pr1] **A. A. Ishtiaq**, M. Hasan, M. M. A. Haque, K. S. Mehrab, T. Muttaqueen, T. Hasan, A. Iqbal, and R. Shahriyar, "BERT2Code: Can Pretrained Language Models be Leveraged for Code Search?" in arXiv:2104.08017 (2021)

Conference Briefings

[B1] K. Tu, Y. Dong, **A. A. Ishtiaq**, S. M. M. Rashid, W. Wang, T. Wu, and S. R. Hussain, "Cracking the 5G Fortress: Peering Into 5G's Vulnerability Abyss" in the Briefings of Blackhat USA 2024, Las Vegas, NV, US, 2024

Poster

[P1] **A. A. Ishtiaq**, T. B. Faruk, and M. S. Hossain, "TCP Reset Attack on Video Streaming" at 2019 International Conference on Networking, Systems and Security (NSysS), Dhaka, Bangladesh, 2019.

Reported Vulnerabilities

- **GSMA CVDs:** CVD-2023-0081, CVD-2023-0071, CVD-2021-0050
- **4G LTE vulnerabilities:** CVE-2024-32911, CVE-2021-40148, CVE-2021-30344, CVE-2021-25480, CVE-2021-25471, SVE-2021-22327, SVE-2021-22324
- **5G NR vulnerabilities:** CVE-2024-29152, CVE-2024-28818, CVE-2023-52534, CVE-2023-52533, CVE-2023-52344, CVE-2023-52343, CVE-2023-52342, CVE-2023-52341, CVE-2023-50804, CVE-2023-50803, CVE-2023-49928, CVE-2023-49927
- **BLE vulnerabilities:** CVE-2024-29155, CVE-2024-20890, CVE-2024-20889, CVE-2022-45192, CVE-2022-45191, CVE-2022-45190, CVE-2022-45189, CVE-2022-41768, CVE-2022-40480, TN1436-ST-PSIRT, HWPSIRT-2022-96208, HWPSIRT-2022-56262, HWPSIRT-2022-13244

Academic Service

- **Journal Review**
  - Applied AI Letters (AAIL)

- **Conference Review (External)**
  - The 9th International Conference on Networking, Systems and Security (NSysS)   2022

Software Artifacts

- **5GBaseChecker:** `https://github.com/SyNSec-den/5GBaseChecker`   2024
- **Hermes:** `https://github.com/SyNSec-den/hermes-spec-to-fsm`   2024
- **BLEDiff:** `https://github.com/BLEDiff/BLEDiff`   2023
- **DIKEUE:** `https://github.com/SyNSec-den/DIKEUE`   2021
- **CoDesc:** `https://github.com/csebuetnlp/CoDesc`   2021

Technical Skills

- **Language:** C, C++, Rust, Java, Python, MATLAB, Assembly
- **Web Technology:** HTML, CSS, JavaScript, Spring, React.js, Next.js
- **Tool/Framework:** nuXmv, ProVerif, libFuzzer, libAFL, srsRAN

Research Mentoring

- **Ziping Ye**, B.Sc. & M.S. Student, Pennsylvania State University   Fall 2021 – Spring 2023
  Research: Intrusion Detection, Deep Learning
- **Jill Haffner**, B.Sc. & M.S. Student, Pennsylvania State University   Fall 2022 – Spring 2023
  Research: Censorship Circumvention
- **Jishnu Chatterjee**, M.S. Student, Pennsylvania State University   Fall 2022 – Spring 2023
  Research: Censorship Circumvention

Teaching Experience

- **Guest Lecturer**, Pennsylvania State University   Fall 2022
  CMPSC 443: Introduction to Computer Security
- **Graduate Teaching Assistant**, Pennsylvania State University   Fall 2021
  CMPSC 221: Object-Oriented Programming with Web-Based Applications

Presentations

- **Hermes: Unlocking Security Analysis of Cellular Network Protocols by Synthesizing Finite State Machines from Natural Language Specifications**, Paper presentation at the 2024 USENIX Security Symposium — August 2024
- **BLEDiff: Scalable and Property-Agnostic Noncompliance Checking for BLE Implementations**, Poster presentation at the 2023 IEEE Symposium on Security and Privacy (SP) — May 2023
- **TCP Reset Attack on Video Streaming**, Poster presentation at the 6th International Conference on Networking, Systems and Security (NSysS 2019) — December 2019

References

- **Dr. Syed Rafiul Hussain**
  Assistant Professor
  Department of Computer Science and Engineering
  Pennsylvania State University
  Email: `hussain1@psu.edu`

- **Dr. Rui Zhang**
  Assistant Professor
  Department of Computer Science and Engineering
  Pennsylvania State University
  Email: `rmz5227@psu.edu`