Varun Viswanath

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Education

2019 - Now **University of California, San Diego** — La Jolla, CA
Ph.D. in Electrical and Computer Engineering, Machine Learning and Data Science
Advisor: Edward Wang

2015 - 2019 **University of Washington** — Seattle, WA
B.S. in Computer Science and Engineering, Paul G. Allen School of Computer Science and Engineering
Senior Research Thesis: Using Confidence in Smartphone Spirometry
Advisor: Shwetak Patel

Honors, Accolades, Services

Jul 2018 **Session Chair,** Session: Deep Learning Imaging II, EMBC '18 — Honolulu, HI

Jan - Jun 2019 **Instructor,** CSE 590u: Ubicomp Paper Reading Research Seminar — Seattle, WA

Peer Reviewed Journal Publications

Jul 2018 **SpiroConfidence: Determining the Validity of Smartphone Spirometry using Machine Learning** [PDF]
Varun Viswanath, Jake Garrison, Shwetak Patel
EMBC 2018

Research

Sep 2020 - Now **Tempredict: Predicting COVID-19 from Continuous Physiological Data** — Smarr Lab, UCSD
Inventing methods to analyze the physiological signals of temperature and heart rate passively collected every minute over the course of several months to identify the gradual physiological trend of contracting the COVID-19 virus.

Mar - Sep 2020 **SpO2: Tracking Blood Oxygen Levels with a Mobile Phone** — UDComp Lab, UCSD
Studied methods of tracking blood oxygen concentration from PPG signals collected with smartphones on subjects with blood oxygen concentrations ranging from 70-100%. Achieved 3% MAE using deep learning models.

Jun - Sep 2020 **Spectrackles: Tracking Facial Expressions with a Spectacle-mounted Camera** — UDComp Lab, UCSD
Trained a VGG architecture using transfer learning to predict facial movements from extreme perspective-shifted images with partial views of a user's face. Our model accurately identified motions that indirectly implied expressions.

2016 - 2019 **SpiroSmart** — UbiComp Lab, UW
Improved upon prior work predicting lung function from smartphone spirometry audio clips by using various deep learning architectures to augment the prior work's manually designed DSP features. Designed a separate model to validate smartphone spirometry audio, achieving 98/88 PR and augmenting accessibility of smartphone spirometry.

Relevant Coursework

UCSD Statistical Learning 1, Probability and Statistics, Neural Networks/Pattern Recognition, Mobile Health Sensing

UW Deep Learning, Natural Language Processing, Artificial Intelligence, Computer Vision, Machine Learning

Skills

Java | Python | Swift | JavaScript | C/C++ | SQL | R | Keras | PyTorch | FastAI | Arduino | Bash | Vim | Git | Raspberry Pi | Google Cloud Platform

Internship Experience

Jun - Sep 2018 **Uber Elevate Intern** — San Francisco, CA
Explored a range of novel algorithms and heuristics for finding high optimality paths for building aircraft flight plans. Showed our algorithm could find high quality solutions in 1 min while current brute force solution took 30 min.

. Jun - Sep 2017 **Zealery Research Intern** — Boston, MA
Researched models to transfer clothing worn in one image onto the body of a person in another image.
Built model that used Poison Image Editing to segment clothes and Image Style Transfer to transfer it to new image.

Poster Presentations

Oct 2018 **UW Industry Affiliates Poster Session,** SpiroConfidence — Seattle, WA
Achieved 98% precision and 88% recall on binary classification of spirometry audio using a Gated-CRNN.

Dec 2018 **CSE 590g1 Intro to Deep Learning,** Pneumonia Classifier Using Darknet Architecture — Seattle, WA
Achieved 83% accuracy on Stanford dataset of chest X-rays of normal and pneumonia patients using Darknet model.

Dec 2018 **CSE 455 Computer Vision,** Puppy.CV: Classifying Puppy Breed — Seattle, WA
Achieved 85% accuracy on 6 classes of Stanford Dog Dataset using 5-layer CNN.

Software Development Projects

March - April 2020 **COVID Dashboard** — Earth 2.0, UCSD
Helped to design and build a ReactJS + NodeJS citizen science webservice to deliver and collect useful COVID data

Jan - March 2020 **Facial Tracking Glasses** — Ubiquitous Data Computing Lab, UCSD
Constructed device that uses quad-cam Raspberry Pi setup to record wearer's facial expressions through daily living.

Jun - Aug 2017 **FreshAir** — UbiComp Lab, UW
Built Swift iOS app, asynchronous server with Tornado, and Docker system for a server and database, as well as a prediction algorithm that performs real time SpiroSmart tests, both for use in a 2-year international clinical study.

Jun – Sep 2017 **SpiroSound** — UbiComp Lab, UW
Ran study and analyzed data to identify polynomial relationship between audio and human breath air flow.
Built visual feedback for study participant. Built data pipeline and data processing functions in python.

Aug 2017 **PupilScreen** — UbiComp Lab, UW
Built prototype app in Swift and tornado server for collecting and uploading video data.

Extra-Curricular

2015 - 2019 **UW Chess Club,** President
Organized weekly meetings and 4 tournaments with Amazon, Microsoft, and Allen Institute of Artificial Intelligence. Grew club size from just 1 member to 60-70 members. Built website and social media platforms. [Link]

2016 - 2018 **CodeDay Seattle Mentorship Team,** Hackathon Mentor for iOS and Web programming

2015 - 2017 **Human Powered Submarine,** Embedded Systems Architect, Web Developer

Hackathons

Oct 2018	DubHacks, University of Washington	Seattle, WA
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Apr 2017	DefHacks, Microsoft	Redmond, WA
Feb 2016	ZooHackathon, Woodland Park Zoo	Seattle, WA
Oct 2016	DubHacks, University of Washington	Seattle, WA
Oct 2016	FishHackathon, Impact Hub	Seattle, WA
Oct 2015	DubHacks, University of Washington	Seattle, WA
May 2015	LAHacks, University of California, Los Angeles	Los Angeles, CA