

Prabhu Janakaraj

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I am interested in connectivity, with broad spectrum of experience in Computer Networking and Virtualization. I am specializing in AI enabled Wireless Network Systems: From Edge to Core.

RESEARCH INTERESTS

- *Wireless Networking* • *Software Defined Networking* • *Edge Computing* • *Reinforcement Learning*

EDUCATION

University of North Carolina at Charlotte

Ph.D. in Computer and Information Systems
Advisor: Dr. Pu Wang

Charlotte, NC
Jan 2018 - May 2021 (Expected)

Wichita State University

Ph.D. in Electrical Engineering and Computer Science
Advisor: Dr. Pu Wang

Wichita, KS
Jan 2016 – Dec 2017

Wichita State University

M.S in Computer Networking
Advisor: Dr. Pu Wang

Wichita, KS
Dec 2015

Thesis: Towards Cloud-Based Crowd-Augmented Spectrum Mapping for Dynamic Spectrum Access

Sasurie Academy of Engineering

Affiliated to Anna University, Chennai
B.E in Electronics and Communication Engineering

Tamil Nadu, India
Dec 2011

Project: Minimizing the power consumption of Location based services on Mobile Phones using Ns-2

SKILLS

- Data plane: OpenVswitch, Intel DPDK, VMware NSX-T and NSX Edge, MAC 80211
- SDN Frameworks: Ryu Controller, ONOS, OpenDayLight
- Cloud Frameworks & Telco Knowledge: OpenStack, Kubernetes, 5G-NR, CloudRAN
- Software Languages: C, C++, Python, Java, Matlab, REST Interface
- Simulators: Mininet, Packet Tracer, GNS-3, NS-3, NS-2, MAC_80211_HWSIM
- Hardware Platforms: Gateworks, OpenWRT based routers, Ettus-USRP, Spectrum Analyzer, Hack-RF
- Machine Learning Frameworks: Tensorflow, Keras, Pytorch, PySyft
- Monitoring Frameworks: Prometheus, Grafana, Telegraf
- Automation: Puppet, Ansible
- Virtualization: KVM, Docker, LXC, Qemu

RESEARCH EXPERIENCE

Graduate Research Assistant (with Dr. Pu Wang)

Jan-2018 to Present

Wireless Networking and Sensing Lab,

University of North Carolina at Charlotte, Charlotte, North Carolina

- **Starlings:** This work involves deploying advanced software defined wireless mesh networking testbed that can provide intelligent and autonomous wireless edge computing platform for IoT, Image recognition, Virtual and Augmentation reality devices
- **STAR:** Realize simultaneous tracking and recognition of human targets using millimeter wave radar and deep learning
- **OpenWFL:** Analyze the bottleneck of federated learning convergence time and accuracy over multihop wireless network. Improve the model performance by resolving the routing path bottleneck through reinforcement learning.

Graduate Research Assistant (with Dr. Pu Wang)

Aug-2014 to Dec 2017

Software Defined Radio and Networking Laboratory,

Wichita State University, Wichita, Kansas

- **Softmesh:** This work involves deploying software defined wireless mesh networking testbed. This work also demanded skills with porting some of the custom packages for embedded operating system and deep knowledge in **OpenVswitch and wireless Mac80211**
- **EM-Cloud:** This work involves investigating cloud computing platforms and create a testbed to enhance our research in the area of Wireless Software Defined Mesh Network with potential application for Internet of Things. Apply machine learning techniques to perform smarter network traffic routing and load balancing
- **C-RAN:** Implementation of physical testbed with USRP's as remote radio head and baseband processing using centralized cloud platform, analyze the performance measures for further study in this area
- **MI based underwater Communication:** The work involves enhancing our custom designed Magnetic Induction Based antenna operating in low frequency to improve its achievable bandwidth and verify its operation in environmental test. The verification test cases are built using the API of GNU Radio with C++ and Python, in use with BladeRF hardware
- **TVWS Spectrum Mapping:** We developed a cloud-based and crowd-augmented spectrum mapping system by combining individual spectrum measurements obtained with mobile devices at random locations. And then we performed optimization to obtain the optimal location for gaining high resolution high accurate spectrum mapping with minimal cost for sampling

Graduate Research Assistant (with Dr. Pingfeng Wang)

Feb-2014 to Aug-2014

Reliability Engineering and Automation Laboratory

Wichita State University, Wichita, Kansas

- Created a web front-end for a mobile robot equipped with thermal camera's for detecting dead chicken's in chicken farm
- Transformed the MATLAB algorithm into JAVA for complex image processing

TEACHING EXPERIENCE

Instructor

Aug-2019 to May 2020

*Department of Computer Science,
University of North Carolina at Charlotte, Charlotte, North Carolina*

- Instructor of the record for graduate level course, ITCS 6166 Computer Communications and Networking
- Taught fundamentals of Networking, SDN and Wireless networks
- Designed course materials with heavy focus on SDN concepts
- Mentored students to involve in SDN research

Graduate Teaching Assistant

Jan-2015 to Dec-2015

*Electrical Engineering and Computer Science Department,
Wichita State University, Wichita, Kansas*

- Designed Laboratory experiments for CS - 898AF Cognitive Radio Networking class to give hands-on experience for students with Software Defined Radio hardware's
- Demonstrated OpenBTS functionality using USRP
- Gave a one-day lecture on GNU Radio and USRP in CS – 898 AF class
- Mentored students to complete their hardware implementation-based class project for Cognitive Radio Networking using USRP
- Organized meetings with group of students in both the classes to clarify their issues in project topics
- Mentored students in their class project for CS – 835 Ad-Hoc and Sensor Networks
- Supervised Lab session for EE 492 – Electronics Circuits II
- Graded lab report submission

INDUSTRY EXPERIENCE

VMware - Intern

May 2020 to Present

BU: Telco NFV Solutions

- Validate VMware Telco solutions comprising of BMEdge, NSX-T and Intel DPDK architecture for throughput and delay requirements
- Analyze the benefits of flow processing offload from Intel and Mellanox NIC's
- Validate Lcore scalability test against RFC 2544 requirements using Spirent Test Center

Freelance Consultant

Feb-2012 to Aug-2013

- Maintained VMware vSphere servers (5, 6.x) and ensured uptime by regular tune-ups based on demand
- Handling projects related to Linux Server deployments and Network Auditing
- Worked with firewall deployment associated with Mikrotik, Endian and PfSense
- Worked in implementation of RADIUS, TACAS and LDAP authentication solution for small office
- Implemented site to site VPN using Open VPN and Cisco VPN

Corporate Consultant

Mazenet Solutions, Coimbatore, Tamil Nadu, India

Jun-2011 to Jan-2012

- Handled training sessions for newly recruited candidates as an external vendor
- Training session focused on Unix scripting and basic networking technologies
- Evaluated candidate's performance on a day to day basis after training session

GLOBAL CERTIFICATIONS

- Certified as a **CISCO CERTIFIED NETWORK ASSOCIATE** in 2010 (Expired)
Certificate No: CSCO11710332
- Certified as a **REDHAT CERTIFIED ENGINEER (RHCE)** in 2009 (Expired)
Certificate No: 805009861342269
- Attended workshop on "**Network Security**" at IIT-Madras, India

PROFESSIONAL SERVICE

- Reviewer for IEEE VTC 2015, IEEE VTC 2016 and IEEE ICCCN 2016, IEEE WCNC 2017, IEEE IEEE Globecom 2018, IEEE ICCCN 2018, IEEE INFOCOM 2019, NANOCOMNET 2018 Journal, Journal of Distributed Sensor Networks 2018, IEEE TWC 2020, Elsevier AdHoc Networks 2020, Elsevier COMNET 2020
- Graduate Mentor - NSF REU Summer 2018
- IEEE Student Member

PUBLICATIONS

- P. Pinyarash, **P. Janakaraj**, M. Lee and P. Wang, "FedAir: Towards Multi-hop Federated Learning Over-the-Air," – IEEE SPAWC 2020
- **P. Janakaraj**, P. Pinyarash, M. Lee and P. Wang, "Towards In-Band Telemetry for Self-Driving Wireless Networks," – Accepted for INFOCOM WORKSHOP, 2020
- A. Rabanimotlagh, **P. Janakaraj** and P. Wang, "Optimal Crowd-Augmented Spectrum Mapping via an Iterative Bayesian Decision Framework," – *Ad Hoc Networks (Elsevier) Journal*
- **P. Janakaraj**, K. Jakkala, A. Bhuyan, Z. Sun, P. Wang and M. Lee, "STAR: Simultaneous Tracking and Recognition Through Millimeter Waves and Deep Learning," – WMNC' 2019
- **P. Janakaraj**, P. Wang and Z. Chen, "Towards Cloud-based Crowd-augmented Spectrum Mapping for Dynamic Spectrum Access," – *ICCCN' 2016*