Sagar Suhas Joshi

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Education

Georgia Institute of Technology, Atlanta, GA   *August 2017 - May 2022 (Expected)*
- Third year, PhD in **Robotics**. GPA: 4.0/4.0
- Graduate Research Assistant at Dynamics and Controls Systems Lab
- Area of research: **Sampling-based motion planning**

Indian Institute of Technology (IIT)-Madras, India   *July 2017*
- Dual Degree (B.Tech and M.Tech) in Engineering Design (Automotive Specialization)
- CGPA: 9.25/10 **(Top rank in Department**)

Awards/Achievements

- Two IIT-Madras **institute merit awards** for exemplary academic performance   *2017,2016 India*
- **Institute Convocation award** for highest CGPA in all five years   *2017 India*
- **DAAD** (German Academic Exchange Service) **scholarship winner**   *2015 India*

Publications

- Sagar Suhas Joshi. and Tsiotras, P., "Non-Parametric Informed Exploration for Sampling-Based Motion Planning," International Conference on Robotics and Automation, Montreal, Canada, May. 20–24, 2019.
- Sagar Suhas Joshi. and Tsiotras, P., "Relevant Region Exploration On General Cost-Maps for Sampling-Based Motion Planning," International Conference on Robotics and Automation, 2020 (Submitted).
- Sagar Suhas Joshi, Niko Maas, and Dieter Schramm, "A Vehicle Dynamics Based Algorithm for Driver Evaluation", IEEE ISCO- 11th International conference on Intelligent Systems and Control, Coimbatore, India, 5th -6 th January 2017

Research Experience

Graduate Research Assistant: Motion Planning for Robots   *Georgia-Tech, 2017- ,*
(Under the guidance of Prof. Panagiotis Tsiotras, Institute for Robotics and Intelligent Machines)
- Deep learning and heuristic based methods for motion planning of complex, higher dimensional robotic systems
- Implementing the algorithms using popular software frameworks such as ROS, OMPL and MoveIt!

Masters Thesis Project: Motion Planning and Control of Autonomous Ground Vehicles   *IIT-Madras, 2017*
 (Under the guidance of Prof. Shankar Ram, Engineering Design Department)
- Used *Hybrid A* (and dubin's path)* algorithm to generate feasible, obstacle free path for non-holonomic vehicles
- Designed a LQR optimal path tracking algorithm considering steering wheel (motor) dynamics
- Simulated the developed controller on a detailed nonlinear plant using IPG CarMaker

A Vehicle Dynamics Based Algorithm for Driver Evaluation   *Universität Duisburg-Essen, Germany, May-July 2015*
(Under the guidance of Prof. Dieter Schramm and Niko Maas, Mechatronics Department)

- Formulated a novel algorithm for generating a real time driver performance metric using vehicle state and driver input data
- Evaluated driver's steering input by defining an optimal (LQR) input for lane keeping and comparing it to the actual input
- Evaluated driver's pedal activity using tire slip data and using the concept of friction ellipse.
- Used vehicle acceleration data (lateral and longitudinal) to evaluate the driver on the basis of passenger comfort

Professional Experience

Pipe routing and Optimization Algorithm, Caterpillar Inc., India   *Jan –May 2016*
- Designed a ***A* based algorithm** for **routing** considering piping constraints
- Formulated and solved an **integer programming problem** for **segmenting** the route
- The project was presented at Caterpillar Analysis Testing and simulation **(AST) conference, Preoria, USA**

P.A.L Game, The Bridge: Connecting Dimensions, India   *Jan-April 2014*

- Designed a **computer game using PyGame-Python** intended to **help ADD/ADHD children**
- Used the principle of paired associate learning (P.A.L) for designing a flash card memory game
- The application was presented at **EuroPython conference, Berlin**, **2014**

Skills

Programming:	C++, Python, ROS, OMPL, MoveIt, PyTorch
Machine Drawing/Solid Modeling:	AutoDesk Inventor
Mathematical Modeling:	Wolfram Mathematica, MATLAB and Simulink
Language:	Marathi (native), English, Hindi
Music:	Tabla
Sports:	Basketball, Cycling

Design Projects

Novel Computer Interface for physically disabled, *IIT-Madras*   *2015*
(Under the guidance of Prof. Sandipan Bandopadhyay, Engineering Design Department)
Designed a computer interface for people with one arm and visually challenged users consisting of

- Glove Keyboard: Low cost input device with 26 copper patches as keys on the palm of the glove.
  Thin copper wires carrying information to an Arduino micro-controller.
- Digital Assistant Aarya: Speech to Text and Text to speech for basic computer navigation, audio interface

ConnectX: Serial Emulator Application   *2014*

- ConnectX is a GUI to display and plot data from received from a microcontroller
- Includes easy to set parameters like Baud rate, COM number etc
- The Application was presented at EuroPython 2014 conference, Berlin

Leadership and Extra-Curriculars

Institute Basketball Captain, **IIT-Madras, India**   *July 2016- July 2017*

- Lead the team to **bronze medal victory** in Inter-collegiate Sports fest tournament 2016
- **Mentored** over 25 NSO (freshmen) basketball players

Robotics Workshop Coordinator, IIT-Madras, India   *January 2014*

- Organized a do it yourself workshop for assembling a differential drive robot for over 300 participants
- Procured components, assembled robotics kits and provided guidance for the participants