

Sai Hemachandra Vemprala

CONTACT INFORMATION	Microsoft Bravern 2/13063 Bellevue, WA - 98004	Phone: (480) 269-2498 Email: Sai[dot]Vemprala[at]microsoft.com	Website: saihv.com
INTERESTS	Ground/aerial robotics: localization, sensor fusion, planning, computer vision, machine learning.		
EDUCATION	Texas A&M University , College Station, Texas, USA <i>Ph.D., Mechanical Engineering</i> , 2019 <ul style="list-style-type: none">• Dissertation: "Vision based Collaborative Localization and Path Planning for Micro Aerial Vehicles"• Advisor: Dr. Srikanth Saripalli Arizona State University , Tempe, Arizona, USA <i>M.S., Electrical Engineering</i> , 2013 Jawaharlal Nehru Technological University , Hyderabad, Telangana, India <i>B.Tech., Electrical and Electronics Engineering</i> , 2011		
TECHNICAL SKILLS	<ul style="list-style-type: none">• Languages: C, C++, Python, MATLAB, C#/.NET; familiar with Julia• Applications: ROS, Gazebo, V-REP, OpenCV, SimuLink, Unreal Engine; familiar with CUDA, Tensorflow, Darknet, Keras; Pandas, Dask, Scikit• Operating systems : Windows, Linux, Android		
EXPERIENCE	Microsoft Corporation , Bellevue, Washington, USA <i>Researcher, AI & Research Division</i> Jul 2019 - present Texas A&M University , College Station, Texas, USA <i>Research Assistant</i> Jan 2017 - May 2019 <ul style="list-style-type: none">• Primary research focusing on collaborative localization and navigation for UAV swarms.• Developed a computer vision based real-time cancer tumor tracking system in collaboration with Mayo Clinic Arizona.• Developed a deep learning based framework for drone detection using depth images, in collaboration with labs at MIT and UPM. Arizona State University , Tempe, Arizona, USA <i>Research Assistant</i> Jan 2013 - Dec 2016 <ul style="list-style-type: none">• Primary research focused on autonomous navigation of unmanned vehicles, GPS denied localization for micro aerial vehicles.• Worked on research aimed at achieving a quantitative definition and implementation of graceful motion in humanoid robots. Millennium Engineering , NASA Ames Research Center, Mountain View, California, USA <i>Graduate Intern</i> May - Aug, 2016 <ul style="list-style-type: none">• Developed the software architecture for sensing and communication onboard a quadrotor UAV and developed a framework for estimation and navigation in GPS denied subterranean environments.• Developed a 6DOF Simulink model for simulation of a fixed wing UAV.		

- Implemented attitude stabilization on open source autopilot hardware for an experimental unmanned aircraft.
- Developed image processing software for analyzing multispectral satellite images.

Arizona State University, Tempe, Arizona, USA

Research Aide, Extreme Environments Robotics Laboratory

May 2012 - Dec 2013

- Developed ground station software and embedded firmware for the Micro Submersible Lake Exploration Device (MSLED) that was successfully deployed at Lake Whillans, Antarctica. MSLED played a key role in discovery of life forms under Antarctica for the first time.
- Led a team that designed a volcanic monitoring system through sensor fusion and developed data transmission protocols for reporting volcanic and seismic activity. Instruments were deployed at various volcanic locations worldwide such as in Nicaragua, Sicily, Iceland, etc.

Intel Corporation, Santa Clara, California, USA

Graduate Technical Intern

Jun - Dec, 2013

- Developed embedded firmware for the biometric headset "BioSport". Involved in hardware and signal processing algorithm development.

Guru Nanak Engineering College, Hyderabad, India

Undergraduate Researcher

Jun 2009 - Jan 2011

- Developed novel power flow calculation and power system optimization algorithms for semi large to large scale distribution systems.
- Developed optimal capacitor placement approaches and system restoration approaches with algorithms such as genetic and ant colony optimization algorithms.

JOURNAL PAPERS	A.E. Behar et al (including S. Vemprala), 'MSLED: The micro subglacial lake exploration device.' Underwater Technology, vol. 33, Issue 1, pp. 3-17. DOI: 10.3723/ut.33.0033.
	S. Vemprala, S. Saripalli, "Collaborative Localization for Micro Aerial Vehicles" (under review)
	A. Carrio, J. Torres, S. Vemprala, S. Saripalli, J. How, "Onboard Detection and Localization of Drones through Depth Maps" (under review)
CONFERENCE PAPERS	S. Vemprala, S. Saripalli, C. Vargas, M. Bues, Y. Hu, J. Shen, "Real time Tumor Tracking for Pencil Beam Scanning Proton Therapy", 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018), Madrid, Spain, 2018, pp. 4434-4440.
	A. Carrio, S. Vemprala, A. Ripoll, S. Saripalli, P. Campoy, "Drone Detection using Depth Maps", 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018), Madrid, Spain, 2018, pp. 1034-1037.
	S. Vemprala, S. Saripalli, "Collaborative Uncertainty-aware Navigation for Vision based Multirotor Swarms", Proceedings of the AHS International 74th Annual Forum, Phoenix, USA, 2017, pp. 1774-1783.
	S. Vemprala and S. Saripalli, "Monocular Vision based Collaborative Localization for Swarms of Micro Aerial Vehicles", 18th IEEE International Conference on Unmanned Aerial Systems (ICUAS 2018), Dallas, USA, 2018, pp. 315-323.
	S. Vemprala and S. Saripalli, "Vision based Collaborative Path Planning for Micro Aerial Vehicles", 2018 IEEE International Conference on Robotics and Automation (ICRA), Brisbane, Australia, 2018, pp. 1-7.

S. Vemprala and S. Saripalli, “Vision based Collaborative Localization for Swarms of Aerial Vehicles”, Proceedings of the AHS International 73rd Annual Forum, Dallas, USA, 2017, pp. 2980-2985.

S. Vemprala and S. Saripalli, “Vision based collaborative localization for multirotor vehicles,” 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Daejeon, South Korea, 2016, pp. 1653-1658.

A. Mora, S. Vemprala, A. Carrio and S. Saripalli, “Flight performance assessment of land surveying trajectories for multiple UAV platforms,” 2015 Workshop on Research, Education and Development of Unmanned Aerial Systems (RED-UAS), Cancun, 2015, pp. 1-7.

P. R. Babu, M. P. R. Vanamali, M. P. V. V. R. Kumar and V. S. Hemachandra, “Network reconfiguration in distribution systems using L-E method,” 2010 Annual IEEE India Conference (INDICON), Kolkata, 2010, pp. 1-4.

P. R. Babu, M. P. V. V. R. Kumar, V. S. Hemachandra and M. P. R. Vanamali, “A novel power flow solution methodology for radial distribution systems,” 2010 IEEE Region 8 International Conference on Computational Technologies in Electrical and Electronics Engineering (SIBIRCON), Listvyanka, 2010, pp. 507-512.

PRESENTATIONS

S. Vemprala, “Collaborative autonomy for Micro Aerial Vehicles through Vision”, Invited talk at Universidad Politecnica di Madrid, 2018.

S. Vemprala, “Sampling based Path Planning for Unmanned Aerial Vehicles”, Invited talk at the workshop on Complex Collaborative Systems, IROS 2017.

S. Vemprala, S. Saripalli, “Vision based MAV Swarms in a Photorealistic Simulation Framework”, 1st International Symposium on Aerial Robotics, 2017.

S. Vemprala, I. Shelanskey, M. Ragan, L. Gharavi, S. Saripalli, “Ars Robotica: A Movement Framework for Robots in Theater”, Workshop on Artistically Skilled Robots, IROS 2016.

L. Gharavi, S. Saripalli, S. Vemprala, M. Ragan and I. Shelanskey. “Ars Robotica”, Exemplar Project presentation at the 2015 a2ru National Conference, 2015.

S. Vemprala and S. Saripalli. “Autonomous exploration and navigation strategies for MAVs.” American Helicopter Society International - 6th AHS International Specialists’ Meeting on Unmanned Rotorcraft Systems, 2015.

PATENTS

As a co-inventor, part of the Intel “New Devices” team:

Indira Negi et al, “System and method for data transmission and power supply capability over an audio jack for mobile devices”, Intel Corp., US Patent 10,165,355 (issued 12/25/2018)

Indira Negi et al, “System and method for device action and configuration based on user context detection from sensors in peripheral devices”, Intel Corp., US Patent 10,117,005 (issued 10/30/2018)

COMMUNITY

Reviewer for:

- Journal of Intelligent Robotics and Systems (JINT)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE International Conference on Intelligent Robots and Systems (IROS)

Professional memberships:

- Institute of Electrical and Electronics Engineers (IEEE)
- American Helicopter Society (AHS)

MISC.

ACHIEVEMENTS

Winner of the 2018 TAMU Data Science contest

- Developed predictive models for taxi revenue over time and location using public taxi ride data from the city of Chicago. ARIMA based forecasting and a recurrent neural network with LSTM units were implemented to generate accurate predictions.

DAC System Design Contest 2018 - Top 5 finish

- Led a team of graduate students in designing a deep learning pipeline that can classify and detect objects in a custom dataset, while running at a speed of >20 FPS on an NVIDIA Jetson TX2. We implemented an optimized Tiny YOLO v2 model that achieved 21 FPS during inference with > 80% IoU on validation. Our team achieved a top 5 finish among 60 teams worldwide.

REFERENCES

Dr. Srikanth Saripalli
Associate Professor
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Texas A&M University
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Dr. Ashish Kapoor
Sr. Principal Research Manager
Microsoft Research
Redmond, Washington
Email: akapoor@microsoft.com

Dr. Andres Mora Vargas
Robotics and Systems Engineering Lead
NASA Ames Research Center
Mountain View, California
Email: Andres.Mora@nasa.gov