VARUN NALAM

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EDUCATION

Arizona State University *August 2015 - May 2020*
PhD in Mechanical Engineering. CGPA: 4.0/4.0
Indian Institute of Technology, Madras *July 2009 - May 2014*
B.Tech and M.Tech in Mechanical Engineering. CGPA: 7.89/10.00

RESEARCH EXPERIENCE

Reinforcement Learning Based Gait Assistance using Hip Exoskeleton *September 2020 - present*

- Developing gait assistance algorithms for proprietary hip exoskeleton using Least Squares Policy Iteration
- The algorithms would reduce human exertion during walking without sacrificing efficiency.

Neuromuscular Modeling of Human Ankle *August 2015 - May 2020*

- Developed a neuromuscular model of the ankle using a robotic platform that would serve as a basis for lower limb exoskeletons and rehabilitation protocols
- The model is shown to predict human ankle behavior during various tasks in a wide range of functional environments

Ankle Rehabilitation in Stroke Survivors *August 2018 - December 2018*

- Conceptualized, implemented and validated a robotic training protocol aimed at improving paretic ankle motor control in stroke survivors.
- The 6 week study resulted in improvements in both the test subjects as observed Through kinematic and clinical evaluations.

Flexible Robotic Endoscope for Cardiac Surgery *October 2014 - July 2015*

- Developed the embedded system and control algorithm of a novel flexible endoscope designed for cardiac surgeries.
- The device is expected to reduce the recovery time and complexity of micro invasive cardiac surgeries.

Development of Motion Adaptation Device *May 2013 - May 2014*

- Developed a device that can analyze, record and adapt human hand motion to different robotic systems.
- Demonstrated the utility of the system by successfully controlling a 6 DoF Robotic Arm.

Portable Gait Analysis and Rehabilitation System *May 2013 - May 2014*

- Developed an economic device costing $40 for gait rehabilitation in low income countries by implementing the embedded system and a learning algorithm for abnormality detection.

TECHNICAL EXPERTISE

Embedded Systems	STM32,ATMEL,Simulink Real Time Systems,RTOS,TwinCAT
Software	Solidworks, EAGLE, SIMULINK, MATLAB, LabVIEW
Languages	C,C++,Python

PUBLICATIONS AND PATENTS

[1] Adjei E., Nalam V., Lee H., 2020, Frontiers in Sports and Active Living, 2

[2] Hennington L., Nalam V., Eikenberry M. C., Kinney C. L., Lee H., 2019, IEEE Transactions on Medical Robotics and Bionics, 1, 237

[3] Li Z., Zin Oo M., Nalam V., Duc Thang V., Ren H., Kofidis T., Yu H., 2016, Journal of Mechanisms and Robotics, 8

[4] Nalam V., Lee H., 2017, in 2017 IEEE International Conference on Robotics and Automation (ICRA). pp 511–516

[5] Nalam V., Lee H., 2018, Systems and methods for a multi-axis robotic platform for studying neuromechanics of an ankle joint (Patent)

[6] Nalam V., Lee H., 2019, IEEE/ASME Transactions on Mechatronics, 24, 459

[7] Nalam V., Adjei E., Lee H., 2020, IEEE Transactions on Biomedical Engineering

LEADERSHIP ROLES

Co-founder, Sol Robotics *October 2019 - present*

- Co-Founder and technical lead for an early stage robotic venture incubated at Intel
- Part of a 4 member team which was selected into the final 8 out of 600 potential ventures

GPSA Assembly Member and Engineering Committee Chair *April 2018 - February 2020*

- Elected to represent IRA Fulton Schools of Engineering as an assembly member in the graduate student government at ASU.
- Founded Engineering committee to better serve graduate engineering students and advocate for mental wellness initiatives for PhD students.

Research Engineer at SINAPSE, National University of Singapore *October 2014- July 2015*

- The lead controls engineer for multiple robotic surgical devices in a team comprising of surgeons, engineers and designers.
- Developed a novel control mechanism that can be intuitively learned by surgeons with minimal training while mentoring 4 undergraduate interns.

CFI Administration and Student Relations Head *2011 - 2014*

- CFI is a student run initiative which nurtures technical creativity and provides the necessary guidance and resources for the students of IIT Madras to pursue their endeavors in engineering.
- Coordinated a 3 phase strategy which increased the number of successful student driven innovative projects from 5 to12 in 2014.

EXTRACURRICULAR ACTIVITIES

- Awarded the best student paper at Ubiquitous Robotics Conference, Hawaii. (2018)
- Volunteered at ASU Rehabilitation Robotics Workshop and ASU Southwest Robotics Symposium, which is a platform for showcasing robotics research at ASU. (2016-2018)
- Volunteered at the Carnival for MS, organized in Tempe for spreading awareness about Multiple Sclerosis.(2017)