Nabeel Nasir

University of Virginia
151 Engineer's Way
Charlottesville, VA 22903

Tel: +1 434.466.8219
cs.virginia.edu/~nn5rh
nabeeln@virginia.edu

Education

2018 -	**University of Virginia**, Charlottesville, VA Ph. D. Candidate in Computer Science, Adviser: Prof. Bradford Campbell Thesis: Untangling the Cloud from Edge Computing for IoT	GPA: 3.68 / 4.0
2012 - 2014	**Indian Institute of Technology Bombay**, India M. Tech. in Computer Science, Adviser: Prof. Krithi Ramamritham Thesis: Smart Door: Occupancy Prediction and its Applications	GPA: 9.46 / 10
2007 - 2011	**Cochin University of Science & Technology**, India B. Tech. in Computer Science	GPA: 76.30 / 100.0

Research Experience

University of Virginia — Charlottesville, VA
Graduate Research Assistant — 2018 - present

- Goal: To enable Edge Computing for IoT which is cost-effective, scalable, general-purpose, and privacy-aware without the drawbacks of cloud dependency.
- Uses a distributed network of heterogeneous edge gateways to execute applications instead of using edge servers.
- Provides an infrastructure on the edge allowing user devices (computers, smartphones, robots, AR headsets etc.) to interact with the environment with context-awareness.
- Aims to empower users in shared spaces to control which applications can use their IoT data through privacy policies.

Indian Institute of Technology, Bombay — Mumbai, India
Graduate Student — 2012 - 2014

- Developed an occupancy detection system by fusing cheap and ubiquitous sensors to predict identity of occupants in a room.
- Studied impact of occupancy data on load forecasting, and reduced electricity usage by identifying anomalous devices.
- Funded by the Department of Electronics and Information Technology (DeITY), Government of India, and TCS Research, and resulted in two publications.

Work Experience

EnLite Research — Mumbai, India
Software Developer E3 — 2017 - 2018

- Designed a system to reduce HVAC energy consumption and improve user comfort in offices.
- Developed an anomaly detection daemon to identify cooling inefficiencies and sensing issues.

Adobe Systems — Bangalore, India
Member of Technical Staff II — 2014 - 2016

- Worked as an Android developer for the Lightroom and Photoshop Mix mobile apps.
- Developed key modules including image sharing, advanced editing palette, and stylus support.

Publications

[1] Kartik Palani, **Nabeel Nasir** et al. Putting Smart Meters to Work: Beyond the Usual
5th ACM International Conference on Future Energy Systems. ACM e-Energy 2014.

[2] **Nabeel Nasir**, et al. Fusing Sensors for Occupancy Sensing in Smart Buildings
11th International Conference on Distributed Computing and Internet Technology, ICDCIT 2015.

[3] **Nabeel Nasir** et al. An Architecture for Edge Computing over Underutilized Gateways: Demo Abstract
17th ACM Conference on Embedded Networked Sensor Systems. ACM SenSys 2019.

[4] **Nabeel Nasir** et al. Enabling Elasticity on the Edge using Heterogeneous Gateways: Poster Abstract
19th ACM Conference on Embedded Networked Sensor Systems. ACM SenSys 2021.

[5] **Nabeel Nasir**. Untangling the Cloud from Edge Computing for IoT: PhD Forum Abstract Best Presentation Award

19th ACM Conference on Embedded Networked Sensor Systems. ACM SenSys 2021.

[6] **Nabeel Nasir** et al. Leveraging IoT Gateways for a Decentralized Edge Computing Platform (to be submitted, Jan '21) *7th ACM/IEEE Symposium on Edge Computing. ACM/IEEE SEC 2022.*

Selected Projects

NexusEdge: Distributed Middleware for Edge Gateways [code] 2021

- Allows resource constrained IoT gateways (Raspberry Pi, NVIDIA Jetson etc.) to cooperate together and execute applications without cloud support.
- Key features: Bluetooth Low Energy (BLE) auto-discovery for scaling, supports IoT device handling modules, provides device data streams over MQTT.

Temi Whiteboard Snap [code] 2021

- Allows users of our lab to remotely request the Temi Robot to navigate to a whiteboard and send a snap over Slack.
- Utilized Slack slash commands, AWS API Gateway, AWS Lambda, MQTT, and an Android app.

Hoos Nearby: Enabling User Interaction for NexusEdge Gateways [code] 2020

- Web Application enabling users to discover nearby NexusEdge gateways, deploy Node.js IoT applications and manage them.
- Supports application log streaming on MQTT over WebSockets, BLE scanning, etc.

Smart Doodle: Pattern Recognition on Android Smart Watch [code] 2018

- Developed a smart watch application to map user defined doodles on the watchface to watch actions (open app, change settings etc.) or smart home interactions.
- Used TensorFlow Lite to run a classifier locally on a constrained watch hardware.

Navigation System using Reinforcement Learning [code] 2018

- Used reinforcement learning to train an agent to navigate in a simulated environment with obstacles.
- Used QLearning for reinforcement learning and Deepmind lab for the simulated game arena.

Pocket Library: Book Organizer for Android 2017

- Developed an Android application for easy book cataloging.
- Handled all aspects of the work: development, testing, UI design, release engineering, content writing, App Store Optimization, and promotion.

Honors and Awards

- **Best Presentation Award** at the **ACM SenSys/BuildSys PhD Forum**, 2021.
- Awarded the **NSF Student Travel Grant** for attending **ACM SenSys**, 2019.
- Awarded the **University of Virginia Computer Science Fellowship**, 2019.
- **Spot Award** at Adobe for the work on the advanced editing palette feature in Lightroom Android, 2015.
- **2nd Place** in Hack Day, annual hackathon of the Digital Imaging group at Adobe, 2015.
- **Ranked 81st** among 156,780 candidates in the **Graduate Aptitude Test in Engineering (GATE), India**, 2012.

Teaching Experience

2020 -	**University of Virginia**, *Graduate Teaching Assistant* - CS 4457: Computer Networks - CS 4414: Operating Systems - CS 4740: Cloud Computing
2012 - 2014	**Indian Institute of Technology Bombay**, *Graduate Teaching Assistant* - CS 308: Embedded Systems Lab (Lead TA) - CS 684: Embedded Systems - CS 254: Digital Logic Design Lab - CS 101: Computer Programming Lab

Skills

- **Programming**: Java, Node.js, Python, Shell Scripting, Scala, C/C++/C#
- **Databases**: InfluxDB, MongoDB, SQLite, MySQL
- **Machine Learning**: TensorFlow, TensorFlow Lite, Scikit-learn
- **Embedded**: Arduino, Raspberry Pi