

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
- Expected graduation data: May 2019

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

Experience

Graduate Research & Teaching Assistant

NV, USA

UNIVERSITY OF NEVADA, RENO

Aug. 2015 - PRESENT

- Contributed research on improving efficiency, security, and sustainability of smart and connected communities to provide better and safe living conditions.
- Gave lab lectures, graded homeworks, programming projects, and held office hours for undergraduate courses on "Introduction to Computing" and "Introduction to Computer Science".
- Designed novel course content on the topic "Cyber-security in Smart and Connected Autonomous Infrastructure".
- Provided training to Nevada school teachers on "Hardware-based Security in Biometric Systems".

Research Assistant

India

INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

Jun. 2014 - Jul. 2015

- Improved the performance of a concolic tester for automatic generation of testcases to achieve high MCDC coverage of C programs.
- Mentored two undergraduate summer interns.

Trainer

India

CETPA INFOTECH. PVT. LTD.

Jul. 2011 - May 2014

- Trained VHDL and Verilog languages to undergraduate students.

Research Interest

Cyber Security, Secure Data Science, Machine Learning, Data Analytics, and Internet of Things

Skills

Programming languages: C, C++, Python, Java, OCaml

Tools: TensorFlow, Keras, MATLAB, CIL, CREST, Frama-C

Platforms: Linux, Windows, MacOS

Research Projects

UNIVERSITY OF NEVADA, RENO

(DEVELOPED MODULES IN PYTHON)

- Exploring the impact of data falsification attack on the performance of deep learning algorithms, viz. DNN, RNN, CNN, and their combinations.
- Examining the performance of deep learning algorithms applied to traffic prediction system under adversarial attack.
- Investigating defense and mitigation strategies against adversarial attack on deep neural network algorithms.
- Developed efficient and robust anomaly detection method to mitigate the impact of data falsification on deep neural networks.

PLUG-IN ELECTRIC VEHICLE (PEV) CHARGING (DEVELOPED ALGORITHMS AND SIMULATION ATMOSPHERE IN PYTHON)

- Proposed an integrated Communication, Optimization, and Prediction (COP) unit design for providing charging service to en-route PEVs.
- Developed traffic prediction method based on the DNN to determine future congestion near PEV charging stations.
- Investigated the set-cardinality based optimization algorithm for charging station assignment to en-route PEVs based on traffic congestion and multiple parameters associated with charging and discharging of en-route PEVs.
- Researched an architecture to automate PEV charging in a parking place.
- Investigated rectangle packing based algorithm that determines PEV charging schedule and charging level at which a PEV should be charged to reduce cumulative power deviation and improve load factor performance of the parking place.

CLOUD AND EDGE COMPUTING SYSTEMS (TEST-BED DEVELOPMENT)

- Surveyed the importance and open research issues of Edge computing, Cloud-Edge collaboration, and Software-defined networks when applied to the smart and connected vehicles.
- Developed novel fog computing architecture and implemented it on testbed. Compared the computation offloading performance of proposed architecture with Amazon Web Services (AWS) cloud for different machine learning applications.
- Analyzed the effect of frequency tuning of offloadable device on computation offloading performance. Compared CPU performance of both offloading and offloadable device (performed on developed testbed).
- Developed an application placement architecture for Cloud-Edge hierarchical system based on simulated annealing to improve the computation performance of Unmanned Aerial Vehicle (UAV) system.

SMART HOMES (IMPLEMENTED SCHEDULING POLICIES BY DEVELOPING SIMULATORS IN PYTHON)

- Investigated scheduling policy for smart home appliances based on greedy and boltzmann machine methods under the scenario of dynamic electricity pricing environment to reduce average cost of a consumer.

IIT KANPUR

IMPROVING MCDC COVERAGE OF C PROGRAMS (DEVELOPED AND IMPLEMENTED TESTING TOOL IN C/C++, OCAML, AND PYTHON)

- 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.

NIT KURUKSHETRA

SENSOR PLACEMENT BASED ON EVENT DENSITY DISTRIBUTION

- Developed wireless sensor placement module to improve the coverage area based on Self-Organizing Map under the situation of uneven event density distribution.

Extracurricular Activity

- Elected twice as a council member representative of Graduate Students Association (GSA), UNR, serving since Aug. 2017.
- Events committee representative at GSA, UNR, since Aug. 2017.
- 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 , Graduate Students Association, UNR	NV, USA
2014	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-India, for qualifying GATE exam (Top 1.4% among ≈1, 80000 students)	Kurukshetra, India

Publications

The full list of publication is given in <https://raj-shukla.github.io/>