

Girish Narayanswamy

Health Sensing || ML & AI || Signal Processing || Embedded Systems

girishvn@uw.edu || 720-938-0208 || linkedin.com/in/gnarayanswamy

Girish is a first year PhD Student in the **Ubiquitous Computing Lab** at the University of Washington. He is advised by Professor **Shwetak Patel**. Girish's interests lie at the intersection of **learning (ML/AI)**, **signal processing**, and **embedded systems** with an emphasis in **Mobile Health Sensing** and **Learning for Low-Resource Platforms**.

Education

University of Washington Seattle

PhD Electrical and Computer Engineering (ECE/CSE)

Advised by Shwetak Patel || UbiComp Lab

Sept 2020 - Present

GPA: 4.00

University of Colorado Boulder

BS Electrical & Computer Engineering (Magna Cum Laude & Eng. Honors)

Minor Computer Science

Aug 2014 - May 2019

GPA: 3.86

Research

OsteoApp *Project Lead*

Nov 2020 - Present

- Mobile app used to collect impulse response of tibia via accelerometer
- Natural frequency of bone changes with bone-mass-density.
- Correlated to bone-mass-density, DEXA, fracture risk, osteoporosis/osteopenia risk

Mobile Compensatory Reserve Index Sensing *Project Lead*

Nov 2020 - Present

- Mobile app-based remote photoplethysmography (rPPG) used to derive CRI
- Applications include hypovolemic shock detection, dehydration/exercises monitoring

Mobile Stroke Screening *Signal Processing Support*

Aug 2020 - Present

- Mobile app-based remote photoplethysmography (rPPG)
- rPPG mapped in facial angiosomes to detect carotid atheroembolic stroke risk
- Phase delay in pulse wave between angiosomes may be due to carotid stenosis

Work Experience

UW Seattle: Computer Vision - Traditional & Deep Methods *Teaching Assistant*

Sept. 2020 - Dec. 2020

- Developed lab material, held office hours, graded homework, labs, and projects
- Python, OpenCV, PyTorch, Image Processing, Deep Learning

CU Boulder: Hearing Research Lab *Research Assistant*

Aug 2019 - May 2020

- Developed tools and GUIs for use in audiology clinical studies
- Explored use of AI to predicting audio quality and perception (HASQI/HASPI)

Qualcomm Technologies *R&D Software Intern*

June 2018 - Sept. 2018

- Member of the 11ax Wifi PHY modeling team
- Built framework to package, store, and visualize simulation results

CU Boulder: Correll Lab *Research Assistant*

Oct. 2016 - June. 2017

- UROP grant to color characterize novel force-proximity sensor used for a robotic claw
- Assisted in integration of the sensor onto a prosthetic hook

CU Boulder: Applications of Embedded Systems <i>Teaching Assistant</i>	Aug. 2016 - Dec. 2016
<ul style="list-style-type: none"> • Developed lab material, held office hours, graded homework, labs, projects, and tests • Embedded C, TI MSP432 ARM Cortex M4 mcu, Software/Hardware Debug 	
Medtronic <i>R&D Software Intern</i>	May 2016 - Aug. 2016
<ul style="list-style-type: none"> • Member of the surgical device R&D software team • Created audio feedback drivers for Ultrasonic Tissue Dissector 	

Projects

Disease Spread in Small Population Networks	Apr. 2019 - May 2019
<ul style="list-style-type: none"> • Graph analysis to test similarity of sampled-co-presence and face-to-face networks • Applied to disease spread and vaccination in small population graphs (100-500 nodes) 	
Melanoma Detection Application	Apr. 2019 - May 2019
<ul style="list-style-type: none"> • Mobile application to detect melanoma given a skin-growth image • 80% accuracy using decision tree model. Improved to 90% with use of shallow NN 	
Configurable Human Interface Device (Senior Design Project)	Aug. 2017 - May 2018
<ul style="list-style-type: none"> • Configurable controller intended to improve disability technology access • Touchscreen, buttons, joystick, Bluetooth, ARM m4 MCU, IMU • PCB design, firmware and application development, rapid prototyping, component selection, requirement setting 	
Audio Genre Classifier	Apr. 2017 - May 2017
<ul style="list-style-type: none"> • Statistically analyzed parameters derived from tracks using signal processing • Classification was improved by using a pre-built Matlab support vector machine 	

Selected Skills and Coursework

Programming Skills: Python, C, C++, MATLAB, Java (working knowledge), Unix (working knowledge), Linux, ARM microcontrollers, Firmware development, UART, I2C, SPI, GitHub, Debugging, ML/AI (working knowledge)

Electrical Eng. Skills PCB Design, SMT Soldering, Hardware Debugging, Oscilloscope, Function Generator, Logic Analyzer, Multimeter

Programming Courses Principles of Embedded Software (grad), Artificial Intelligence (grad), Machine Learning (grad), High Dimensional Dataset Analysis (grad), Data Structures, Algorithms, Operating Systems, C Programming, Computer Organization, Applications of Embedded Systems

Electrical Eng. Courses Digital Signal Processing (grad), PCB Design (grad), Linear Systems, Circuits as Systems, Digital Logic, Electromagnetic Fields and Waves

Mathematics Courses Calc. I/II/III, Differential Eqs., Linear Algebra, Discrete Math, Probability, Matrix Methods

Honors and Extracurriculars

Engineering Honors Program: Selective residence program based of applicant's academics/extracurriculars

Outstanding Colleague Award: Presented by department of Electrical and Computer Engineering at CU Boulder

UROP Individual Grant: Grant to research and color characterize force-proximity sensor for smart prosthetics

CU Dean's List: All semesters (Fall 2014 - Spring 2019)

Scholarships: Intel Merit, BOLD, Engineering Differential, Sewall Esteemed

University of Colorado Mamabird: One of the nation's top 5 collegiate Ultimate Frisbee teams

Shotokan Karate: Shodan (first degree black belt), Senpai (instructor) at International Martial Arts Association

Fairview HS Ultimate Frisbee Coach: Head coached 2019 - 2020 Fairview HS Ultimate Frisbee team

Interests: Photography (ig: gvn_photos), Hiking, Camping, Skiing, Board/Card Games, Reading