Raj Mani Shukla

PH.D. CANDIDATE · UNIVERSITY OF NEVADA, RENO

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Education

Ph.D. in Computer Science and Engineering
UNIVERSITY OF NEVADA, RENO

NV, USA
Aug. 2015 - PRESENT

- Advisor: Dr. Shamik Sengupta

M.Tech. in Instrumentation Engineering
NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA

India
Aug. 2011 - May 2013

- Advisor: Dr. J.K. Quamara, Dr. Pardeep Kumar (Kurukshetra University)

B.Tech. in Electronics and Communication Engineering
BUNDELKHAND INSTITUTE OF ENGINEERING AND TECHNOLOGY, JHANSI

India
Aug. 2007 - May 2011

Experience

Graduate Research & Teaching Assistant
UNIVERSITY OF NEVADA, RENO

NV, USA
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".

Summer Intern
M2 MEDICAL INTELLIGENCE

NV, USA
Jun. 2016 - Jul. 2016

- Created modules in python for fitting disease count data and forecast the future disease count values based on the poisson model and negative binomial model.

Research Assistant
INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

India
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
CETPA INFOTECH. PVT. LTD.

India
Jul. 2011 - May 2014

- Trained VHDL and Verilog languages to undergraduate students.

Research Interest

Machine learning, Neural network, Big data analysis, Cloud and Edge computing, Security, Software-defined networks

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

ANALYSIS, DETECTION AND MITIGATION OF DATA FALSIFICATION ATTACKS ON DEEP NEURAL NETWORK ALGORITHMS

(DEVELOPED MODULES IN PYTHON)

In-Progress

- 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

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://drive.google.com/drive/publications.