Raj Mani Shukla

Ph.D. Candidate · University of Nevada, Reno
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Education

Ph.D. in Computer Science and Engineering — *NV, USA*
University of Nevada, Reno — *Aug. 2015 - PRESENT*
- Advisor: Dr. Shamik Sengupta

M.Tech. in Instrumentation Engineering — *India*
National Institute of Technology, Kurukshetra — *Aug. 2011 - May 2013*
- Advisor: Dr. J.K. Quamara, Dr. Pardeep Kumar (Kurukshetra University)

B.Tech. in Electronics and Communication Engineering — *India*
Bundelkhand Institute of Engineering and Technology, Jhansi — *Aug. 2007 - May 2011*

Research Interest

Cyber Security: Security Data Science, Anomaly Detection, Blockchain
Internet of Things: Plug-in Electric Vehicle Charging, Cloud and Edge Computing, Sensor Deployment
Machine Learning: Deep Neural Network, Clustering, Predictive Analytics

Professional Experience

Research Assistant, University of Nevada, Reno — *Aug.2015 - PRESENT*
- Execute research on multiple projects.
- Publish papers in relevant venues.
- Collaboration with colleagues in research projects.

Teaching Assistant, University of Nevada, Reno — *Aug.2015 - PRESENT*
- Give lab lectures, grade homeworks, programming projects, and hold office hours on “Introduction to Computing” and “Introduction to Computer Science”courses.
- Managed submission system and developing auto-grader for programming and lab assignments.
- Designed novel course content on “Cyber-security in Smart and Connected Autonomous Infrastructure”.
- Provided training to Nevada school teachers on “Hardware-based Security in Biometric Systems”.

Junior Research Fellow, Indian Institute of Technology, Kanpur — *Jun. 2014 - Jul. 2015*
- Developed Automatic Test Case Generation tool.
- Mentored two undergraduate summer interns.

Trainer, Cetpa Infotech. Pvt. Ltd. — *Jul. 2011 - May 2014*
- Trained VHDL and Verilog languages to undergraduate students.

Research Projects

Anomaly Detection for IoT
- Developing techniques that can classify anomalies arising from different sources (current project).
- Investigated an scalable outlier detector for IoT.
- Analyzed the performance of traffic prediction application under Data-falsification attack.

Plug-in Electric Vehicle (PEV) Charging

- Developed an integrated Communication, Optimization, and Prediction (COP) unit for providing charging service to en-route PEVs.
- Developed scheduling policy for providing charging service to parked vehicles.

Cloud and Edge Computing Systems

- Developed an application placement architecture for Cloud-Edge hierarchical system.
- Proposed parameter tuning based computation offloading for IoT.
- Surveyed the importance and open research issues of Edge computing, Cloud-Edge collaboration, and Software-defined networks.

Scheduling and sensor placement for IoT

- Investigated scheduling policy for smart home appliances under the scenario of dynamic electricity pricing environment.
- Developed sensor placement module to improve the coverage area for uneven event density distribution.

Improving MCDC Coverage of C Programs

- Developed modules in OCaml to improve the robustness of concolic tester and integrated it with Frama-C.
- Developed algorithm to enhance coverage of C programs in CREST.

Student Supervision

- Watson Jia, Undergraduate student, Summer 2019
- Aastha Sharma, Undergraduate student, Summer 2015
- Jayant Agarwal, Undergraduate student, Summer 2015

Leadership and Committee Services

- Elected twice as a council member representative of Graduate Students Association (GSA), UNR, served from Aug. 2017-June 2019.
- Events committee representative at GSA, UNR, from Aug. 2017-June 2019.
- Served as the Vice-President of CSE Graduate Students Club from Sep. 2016 to Aug. 2015.
- Worked as the Cultural Secretary of Indian Students Organization (ISO), UNR from Sep. 2015 to Aug. 2016.

Honors & Awards

2019	**Outstanding International Graduate student**, GSA, UNR	*NV, USA*
2016	**ISVLSI travel grant**, IEEE iNIS (awarded to 3 students)	*Gwalior, India*
2014	**Student travel grant**, Embedded System Week	*Noida, India*
2011-'13	**GATE Scholarship**, MHRD (Top 1.4% among ≈180000 students)	*NIT KKR*

Peer review

- **Journals:** IEEE Communication Magazine, IETE Technical Review, Journal of Computing, Journal of Computer Networks and Communications
- **Conferences:** IEEE International Symposium on Nanoelectronic and Information Systems, IEEE Military Communications

Skills

Programming languages: C, C++, Python, Java, OCaml
Tools: TensorFlow, Keras, MATLAB, CIL, CREST, Frama-C
Platforms: Linux, Windows, MacOS

Publications

1. **Raj Mani Shukla** and Shamik Sengupta, “Classification of Anomalies arising from Multiple Sources using Ensemble Learning ”, Current paper, under submission.

2. **Raj Mani Shukla** and Shamik Sengupta, “Scalable and Robust Outlier Detector using Hierarchical Clustering and Long Short Term Memory (LSTM) Neural Network for Internet of Things”, Under review, Elsevier Internet of Things Journal.

3. **Raj Mani Shukla** and Shamik Sengupta, “COP: An integrated Communication, Optimization, and Prediction unit for smart Plug-in Electric Vehicle Charging”, Under review, Elsevier Internet of Things Journal.

4. **Raj Mani Shukla** and Shamik Sengupta, “Towards Robust Outlier Detector for Internet of Things Applications”, Book chapter, Accepted and to appear in Modeling and Design of Secure Internet of Things, Eds. Charles A. Kamhoua, Laurent L. Njilla, Alexander Kott, Sachin S. Shetty, Wiley-IEEE Press, February 2020.

5. Watson Jia, **Raj Mani Shukla** and Shamik Sengupta, “Anomaly Detection using Supervised Learning and Multiple robust Statistical Methods ”, Accepted and to appear in special topics on Machine and Deep Learning in Cyber Security and Privacy Issues, IEEE International Conference on Machine Learning and Applications (ICMLA-2019) Boca Raton, Florida, December 2019.

6. **Raj Mani Shukla** and Shamik Sengupta, “Analysis and Detection of Outliers due to Data Falsification Attacks in Vehicular Traffic Prediction Application”, In Proceedings IEEE Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON), New York, USA, November 2018.

7. **Raj Mani Shukla**, Shamik Sengupta and Amar Nath Patra, “Software-defined Network Based Resource Allocation in Distributed Servers for Unmanned Aerial Vehicles”, In Proceedings of IEEE Annual Computing and Communication Workshop and Conference (CCWC) Las Vegas, Nevada, January 2018.

8. **Raj Mani Shukla**, Shamik Sengupta and Amar Nath Patra, “Smart Plug-in Electric Vehicle Charging to Reduce Electric Load Variation at a Parking Place”, In Proceedings of IEEE Annual Computing and Communication Workshop and Conference (CCWC). Las Vegas, Nevada, January 2018.

9. **Raj Mani Shukla**, Shamik Sengupta and Mainak Chatterjee, “Software-Defined Network and Cloud-Edge Collaboration for Smart and Connected Vehicles”, In Proceedings of International Conference on Distributed Computing and Networking (ICDCN). Varanasi, India, January 2018.

10. **Raj Mani Shukla** and Shamik Sengupta, “A Novel Software-defined Network Based Approach for Charging Station Allocation to Plugged-in Electric Vehicles”, In Proceedings of 16th IEEE International Symposium on Network Computing and Applications (NCA 2017). Boston, USA, November 2017.

11. **Raj Mani Shukla** and Arslan Munir, “An Efficient Computation Offloading Architecture for the Internet of Things (IoT) Devices”, In Proceedings of IEEE Consumer Communications & Networking Conference (CCNC), Las Vegas, Nevada, January 2017.

12. **Raj Mani Shukla**, Prasanna Kansakar, and Arslan Munir,“A Neural Network-based Appliance Scheduling Methodology for Smart Homes and Buildings with Multiple Power Sources”, In Proceedings of IEEE International Symposium on Nanoelectronic and Information Systems (iNIS), Gwalior, India, December 2016.

13. **Raj Mani Shukla** and Arslan Munir, “A Computation Offloading Scheme Leveraging Parameter Tuning for Real-time IoT Devices”, In Proceedings of IEEE International Symposium on Nanoelectronic and Information Systems (iNIS), Gwalior, India, December 2016.