Niladri Das

Current Position

Ph.D. student in Aerospace Engineering at Texas A&M University, working with Dr. Raktim Bhattacharya on: Optimal Transport based filtering for Space Situational Awareness and Optimal Sensing Architecture.

Contact

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Research

• **Non-Linear filtering** • **Optimal Sensing** • **Situational Awareness** • **Non-Linear Control**

Education

Doctor of Philosophy in **Aerospace Engineering** — Adviser: Dr. R. Bhattacharya
Texas A&M University, USA — 2015 - Present
Dissertation: Optimal Transport based non-linear filtering and optimal sparse sensing architecture design. — GPA: 3.826/4

Master of Technology in **Electrical Engineering** — Adviser: Dr. L. Behera
Indian Institute of Technology Kanpur, India — 2012 - 2014
Dissertation: Learning to Grasp & Programming by Demonstration Using a 7-DOF Barrett WAM. — GPA : 7.91/10

Bachelor of Engineering in **Electrical Engineering** — Adviser: Dr. A. Chatterjee
Jadavpur University, Kolkata, India — 2008 - 2012
Project: Image Processing Based Object Detection. — GPA : 7.84/10

Experiences

Winner of A-Hack-of-the-Drones — 28-30 Sep,2018.
Member of the **A-Team** from Texas A&M that won the A-Hack-of-the-Drones competition (Sponsor: USArmy Futures Command and MD5) in Austin, Texas.
• Developed vision based solution for C-SUAS.

Graduate Research I — Adviser: Dr. R. Bhattacharya
Dept. of Aerospace Engineering, Texas A&M. — Sep 2015-Present

- Working on an AFRL project project, *Adaptive Markov Inference Game Optimization for Rapid Discovery of Evasive Satellite Behaviors*, in collaboration with Intelligent Fusion Technology, Inc (2018-Present)
- Worked on an AFOSR project, *Cloud Computing Based Robust Space Situational Awareness*, in collaboration with Dept. of Statistics, TAMU (2015-2018)
  - Developed Optimal Transport filter based framework for SSA.
  - Developed Orbit Propagator.

Project Associate — PI: Dr. L. Behera
Dept. of Electrical Engineering, IIT Kanpur — Aug 2014 - Jun 2015

- Developed Gaussian Mixture based model to compensate the unknown non-linearities of 7 degree of freedom Barrett WAM.
- Collaborated in implementing a Inverse Dynamic Model and Higher Order Sliding Mode Control for 7 degree of freedom Barrett WAM. [C++ codes][video]
- Developed dynamical system based trajectory learning for Barrett WAM.
- Served as a Thesis mentor for a master's student.
- Taught ROS to two Master's student.

Graduate Research II — Adviser: Dr. L. Behera
Dept. of Electrical Engineering, IIT Kanpur — July 2013-July 2014

- Developed Inverse Kinematic model for Barrett WAM.

- Implemented Kinect based Object segmentation for grasping using Deep Learning.
- Developed a hand-eye autonomous calibration technique for Barrett WAM.
- Implemented Symbolic Encoding based skill learning on Barrett WAM.[video1][video2]
- Mentored two Under-Graduate interns.

Publications

Journals

- *Optimal Transport Based Tracking of Space Objects in Cylindrical Manifolds.* Journal of Astronautical Sciences (Springer) [**accepted**][preprint]
- *Optimal Transport based Tracking of Space Objects using Range Data from a Single Ranging Station.* Journal of Guidance, Control, and Dynamics [**accepted**][preprint]

Conferences

- *Risk Quantification in Dynamical Systems with Bounded Nonparametric Uncertainty.* 2019 Astrodynamics Specialist Conference, Portland, ME. (Accepted for presentation)
- *Sparse Sensing Architecture For Kalman Filtering With Guaranteed Error Bound.* 2017 1st IAA Conference on Space Situational Awareness, Orlando, Florida.
- *Control of a 4 DoF Barrett WAM Robot - Modeling, Control Synthesis and Experimental Validation.* 2016 IEEE First International Conference on Control, Measurement and Instrumentation
- *Learning Object Manipulation from Demonstration through Vision for the 7-DOF Barrett WAM.* 2016 IEEE First International Conference on Control, Measurement and Instrumentation
- *A probabilistic framework of learning movement primitives from unstructured demonstrations.* 2015 IEEE 13th International Conference on Industrial Informatics
- *Robot Learns from Human Teacher Through Modified Kinesthetic Teaching.* 2014 International conference on Advances in Control and Optimization of Dynamic Systems

Skills

Programming Languages and Packages: C | C++ | Python | Julia | Matlab | Robot Operating System.

Affiliations

Aerospace Graduate Student Council of Texas A&M University

- Student Council Mentor of Aerospace Engineering Department at Texas A&M University. (Academic Year 2018)
- Student Council Member of Aerospace Engineering Department at Texas A&M University. (Academic Year 2017)
- GPSC: Graduate and Professional Student Council delegate of Aerospace Department. (Academic Year 2017)

Other Organisations:

- American Institute of Aeronautics and Astronautics
- Institute of Electrical and Electronics Engineers
- Society for Industrial and Applied Mathematics
- American Astronautical Society.

Journal Reviewer: IEEE Systems Journal.