Sourish Ghosh

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Education

Indian Institute of Technology, Kharagpur — July, 2014 - April, 2019 (*expected*)

Integrated M.Sc.
Department: Mathematics
Major: Mathematics and Computing

Conference Publications

[C4] **Probabilistic Kinematic State Estimation for Motion Planning of Planetary Rovers**
by Sourish Ghosh, Kyohei Otsu, and Masahiro Ono
In *Intelligent Robots and Systems, IROS, 2018 IEEE/RSJ International Conference*, (Madrid, Spain)
Oct. 2018. [PDF]

[C3] **Fast Approximate Clearance Evaluation for Kinematically Constrained Articulated Suspension Systems**
by Kyohei Otsu, Guillaume Matheron, Sourish Ghosh, Olivier Toupet, and Masahiro Ono
arXiv preprint arXiv:1808.00031. [PDF]

[C2] **Joint Perception And Planning For Efficient Obstacle Avoidance Using Stereo Vision**
by Sourish Ghosh and Joydeep Biswas.
In *Intelligent Robots and Systems, IROS, 2017 IEEE/RSJ International Conference*, (Vancouver, Canada)
Sep. 2017. [PDF]

[C1] **A Fuzzy Logic System to Analyze a Student's Lifestyle**
by Sourish Ghosh et al.
In *2017 9th International Conference on Advanced Computational Intelligence, ICACI*, (Doha, Qatar)
Feb. 2017. [PDF]

Experience

Princeton University, Princeton, NJ — June, 2018 - August, 2018
Summer Intern, iRoM Lab
Topic: Learning Data-Driven Dynamic Models of Task-Relevant Perceptual Features for Robot Controllers
Research Areas: control theory, deep learning, variational autoencoders, model-predictive control
Adviser: Dr. Anirudha Majumdar

Cognitive Robotics Summer School, Massachusetts Institute of Technology — July, 2018
Attended a week long workshop based on the following themes: robust execution, motion planning, activity planner, perception and manipulation, and planning under uncertainty and risk. The workshop (for 62 selected attendees) consisted of guest lectures, labs, and a grand challenge.
Organizer: MIT MERS Group

NASA Jet Propulsion Laboratory, Pasadena, CA — May, 2017 - July, 2017
Summer Intern, 347E - Robotic Systems Estimation, Decision, and Control Group
Topic: Probabilistic Kinematic State Estimation for Motion Planning of Planetary Rovers
Research Areas: probabilistic state estimation, risk-aware motion planning
Adviser: Dr. Masahiro Ono

University of Massachusetts, Amherst, MA — May, 2016 - August, 2016
Summer Intern, Autonomous Mobile Robotics Lab
Topic: Joint Perception and Planning for Efficient Obstacle Avoidance using Stereo Vision
Research Areas: obstacle avoidance, stereo vision, motion planning
Adviser: Dr. Joydeep Biswas

Aerial Robotics Kharagpur (ARK), IIT Kharagpur February, 2017 - *present*
Software Team Member
Topic: (1) Building unmanned emergency aerial vehicles to drop medical supplies in less accessible regions of rural India. (2) Controlling drones using the electrical activity (EEG) in human brain.
Research Areas: localization and mapping, motion planning, control theory

Kharagpur RoboSoccer Students' Group (KRSSG), IIT Kharagpur February, 2015 - April, 2016
Software Team Member
Topic: Motion planning algorithms for multi-agent soccer playing robot systems.
Research Areas: multi-agent robot systems, robot soccer, motion planning

Selected Projects

Stereo Dense 3D Reconstruction Tool
This is a ROS package for real-time 3D reconstruction from stereo images. It uses LIBELAS for generating dense disparity maps. It also has a tool for transforming point clouds in different reference frames.
Repository: `https://github.com/umass-amrl/stereo_dense_reconstruction`

JPP
C++/ROS implementation of the paper: Joint Perception And Planning For Efficient Obstacle Avoidance Using Stereo Vision
Repository: `https://github.com/umass-amrl/jpp`

RRT Simulator
An interactive GUI application for visualizing the RRT algorithm for motion planning.
Repository: `https://github.com/sourishg/rrt-simulator`

Stereo Camera Calibration Tools
Tool for the calibration of monocular and stereo cameras using the checker-board method for both pinhole and fisheye model lenses.
Pinhole Model: `https://github.com/sourishg/stereo-calibration`
Fisheye Model: `https://github.com/sourishg/fisheye-stereo-calibration`

Generating Disparity Maps
Implementation of various methods to compute disparity maps.
Repository: `https://github.com/sourishg/disparity-map`

Eye Tracker Gaze Analyzer
A Visual C++ application to analyze a user's gaze response on different images displayed on a computer screen using the Tobii Eye Tracker.
Repository: `https://github.com/sourishg/tobii-eye-tracker`

Responsibilities

Technology Robotix Society, IIT Kharagpur
Governor July, 2017 - April, 2018
I led a three-tier team to successful planning and execution of all the year-long activities of the society which includes organizing the annual Robotix fest, conducting seminars and workshops for students at IIT Kharagpur and other colleges in India, and initiating new research projects in robotics.

Kharagpur Winter of Code (KWoC) 2017, IIT Kharagpur December, 2017
Mentor
I mentored 4 students in KWoC (organized by *Kharagpur Open Source Society*) which is a 5-week long GSoC-styled programme for students who are new to open source software development.
Project: `https://github.com/sourishg/stereo-calibration`

IEEE Robotics Winter Workshop, IIT Kharagpur December, 2015
Mentor
I conducted a week-long workshop for first and second year undergraduates at IIT Kharagpur. I taught basic image processing using OpenCV and C++, and micro-controller programming using an Arduino UNO board. As a final project of the workshop I helped the students build a simple object tracking differential drive robot.

Awards and Achievements

IROS Travel Award October, 2018
Received the IROS Student and Developing Countries (SDC) Travel Award for my publication at IROS 2018.

INSPIRE Scholarship July, 2014 - *present*
A prestigious scholarship awarded by the Government of India to the top 0.07% students who appeared for the JEE Advanced 2014 examination in India, and pursuing a degree in Science.

Caltech SURF Award May, 2017 - July, 2017
Awarded the prestigious Caltech SURF fellowship for doing a summer internship on probabilistic motion planning for Mars Rovers at NASA JPL.

Best Term Project, Soft Computing Course Spring, 2016
Designed a mobile application that tracks the daily lifestyle of a person. Peer reviewed as the best project.

Bronze at MiroSot, FIRA July, 2015
MiroSot is an international five-a-side robot soccer tournament. I was a part of the bronze-winning team of IIT Kharagpur.

Best Fresher, HackerEearth Freshers' Challenge, IIT Kharagpur October, 2014
Finished first amongst all first years in an ACM-ICPC style coding contest organised by HackerEarth.

Media Coverage

Princeton University News August, 2018
My work at Princeton University was featured as part of a story about the International Summer Internship Program.

Internshala Blog September, 2017
My summer internship story at NASA JPL was covered by Internshala, India's largest portal for student internships.

Skills

Languages
C/C++, Python, Java

Libraries and Tools
OpenCV, ROS, Eigen, TensorFlow, Keras, PyBullet, CVXPY, Qt, GNU Octave, Android SDK
