## Sai Hemachandra Vemprala


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**Research Interests**

Robotics, unmanned ground/aerial vehicle localization and planning, computer vision, intelligent systems

**Education**

**Texas A&M University**, College Station, Texas USA

*Ph.D. Candidate* (expected graduation date: December 2018)

- Advisor: Dr. Srikanth Saripalli

**Arizona State University**, Tempe, Arizona USA

*Ph.D. Student* (2014-2016: Transferred to Texas A&M University in Jan 2017)

- Thesis Topic: "Collaborative Localization and Path Planning for Micro Aerial Vehicle Swarms"
- Advisor: Dr. Srikanth Saripalli

*M.S., Electrical Engineering*, Dec 2013

- Thesis Topic: "Incorporating Supervisory Human Inputs into Autonomous Robot Navigation"
- Advisor: Dr. Srikanth Saripalli

**Jawaharlal Nehru Technological University**, Hyderabad, Telangana, India

B.Tech., Electrical and Electronics Engineering, Jul 2011

**Technical Skills**

- Areas : Robotics (localization, sensor fusion, path planning), computer vision, embedded systems, software development, machine learning/deep Learning, power systems/power electronics.
- Languages: C, C++, Python, MATLAB, C#/.NET, Julia, HTML, JavaScript
- Packages : ROS, Gazebo, V-REP, OpenCV, SimuLink, Unreal Engine; familiarity with Tensorflow, Caffe, Darknet, Keras; Pandas, Dask, Scikit
- Operating systems : Windows, Linux, Android

**Experience**

**Texas A&M University**, College Station, Texas, USA

*Research Assistant* **Jan 2017 - present**

- Primary research focusing on collaborative localization and navigation algorithms for swarms of unmanned aerial vehicles using computer vision.
- Leading a team participating in the DAC 2018 System Design Contest on deep learning based object detection.
- Working on developing a computer vision based real-time cancer tumor tracking system using X-ray fluoroscopy images (in collaboration with Mayo Clinic Arizona).

**Arizona State University**, Tempe, Arizona, USA

*Research Assistant* **Jan 2013 - Dec 2016**

- 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.
- Obtained hands-on experience in sensor fusion, ROS based middleware development, embedded systems, various commercial UAV platforms.

**Millennium Engineering**, NASA Ames Research Center, Mountain View, California, USA

*Graduate Intern* **May - Aug, 2016**

- Developed the software architecture for sensing and communication onboard a quadrotor UAV and developed a framework for estimation and navigation in GPS denied environments.
- Part of a team working on developing a 6DOF Simulink model for simulation of a fixed wing UAV.
- Implemented attitude stabilization on open source autopilot hardware for an experimental unmanned aircraft.

**Koolock Inc.**, NASA Ames Research Center, Mountain View, California, USA

*Software Engineer* **May - Aug, 2016**

- Developed image processing software for analyzing multispectral satellite images.

**Indigo Drones**, San Jose, Costa Rica

*Autonomous Systems Engineer* **Apr - Dec, 2015**

- Mission planning, sensor fusion and data analysis for UAVs and imaging sensors in agricultural health monitoring applications.

**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**

- Designed embedded firmware for the biometric headset BioSport.
- Involved in hardware design, sensor fusion and signal processing algorithms for Biosport.

**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, D.D. Chen, C. Ho, ... , J.M. Crowell. "MSLED: The micro subglacial lake exploration device", Underwater Technology, vol. 33, Issue 1, pp. 3-17. DOI: 10.3723/ut.33.0033

## Conference Papers

S. Vemprala, S. Saripalli, "Collaborative Uncertainty-aware Navigation for Vision based Multirotor Swarms", AHS International 74th Annual Forum, 2018, accepted, pending publication.

S. Vemprala and S. Saripalli, "Monocular Vision based Collaborative Localization for Swarms of Micro Aerial Vehicles", Proceedings of the 18th IEEE International Conference on Unmanned Aerial Systems (ICUAS), accepted, pending publication.

S. Vemprala and S. Saripalli, "Vision based Collaborative Path Planning for Micro Aerial Vehi-

cles", Proceedings of the 2018 IEEE International Conference on Robotics and Automation (ICRA), accepted, pending publication.

S. Vemprala and S. Saripalli, "Vision based Collaborative Localization for Swarms of Aerial Vehicles", Proceedings of the AHS International 73rd Annual Forum, 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.

## Other presentations

S. Vemprala, "Sampling based Path Planning for Unmanned Aerial Vehicles", 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.

S. Vemprala, "Autonomous Exploration using Micro Aerial Vehicles", 30th AAAI Conference on Artificial Intelligence (AAAI-16), 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.

## Awards

**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.

## Patents

**As a co-inventor, part of the Intel New Devices team:**
"System and method for data transmission and power supply capability over an audio jack for mobile device", courtesy Intel Corp., awarded July 2015, Pub: WO2015099795 A1.

"System and method for device action and configuration based on user context detection from sensors

in peripheral devices", courtesy Intel Corp., awarded Jun 2016, Pub: US 20160192039 A1.

## References

Dr. Srikanth Saripalli
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School of Earth and Space Exploration
Arizona State University
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Dr. Andres Mora
Robotics and Systems Engineering Lead
Millennium Engineering and Integration Company
NASA Ames Research Center
Email: amora@meicompany.com