

Madhu Vankadari

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About Me:

I am a robotics researcher with strong knowledge in the areas of robot control and vision. I have more than 3 years of industrial experience. I have accomplished several projects and published papers at many reputed conferences. Now, I am seeking a PhD position to further expand my horizons in Machine Vision area. [Website](#), [G-scholar](#), [Github](#)

Work Experience:

Robotics Researcher

July-2016 - Present

[TCS Innovation Labs](#), Bangalore, India

I develop Deep Learning techniques for robot perception and control. My main responsibility is to outperform state of the art methods and create new benchmarks in the field.

Summer Research Intern

May-July 2015

[Robotics and Intelligent systems Lab](#), IIT Kharagpur, India

We developed a simulation and hardware setup for a humanoid robot to implement Reinforcement Learning algorithms for a dynamically stable gait.

Education :

Bachelors in Mechanical Engineering

2012- 2016

[Rajiv Gandhi University of Knowledge Technologies](#)

GGPA : 8.88/10.0

Thesis: Design of a Dynamically Stable Gait ([video](#))

Projects :

UnDEMoN: Unsupervised Depth and Ego Motion Network

Nov'17-present

Depth and Ego-motion estimation is a very well known problem in robotics and computer vision domains. Many supervised methods solved this problem but having the ground truth for all the scenes is typically difficult and expensive while training. So, we propose a solution to solve this problem in a completely unsupervised fashion by making use of the geometric constraints in the images.

Tools Used : Tensorflow, python, numpy, scipy, cv2, PIL

Links : [code](#) , [Video](#)

Publications:

1. **Babu, V. M.**, Majumdar, A., Kumar, S., & Das, K., "Unsupervised Monocular Depth and Ego-Motion Estimation using Conditional Patch GANs." *International Joint Conferences on Artificial Intelligence (IJCAI)*, 2019. ([paper](#))
2. **Babu, V. M.**, Das, K., Majumdar, A., & Kumar, S. (2018, October). UnDEMoN: Unsupervised Deep Network for Depth and Ego-Motion Estimation. In *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* (pp. 1082-1088). ([Paper](#))
3. Garg, Sourav, **Babu, V. M.**, Thanuja Dharmasiri, Stephen Hausler, Niko Suenderhauf, Swagat Kumar, Tom Drummond, and Michael Milford. "Look No Deeper: Recognizing Places from Opposing Viewpoints under Varying Scene Appearance using Single-View Depth Estimation", *IEEE International Conference on Robotics and Automation (ICRA)* 2019. (Accepted Oral) ([Paper](#))
4. **Babu, V. M.**, Majumdar, A., Kumar, S., & Das, K., Unsupervised Monocular Depth and Visual Odometry Estimation through Deep Cycle Consistency ". *2019 Conference on Robot Learning (CORL)* . * in-review

Follow-Me :

Sep'16 - Nov'17

Follow-me is a leader follower architecture designed for drones. A complete vision based relative localization is implemented using Aruco markers. A PID controller with an adaptive gain adjustment mechanism is brought in to address for downwash and turbulence effects. We have used a RL method named LSPI to replace the PID controller because of its adaptability to nonlinear disturbances.

Tools used : python, cv2, Robot operating System (ROS), Gazebo, numpy

Links : code (NA), [video 1](#), [Video 2](#)

Publications:

1. **Vankadari, Madhu Babu**, et al. "A Reinforcement Learning Approach for Autonomous Control and Landing of a Quadrotor." *IEEE, International Conference on Unmanned Aircraft Systems (ICUAS)* 2018. ([paper](#))
2. **Vankadari, Madhu Babu**, Kaushik Das, and Swagat Kumar. "Autonomous Leader-Follower Architecture of AR Drones in GPS Constrained Environments." *Proceedings of the Advances in Robotics (AIR)*. ACM, 2017. ([paper](#))
3. **Babu, V. Madhu**, Kaushik Das, and Swagat Kumar. "Designing of self tuning PID controller for AR drone quadrotor." *IEEE 18th International Conference on Advanced Robotics (ICAR)* 2017. ([paper](#))

Path-Finder:

Path finder is one of my hobbyist projects. In this project, we have used Q-learning to find the shortest path in a occluded environment from a random initialized position to the goal in an image.

Tools used: Python, CV2, Arduino based mobile robot

Links : NA

Publications:

1. **Babu, V. Madhu**, U. Vamshi Krishna, and S. K. Shahenshah. "An autonomous path finding robot using Q-learning." *Intelligent Systems and Control (ISCO), 2016 10th International Conference on*. IEEE, 2016. ([paper](#))

References: Available upon Request