Ashwin Sakhare

Data scientist working at the intersection of neuroscience, medicine, and engineering

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Education

University of Southern California — Los Angeles, CA
Doctor of Philosophy in Biomedical Engineering — Aug. 2015 – April 2021

University of Southern California — Los Angeles, CA
Master of Science in Biomedical Engineering — Aug. 2015 – May 2017

North Carolina State University — Raleigh, NC
Bachelor of Science in Biomedical Engineering — Aug. 2005 – Dec. 2009

Relevant Coursework

- Applied Statistical Data Analysis – application of linear regression models to real-world data
- Machine Learning for Data Science –regression, decision trees, dimensionality reduction, clustering, regularization, hidden Markov models, neural networks

Technical Skills

- **Programming Languages:** C#, Python
- **Statistical Software:** SPSS, SAS
- **Python Packages**: NumPy, Torch, PyQt5, Pandas, Scikit-learn
- **Game Engines**: Unity3D
- **Version Control:** Perforce, Git
- **CAD Software:** SolidWorks

Academic Projects

Deep learning in MRI — Feb. 2020 – Dec. 2020

- Developed a pre-processing pipeline to extract, reshape, and label meningioma tumor slices from 3D volumetric images acquired using multiple MRI sequences.
- Developed a pipeline to train a CNN model for multi-class classification of meningioma tumor consistency.

MRI neuroimaging segmentation software — April 2020 – Oct. 2020

- Developed a desktop application that allows scientists and clinicians to quickly analyze cerebral flow dynamics in the brain.
- Built an interactive GUI for viewing MRI images and metadata, segmenting and labeling anatomical regions of interest, and plotting flow curves.

Health and fitness monitoring software — July 2020 – Nov. 2020

- Developed a desktop application that allows for real-time visualization of health and fitness data from devices within the ANT+ ecosystem.
- Programmed an innovative GUI for visualizing and exporting sensor data from up to 4 ANT+ devices in real-time simultaneously.

Virtual reality serious games — April 2017 - Present

- Programmed gameplay and game mechanics, including custom controller physics and interactions.
- Developed backend SQL database infrastructure for querying and saving game data.
- Programmed real-time serial and UDP data communication between game and hardware peripherals.
- Designed and manufactured a custom, stationary virtual reality exercise bike.
- Supervised a cross-functional team of 10 engineers, technical artists, and neuroscientists.

Research Experience

PhD Researcher — Aug. 2015 – Present
Stevens Neuroimaging and Informatics Institute — *Los Angeles, CA*

- Conducting a 2-year clinical trial assessing the impact of cognitive stimulation and exercise in VR on brain health in older adults at risk for Alzheimer's disease.
- Utilizing multi-modal MRI imaging techniques to detect early neural dysfunction in older adults.

Work Experience

Systems Engineer July 2011 – June 2015
LipoScience *Raleigh, NC*

- Managed design changes to Vantera, an FDA-cleared clinical blood analyzer, reducing downtime and improving sample throughput.

Publications

Stradford J.; Sakhare AR., Ravichandran R., Schroeder T., Michener L., Pa J., *Conducting a VR Clinical Trial in the Era of COVID-19*. *(Submitted)*

Sakhare AR.; Barisano G., Pa J., *Assessing test-retest reliability of phase contrast MRI for measuring cerebrospinal and cerebral blood flow dynamics*. Magn Reson Med. 2019; 82:658–670.

Sakhare AR.; Yang V., Stradford J., Tsang I., Ravichandran R., Pa J., *Cycling and Spatial Navigation in an Enriched, Immersive 3D Virtual Park Environment: A Feasibility Study in Younger and Older Adults*. Front. Aging Neurosci. 2019; 218.

Leadership and Involvement

USC Street Dance Society Breakdancer Aug. 2015 – July 2016
SMART-VR Student Ambassador Nov. 2020 – Present

Select Presentations

Sakhare AR; Pa J. *Virtual Reality to Enhance Brain Health in Older Adults at Risk for Alzheimer's disease*. Seminar in Bioengineering, Los Angeles, CA, October 2019. (Talk)

Sakhare AR; Yang V., Stradford J., Tsang I., Ravichandran R., Pa J. *Cycling and spatial navigation in an enriched, immersive 3D virtual park environment: a study of adverse effects in healthy older adults*. Grodins Research Symposium, Los Angeles, CA, April 2019. (Poster)

Sakhare AR; Yang V., Delev D., Tsang I., Ravichandran R., Pa J. *Nuts and Bolts: Designing a fully integrated VR bike*. USC Virtual Technologies for Health Symposium, Los Angeles, CA, September 2018. (Poster)

Sakhare AR; Yang V., Delev D., Tsang I., Ravichandran R., Pa J. *Combined cognitive and physical activity in VR to promote brain health*. USC Virtual Technologies for Health Symposium, Los Angeles, CA, September 2018. (Poster)