JAYKUMAR SHETH

www.jsheth.com | San Jose, CA | 415-409-8494
www.linkedin.com/in/jaysheth2090 | www.github.com/Jay-Sheth-SCU
www.researchgate.net/profile/Jaykumar_Sheth | jsheth2090@gmail.com

BACKGROUND:

1. Comprehensive understanding of **Linux networking stack, SDN, network routing and switching, security issues, flow control, congestion control, QoS, and network performance tuning**
2. Specialized knowledge of **Internet of Things (IoT) systems, WiFi protocols (802.11n/ac/ax), cellular protocols (GSM, LTE, 5G), monitoring, diagnosis, prognostics, and statistical learning**
3. Experience with **software applications, kernel modules, firmware, and device driver development**
4. Exceptional track record of publishing in top-tier journals and conferences with **cumulative impact factor of 35**

EDUCATION:

1. **Ph.D. in Computer Science and Engineering, Advisor: Dr. Behnam Dezfouli** **2017 – Pursuing**
   - Santa Clara University, California, U.S.A.
2. **M.S in Computer Science and Engineering** **2013 – 2015**
   - Santa Clara University, California, U.S.A.
3. **B.E in Computer Science** **2009 – 2013**
   - Gujarat Technological University, Gujarat, India

RELEVANT EXPERIENCE:

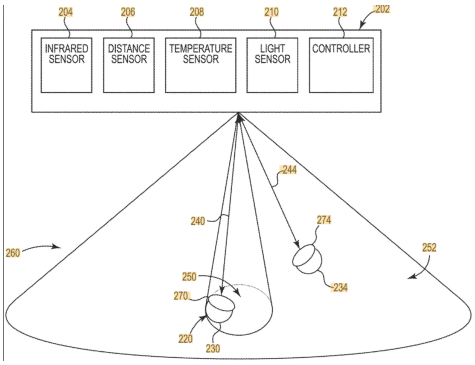
1. **Teaching Assistant, Santa Clara University, CA** **September 2017 – Present**
   - COEN 79 - Object-Oriented Programming and Advanced Data Structures
   - COEN 146 – Computer Networks
   - COEN 44 – Applied Programming in C
   - COEN 177 – Operating Systems
   - COEN 45 – Applied Programming in MATLAB
2. **Software Engineer, Immersive Home, Hewlett-Packard, Palo Alto, CA** **August 2015 – July 2016**
   - Developed firmware and software applications and APIs for sensors such as far-field audio microphone, proximity sensor, temperature sensor, etc.
   - Actualized a patent based on proximity sensors, Internet of Things and AI.
3. **Research Intern, CTO Office, Hewlett-Packard, Palo Alto, CA** **July 2014 – June 2015**
   - Worked directly with Director for Computer Vision and Imaging and the CTO office to undergo a systematic investigation to provide algorithmic recommendations for the impending technologies.
   - Evaluated and benchmarked several 3D scanning and printing technologies extensively to gain a comprehensive knowledge about the upcoming technologies and its software/hardware interfaces.
4. **Research Assistant, Frugal Innovation Hub, Santa Clara University, CA** **January 2014 – July 2014**
   - Built web and mobile applications with a purpose of educating high school students about the fundamental problems and remedies associated with homelessness. The app was presented at the Tech Museum of Innovation-San Jose.
5. **Software Engineer Intern, Tech Integrity Services, Rajkot, India** **December 2012 – June 2013**
   - Developed a connected-home application undergoing the complete software development life cycle experience including requirement analysis, design, coding, testing, and technical documentation.
6. **Software QA Intern, Softpal Technologies, Hyderabad, India** **June 2012-August 2012**
   - Test case documentation, execution; defect management and error reporting utilizing test management tool and automated testing with Selenium, Robot, and PyTest.

SKILLS:

- **Programming Languages**: C, C++, JAVA, MATLAB, Python, Go, Bash
- **Networking:**
  - **Wireless Protocols**: 802.11 n/ac/ax, 802.15.4, LTE, UMTS, Satellite Broadband
  - **Wireless Technologies and Software**: hostapd, ath9k, ath10k, Openwrt, WPA Supplicant
  - **Networking Concepts**: L2, L3, L4, IPv4, IPv6, Switching, Routing, Iptables, ipsec, Firewall Management, NAT, ARP, DHCP
  - **SDN**: OpenDaylight, Open vSwitch
  - **Monitoring Tools and Protocols**: SNMP, Wireshark, Ethereal, NetConf
- **Performance Engineering Tools**: eBPF, trace, kprobe, perf
- **Machine Learning Tools and Concepts:**
  - **Statistical modeling:** Regression, classification, and reinforcement learning
  - **Deep Neural Networks**: CNN, RNN/LSTM, Transformers
  - **Libraries**: Keras. TensorFlow. Scikit-Learn
- **Operating System**:
  - **General Purpose OS:** Linux. MacOS, Windows, Android
  - **RTOS**: ThreadX, FreeRTOS, RTLinux
  - **Network OS**: DD-WRT, Open-WRT
- **Cloud and Virtualization Technologies:** AWS, Docker, Kubernetes, VMWare, VirtualBox
- **Network Simulation Tools:** GNS3, OMNET++

PATENT:

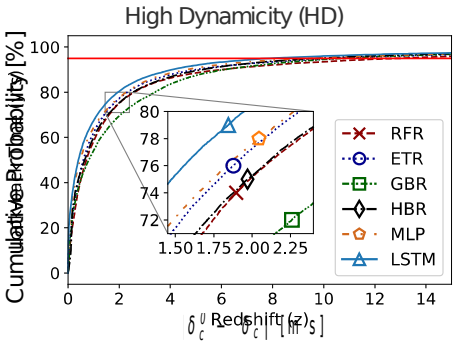
1. **Distance Determination (Granted, US16/095,692, EP3433571A4):**



The system encompasses the objective of building a relatively low cost, accurate, high range and large field of view proximity sensor which can be used to track the motion of people, and predict the behavior through artificial intelligence. The design involved calibrating four sensors to complement each other, and algorithms to make the system intelligent with time through reinforcement learning

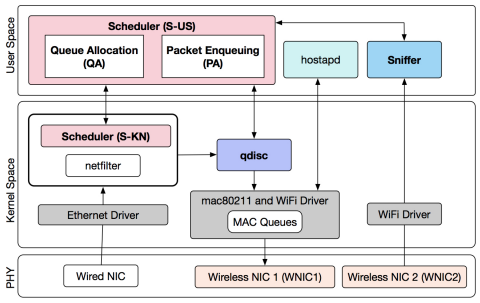
PUBLICATIONS:

1. **EAPS: Edge-Assisted Predictive Sleep Scheduling for 802.11 IoT Stations** (**J Sheth**, C Miremadi, A Dezfouli, B Dezfouli)**,** Journal: **IEEE Systems Journal,** Impact Factor: **5.2** – Under Review**:**



In this paper, we present a new mechanism---edge-assisted predictive sleep scheduling (EAPS)---to adjust the sleep duration of stations while they expect downlink packets. We first implement a Linux-based access point that enables us to collect parameters affecting communication latency. We then use multiple machine learning algorithms to predict downlink packet delivery.

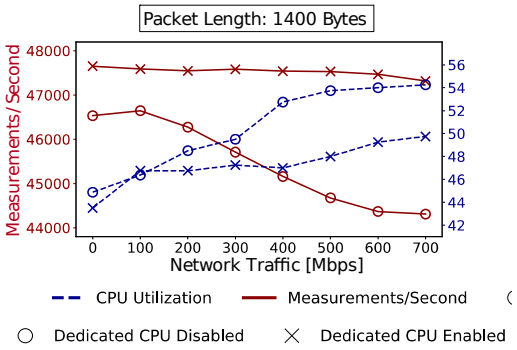
2. **Enhancing the Energy-Efficiency and Timeliness of IoT Communication in WiFi Networks** (**J Sheth,** B Dezfouli)**,** Journal: **IEEE Internet of Things Journal**, Impact Factor: **11.75** – Published**:**



Implementation architecture of Wiotap on a Linux AP.

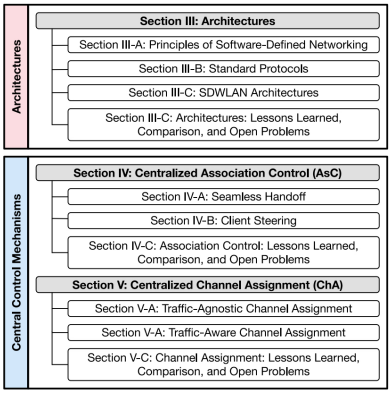
This paper presents Wiotap, an enhanced WiFi access point that implements a downlink packet scheduling mechanism. In addition to assigning higher priority to IoT traffic compared to regular traffic, the scheduling algorithm computes per-packet priorities to arbitrate the contention between the transmission of IoT packets. This algorithm employs a least-laxity first scheme that assigns priorities based on the remaining wake-up time of the destination stations.

3. **MonFi: A Tool for High-Rate, Efficient, and Programmable Monitoring of WiFi Devices** (**J Sheth**, B Dezfouli)**,** Conference: **2021 IEEE WCNC** – Accepted**:**



MonFi, a publicly-available, open-source tool for high-rate, efficient, and programmable monitoring of the WiFi communication stack. With this tool, regular user-space applications can specify their required measurement parameters, monitoring rate, and measurement collection method as event-based, polling-based, or a hybrid of both. We also propose methods to ensure deterministic sampling rate regardless of the processor load caused by user-space applications or packet switching.

4. **A Review of Software-Defined WLANs: Architectures and Central Control Mechanisms** (B Dezfouli, V Esmaeelzadeh, **J Sheth**, M Radi), Journal: **IEEE Communications Survey and Tutorials,** Impact Factor: **20.23** – Published**:**



This paper incorporates a comprehensive overview of software defined wireless local area network architectures and network control mechanisms, and provide a qualitative comparison in terms of features such programmability and virtualization techniques. It includes information about the metrics utilized and problem formulation techniques proposed by each of the mechanism.

ACHIEVEMENTS:

- Outstanding Performance Award, Immersive Home Department, HP Inc.
- Winner of “Logic Artist” at a national level college competition - “Spectrum”, at A.D. Patel Institute of Technology.
- Hack for Humanity, 2019: “SwingBeats” project was the winner of the Hack for Humanity's creativity theme in Winter 2019 and received a $500 gift. This, along with another $2,500 donation, allowed for the purchase of the best AR equipment which will further SwingBeats research

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ACADEMIC SERVICE:

- **TPC member**:
  - IEEE International Workshop on Mobile Fog Computing for IoT Networks (MOBIFOG), Co-located with IEEE WCNC 2020, Seoul, South Korea, April 2020.
  - EAI Edge, Fog, and Cloud Computing for the Internet of Things (EFIOT), Co-located with MobiQuitous 2019, Houston, USA November, 2019
  - Posters and PhD Track Chair, International Conference on Intelligent Technologies for Interactive Entertainment, Santa Clara, 2020

- **Reviewer**
  - IEEE Communications Letters
  - IEEE Global Humanitarian Technology Conference (GHTC)
  - IEEE Wireless Communications and Networking Conference (WCNC)