

# Joydeep Biswas

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## Current Appointment

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Associate Professor, Computer Science Department, University of Texas at Austin

Technical Advisor, Consumer Robotics, Amazon Lab 126

## Education

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|------|--------------------------------|----------------------------------------|
| 2014 | Ph.D. in Robotics              | Carnegie Mellon University             |
| 2010 | M.S. in Robotics               | Carnegie Mellon University             |
| 2008 | B.Tech. in Engineering Physics | Indian Institute of Technology, Bombay |

## Achievements and Awards

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| 2023 | JP Morgan Faculty Research Award                                                                       |
| 2022 | 1st Place, Benchmark Autonomous Robot Navigation (BARN) Challenge, ICRA 2022                           |
| 2021 | NSF CAREER Award                                                                                       |
| 2019 | Student Best Poster Award, Northrop Grumman University Symposium                                       |
| 2019 | IJCAI Early Career Spotlight                                                                           |
| 2019 | Amazon Research Award                                                                                  |
| 2018 | JP Morgan AI Faculty Research Award                                                                    |
| 2018 | Best Demo Award, AAMAS 2018                                                                            |
| 2018 | 5th place, RoboCup 2018 Small Size League, <i>UMass MinuteBots</i> , Faculty Team Leader               |
| 2017 | Lower Bracket 1st place, RoboCup 2017 Small Size League, <i>UMass MinuteBots</i> , Faculty Team Leader |
| 2015 | Siebel Scholar, Class of 2015                                                                          |
| 2015 | 1st place, RoboCup 2015 Small Size League, <i>CMDragons</i> , Student Team Leader                      |
| 2014 | 2nd place, RoboCup 2014 Small Size League, <i>CMDragons</i> , Student Team Leader                      |
| 2013 | 2nd place, RoboCup 2013 Small Size League, <i>CMDragons</i> , Student Team Leader                      |
| 2010 | 2nd place, RoboCup 2010 Small Size League, <i>CMDragons</i> , Team Member                              |

## Employment History

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|----------------|-----------------------------|--------------------------------------------------------------------------------------------|
| 2019 - Present | Associate Professor         | Computer Science Department, University of Texas at Austin, TX, USA                        |
| 2019 - 2023    | Assistant Professor         | Computer Science Department, University of Texas at Austin, TX, USA                        |
| 2019 - 2023    | Adjunct Assistant Professor | College of Information and Computer Sciences, University of Massachusetts Amherst, MA, USA |
| 2015 - 2019    | Assistant Professor         | College of Information and Computer Sciences, University of Massachusetts Amherst, MA, USA |
| 2015           | Post-Doctoral Fellow        | Computer Science Department, Carnegie Mellon University, Pittsburgh, PA, USA               |
| 2012           | Summer Intern               | Google Research, Mountain View, CA, USA                                                    |
| 2010           | Summer Intern               | Intel Research, Pittsburgh, PA, USA                                                        |

## Funding

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### Federal Funding

**NSF Award “GCR: Community-Embedded Robotics: Understanding Sociotechnical Interactions with Long-term Autonomous Deployments”**

Role: Co-PI.

PI: Luis Sentis.

Co-PIs: Elliott Hauser, Justin Hart, Keri Stephens.

Period: October 2022 – September 2027.

**Army Research Laboratories Award “Human-Guided Learning of Neuro-Symbolic Mission Execution Policies”**

Role: PI.

Co-PI: Isil Dillig.

Period: September 2021 – January 2023.

**NSF Award “NRT-AI: Convergent, Responsible, and Ethical Artificial Intelligence Training Experience for Roboticists”**

Role: Co-PI.

PI: Junfeng Jiao.

Co-PIs: Luis Sentis, Justin Hart.

Period: September 2021 – August 2026.

**NSF Award “CAREER: Robust Perception and Customization for Long-Term Autonomous Mobile Service Robots”**

Role: PI.

Period: April 2021 – March 2026.

**NSF Award “RI: Medium: Introspective Perception and Planning for Long-Term Autonomy”**

Role: PI.

Co-PI: Shlomo Zilberstein (UMass)  
Period: July 2020 – June 2023.

**NSF Award “SHF: Small: Interactive Synthesis and Repair For Robot Programs”**

Role: Co-PI.  
PI: Arjun Guha (UMass)  
Period: June 2020 – May 2023.

**DARPA Award “Advancing Learning via Probabilistic Causal Analysis for Competency Awareness”**

Role: Co-PI.  
PI: Charles River Analytics Co-PI: David Jensen (UMass).  
Period: October 2019 – September 2022.

**Army Futures Command Robotics Center of Excellence “Persistent Fully Autonomous Multi-Robot Tactics in Complex Environments”**

Role: Co-PI.  
PI: Peter Stone Co-PIs: Luis Sentis, Justin Hart  
Period: October 2019 – December 2022.

**NSF Award “S&AS: FND: Reliable Semi-Autonomy with Diminishing Reliance on Humans”**

Role: Co-PI.  
PI: Shlomo Zilberstein (UMass)  
Period: September 2017 – August 2020.

**DARPA Award “Intelligent Model-Based Adaptation for Mobile Robotics”**

Role: Co-PI.  
PI: Jonathan Aldrich (CMU) Co-PIs: David Garlan (CMU), Manuela Veloso (CMU), Christian Kaestner (CMU), Claire Le Gouess (CMU).  
Period: November 2015 – November 2019.

**Competitive Industry Awards**

**JP Morgan Faculty Research Award, 2023**

Role: PI.  
Collaborators: Arjun Guha (Northeastern University)  
Period: September 2023 – August 2024.

**Northrop Grumman Mission Systems’ Research in Applications for Learning Machines (REALM) Consortium**

Role: Co-PI.  
PI: Shaoshuai Mou (Purdue) Co-PIs: Daniel A. DeLaurentis (Purdue), Bing Liu (UIC)  
Period: January 2019 – December 2021.

**JP Morgan AI Research Award, 2019**

Role: PI.

Period: September 2019 – August 2020.

**Amazon Research Award, 2018**

Role: PI.

Period: September 2019 – August 2020.

## **Teaching Experience**

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**Instructor, CS 109, Fall 2023: The Essentials of AI for Life and Society**

University-wide course, University of Texas at Austin

**Instructor, CS 388U, Fall 2023: Planning, Search, and Reasoning Under Uncertainty**

Online MS course, University of Texas at Austin

**Instructor, CS 378H, Fall 2023: F1/10 Autonomous Driving – Honors**

Honors Undergraduate course, University of Texas at Austin

**Instructor, CS378/ME379M/ME397/ECE394J/ECE379K, Spring 2023: Connected Autonomous Electric Vehicles**

Undergraduate course, University of Texas at Austin

**Instructor, CS 393R, Spring 2023: Planning, Search, and Reasoning Under Uncertainty**

Graduate course, University of Texas at Austin

**Instructor, CS 378H, Spring 2022: F1/10 Autonomous Driving – Honors**

Honors Undergraduate course, University of Texas at Austin

**Instructor, CS 393R, Fall 2020, Fall 2021: Autonomous Robots**

Graduate course, University of Texas at Austin

**Instructor, CS 378F, Spring 2020, Spring 2021: F1/10 Autonomous Driving**

Undergraduate course, University of Texas at Austin

**Instructor, COMPSCI 220, Fall 2017, Fall 2018: Programming Methodology**

Undergraduate course, University of Massachusetts Amherst

**Instructor, COMPSCI 403, Fall 2016, Spring 2018 : Introduction To Robotics**

Undergraduate course, University of Massachusetts Amherst

**Instructor, COMPSCI 603, Spring 2016, Spring 2017, Spring 2019 : Robotics**

Graduate course, University of Massachusetts Amherst

**Instructor, COMPSCI 691BR, Spring 2017 : Building A Robot Soccer Team**

Graduate Seminar, University of Massachusetts Amherst

## Invited Talks

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Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*University of Maryland*, October 2022

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*Northeastern University*, October 2022

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*Wellesley College*, October 2022

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*Samsung AI Center, NYC*, June 2022

Self-Supervised and User-Supervised Adaptation of Autonomous Robots  
*JP Morgan AI Research Center, NYC*, June 2022

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*Stanford University / Robotics Seminar*, April 2022

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*University of Southern California / CS Colloquium*, April 2022

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*Brown University / BigAI Talk*, April 2022

Motion Control and Visual Representation Learning for High-Speed Off-Road Driving  
*University of Pennsylvania / FITenth Invited Lecture*, April 2022

Particle Filters for Mobile Robot Localization  
*Wellesley College*, February 2022

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*Nvidia*, March 2021

Anticipating and Avoiding Failures Using Introspective Perception and Physics-Informed Program Synthesis  
*MIT Embodied Intelligence Seminar*, February 2021

Building Robots For Long-Term Autonomy, And Keeping Them Autonomous  
*Yale University*, April 2019

The Quest for "Always-On" Autonomous Mobile Robots  
*IJCAI 2019 Early Career Spotlight Talk*, August 2019

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*ICRA 2018 Workshop: Long-term Autonomy and Deployment of Intelligent Robots in the Real-world*, May 2018

Building Robots For Long-Term Autonomy, And Keeping Them Autonomous  
*Carnegie Mellon University*, March 2018

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*Amazon*, November 2017

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous  
*IROS 2017 Workshop: Assistance and Service Robotics in a Human Environment*, September 2017

Autonomous Mobile Robot Perception for Changing Environments  
*ICRA 2016 Workshop: AI for Long-term Autonomy*, May 2016

Deploying Autonomous Service Mobile Robots, And Keeping Them Autonomous.  
*University of New Hampshire Robotics Seminar Series*, March 2016

The Quest for Robust, Reliable, Autonomous Mobile Robots.  
*Williams College Computer Science Department Colloquium*, November 2015

The Quest for Robust, Reliable, Autonomous Mobile Robots.  
*Vecna Robotics*, September 2015

The Quest for Robust, Reliable, Autonomous Mobile Robots.  
*University of Minnesota, Computer Science & Engineering*, April 2015

Vector Map-Based, Non-Markov Localization for Long-Term Deployment of Autonomous Mobile Robots  
*Google X*, April 2015

The Quest for Robust, Reliable, Autonomous Mobile Robots.  
*University of Massachusetts Amherst, School of Computer Science*, March 2015

The Quest for Robust, Reliable, Autonomous Mobile Robots.  
*University of Massachusetts Amherst, School of Computer Science*, March 2015

## **Panels**

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Panel Moderator, Ethics Aware Design of AI  
*2020 Global Analytics Summit: Ethics in AI, Texas McCombs*, November 2020

Discussion Panel, Record of Robotics at CMU Part II, A Live Interview with Manuela Veloso.  
*CMU Record of Robotics Series*, October 2020

Last Mile Autonomous Delivery Systems: A Live Webcast Demonstration, and Panel Discussion  
*UT Good Systems Webinar*, September 2020

The Call for an Accelerated Autonomy – Robotics on the Frontlines of a Crisis  
*Computing In Our New Normal: A UTCS Webinar*, May 2020

Panel Chair, Reasoning and Learning in Real-World Systems for Long-Term Autonomy  
*AAAI 2018 Fall Symposium*, October 2018

## **Professional Service**

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### **Outreach Activities**

- Science on Screen Series at Amherst Cinema, Amherst MA, 31 October 2018: Presented a introduction to “Christine” within the scientific context of actual self-driving cars. *The Radical Future of Self-Driving Cars*.
- SciTech Cafe, Northampton MA, 23 January 2017: Presented a scientific talk to a general public audience. “Where am I?” and Other Fundamental Questions Robots Think Long and Hard to Answer
- HolyokeCodes, Holyoke MA, 8–12 July 2019: Co-Organized with Arjun Guha, a week-long robotics workshop for high-school students with state-of-the-art soccer-playing robots that we used to compete with at RoboCup. We covered the basic robot sense-plan-act control cycle, computational geometry, and simple adversarial planning. Students implemented building blocks of increasingly complex robot behaviors, leading up to a robot soccer tournament.

### **Track Chair / Associate Editor**

- Co-Organizer, Texas Regional Robotics Symposium: April 29, 2022
- Associate Editor, Elsevier Robotics and Autonomous Systems: 2019 – present
- RoboCup Federation Trustee: 2021 – Present
- Diversity and Inclusion Co-Chair, AAAI Conference on Artificial Intelligence (AAAI): 2022
- RoboCup Executive Committee, Small Size League: 2015 – 2021
- Robot Exhibitions Co-Chair, International Joint Conference on Artificial Intelligence (IJCAI): 2021
- RoboCup Symposium Co-Chair: 2020-2021
- Robotics Track Co-Chair, International Conference on Autonomous Agents and Multiagent Systems (AAMAS): 2019
- Associate Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS): 2016

### **Senior Program Committee**

- International Joint Conference on Artificial Intelligence (IJCAI): 2022
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS): 2022
- AAAI Conference on Artificial Intelligence (AAAI): 2020
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS): 2021
- Autonomous Robots and Multirobot Systems Workshop (ARMS): 2016

## **Program Committee / Reviewer**

- Autonomous Robots and Multirobot Systems Workshop (ARMS): 2020
- AAAI Symposium on Educational Advances in Artificial Intelligence: 2021
- RoboCup Symposium: 2015, 2016, 2017, 2018, 2019
- AAAI Undergraduate Consortium: 2021
- IEEE/SICE International Symposium on System Integration (SII): 2019
- Robotics: Science and Systems (RSS): 2015, 2016, 2019
- International Symposium on Multi-Robot and Multi-Agent Systems (MRS): 2019
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS): 2017, 2018
- International Conference on Automated Planning and Scheduling (ICAPS) : 2016, 2018, 2021
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS): 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020
- IEEE International Conference on Robotics and Automation (ICRA): 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021
- IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN): 2010
- IEEE Conference on Human-Robot Interaction (HRI): 2016
- International Joint Conference on Artificial Intelligence (IJCAI): 2016
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS): 2016

## **Journal Reviewing**

- IEEE Robotics and Automation Letters (RA-L): 2017, 2018, 2019, 2020, 2021
- IEEE Robotics and Automation Magazine (IEEE-RAM): 2013, 2014, 2015, 2016, 2019
- IEEE Transactions on Robotics (T-RO): 2015, 2018, 2019, 2020
- International Journal of Robotics Research (IJRR): 2016, 2017
- International Journal of Social Robotics (SORO): 2018, 2019

## **Grant Reviewing**

NSF Panelist: 2016(x2), 2018, 2019, 2020, 2021, 2022



## **University Service**

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### **College Level**

- Faculty Hiring Committee for Whole Communities Whole Health Cluster Hires: 2019–2020
- CNS Fall Lab Working Group in response to COVID restrictions: 2020

### **Department Level**

- Texas Robotics Machine Shop Committee: 2020–2022
- Texas Robotics Space Committee: 2020–2022
- UTCS Turing Scholars Admissions Committee: 2020–2022
- UTCS Diversity, Equity, and Inclusion Committee: 2020–2022
- UTCS Graduate Admissions Committee: 2019–2020
- UMass CICS Honors Program Director: 2018–2019
- UMass CICS Undergraduate Course Assistant Program Director: 2018–2019
- UMass CICS Graduate Admissions Committee: 2015–2016
- UMass CICS Student Activities Committee: 2015–2016
- UMass CICS Data Science Faculty Hiring Committee: 2016–2017
- UMass CICS Student Activities Committee: 2016–2017

## **Advising and Thesis Committees**

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### **PostDoctoral Supervisor**

- Rohan Chandra, 2022 – present
- Kiarash Rahmani, 2022 – present

### **PhD Supervisor**

- Arthur Zhang, UT Austin. 2022–present
- Zichao Hu, UT Austin. 2022–present
- Sadanand Modak, UT Austin. 2022–present
- Noah Patton (Co-advised by Isil Dillig), UT Austin. 2022–present
- Eric Hsiung (Co-advised by Swarat Chaudhuri), UT Austin. 2022–present

- Amanda Adkins, UT Austin. 2020–present
- Joshua Hoffman (Co-advised by Swarat Chaudhuri), UT Austin. 2020–present
- Emily Pruc, UMass Amherst. 2018–2022
- Sadegh Rabiee, UT Austin. 2016–2022, currently at Amazon Lab126  
*Introspective Perception for Mobile Robots*
- Jarrett Holtz, UT Austin. 2015–2022, currently at Bosch Research  
*Leveraging Program Synthesis for Robust Long-Term Robot Autonomy via Interactive Learning and Adaptation*
- Samer Nashed (Changed advisors in 2019), UMass Amherst. 2015–2019
- Spencer Lane (Changed advisors in 2019), UMass Amherst. 2016–2019
- Alyxander Burns (Changed advisors in 2019), UMass Amherst. 2017–2019

### **Master’s Thesis Supervisor**

- Kavan Sikand, UT Austin. 2019–2022
- David Balaban, UMass Amherst, 2016 – 2018  
*A Real-Time Solver For Time-Optimal Control Of Omnidirectional Robots with Bounded Acceleration*

### **Undergraduate Honors Thesis Supervisor**

- Elvin Yang, UT Austin. 2021–2022  
*Wait, That Feels Familiar: Learning to Extrapolate Human Preferences for Preference-Aligned Path Planning*

#### **Best Honors Thesis Award**

- Rahul Menon, UT Austin. 2021–2022  
*Terrain-Adaptive Global Planning from Local Demonstrations*
- Shakeel Samsudeen, UT Austin. 2021–2022  
*Context-Aware Object SLAM*
- Nathaniel Plaxton, UT Austin. 2021–2022  
*Estimating Kinodynamic Uncertainty Using Learned Gaussian Noise Models*
- Michael Satanovski, UT Austin, 2021-2022  
*An Empirical Evaluation of LIDAR Object Detectors for Autonomous Mobile Robots*
- Edward Schneeweiss, UMass Amherst, 2015 – 2019  
*Joint Perception and Planning for Obstacle Avoidance over Non-Planar Terrain*
- Kyle Vedder, UMass Amherst, 2015 – 2019  
*X\*: Anytime Multiagent Path Planning With Bounded Search*
- George Larionov, UMass Amherst, 2015 – 2016  
*Human-robot Interaction: Integrating Speech Recognition with a Mobile Robot System*

## **PhD Committee Member**

- Connor Basich, UMass Amherst. Supervisor: Shlomo Zilberstein
- Minkyu Kim, UT Austin. Supervisor: Luis Sentis
- Abhinav Verma, UT Austin. Supervisor: Swarat Chaudhuri
- Kyle Hollins Wray, UMass Amherst. Supervisor: Shlomo Zilberstein
- Justin Svegliato, UMass Amherst. Supervisor: Shlomo Zilberstein
- Tiffany Liu, UMass Amherst. Supervisor: Roderic Grupen
- Takeshi Takahashi, UMass Amherst. Supervisor: Roderic Grupen
- Mike Lanighan, UMass Amherst. Supervisor: Roderic Grupen
- Keen Sung, UMass Amherst. Supervisor: Brian Levine
- (Thesis Opponent) <sup>1</sup>, Nils Bore, KTH. Supervisor: John Folkesson

## **Undergraduate Honors Thesis Committee Member**

- Stefan Kussmaul, UMass Amherst. Supervisor: Roderic Grupen
- Karl Schmeckpepper, UMass Amherst. Supervisor: Roderic Grupen

## **Publications**

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### **Conference Papers**

- [1] Pranav Atreya and Joydeep Biswas. “State Supervised Steering Function for Sampling-based Kinodynamic Planning.” In: *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*. International Foundation for Autonomous Agents and Multiagent Systems. 2022. URL: [https://joydeepb.com/Publications/aamas2022\\_s3f.pdf](https://joydeepb.com/Publications/aamas2022_s3f.pdf).
- [2] Kavan Singh Sikand, Sadegh Rabiee, Adam Uccello, Xuesu Xiao, Garrett Warnell, and Joydeep Biswas. “Visual Representation Learning for Preference-Aware Path Planning.” In: *Robotics and Automation (ICRA), IEEE International Conference on*. 2022, pp. 11303–11309. URL: [https://joydeepb.com/Publications/icra2022\\_vrlpap.pdf](https://joydeepb.com/Publications/icra2022_vrlpap.pdf).
- [3] Jarrett Holtz, Simon Andrews, Arjun Guha, and Joydeep Biswas. “Iterative Program Synthesis for Adaptable Social Navigation.” In: *Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference on*. 2021, pp. 6256–6261. DOI: 10.1109/IROS51168.2021.9636540. URL: [https://joydeepb.com/Publications/iros2021\\_idips.pdf](https://joydeepb.com/Publications/iros2021_idips.pdf).

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<sup>1</sup>A PhD thesis dissertation in the Swedish doctoral system is formally presented by an external examiner, called the *thesis opponent*. A thesis opponent places the work of the PhD thesis in context with the state of the art, presents the findings of the thesis, and leads a discussion with questions.

- [4] Kavan Singh Sikand, Logan Zartman, Sadegh Rabiee, and Joydeep Biswas. “Robofleet: Secure Open Source Communication and Management for Fleets of Autonomous Robots.” In: *Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference on*. 2021, pp. 406–412. DOI: 10.1109/IROS51168.2021.9635830. URL: [https://joydeepb.com/Publications/iros2021\\_robofleet.pdf](https://joydeepb.com/Publications/iros2021_robofleet.pdf).
- [5] Jiayi Wei, Tongrui Li, Swarat Chaudhuri, Isil Dillig, and Joydeep Biswas. “OneVision: Centralized to Distributed Controller Synthesis with Delay Compensation.” In: *Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference on*. 2021, pp. 398–405. DOI: 10.1109/IROS51168.2021.9636164. URL: [https://joydeepb.com/Publications/iros2021\\_onevision.pdf](https://joydeepb.com/Publications/iros2021_onevision.pdf).
- [6] Connor Basich, Justin Svegliato, Kyle Hollins Wray, Stefan Witwicki, Joydeep Biswas, and Shlomo Zilberstein. “Learning to Optimize Autonomy in Competence-Aware Systems.” In: *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*. International Foundation for Autonomous Agents and Multiagent Systems. 2020, pp. 123–131. DOI: 10.5555/3398761.3398781. URL: [https://joydeepb.com/Publications/aamas2020\\_cas.pdf](https://joydeepb.com/Publications/aamas2020_cas.pdf).
- [7] Jarrett Holtz, Arjun Guha, and Joydeep Biswas. “Robot Action Selection Learning via Layered Dimension Informed Program Synthesis.” In: *Conference on Robot Learning (CORL)*. 2020. URL: [https://joydeepb.com/Publications/corl2020\\_ldips.pdf](https://joydeepb.com/Publications/corl2020_ldips.pdf).
- [8] Sadegh Rabiee and Joydeep Biswas. “TV-SLAM: Introspective Vision for Simultaneous Localization and Mapping.” In: *Conference on Robot Learning (CORL)*. 2020. URL: [https://joydeepb.com/Publications/corl2020\\_ivslam.pdf](https://joydeepb.com/Publications/corl2020_ivslam.pdf).
- [9] Joseph Spitzer, Joydeep Biswas, and Arjun Guha. “Making High-Performance Robots Safe and Easy to Use for an Introduction to Computing.” In: *Educational Advances in Artificial Intelligence (EAAI)*. 2020. URL: [https://joydeepb.com/Publications/eaai2020\\_jsbots.pdf](https://joydeepb.com/Publications/eaai2020_jsbots.pdf).
- [10] Joydeep Biswas. “The Quest For ”Always-On” Autonomous Mobile Robots.” In: *International Joint Conference on Artificial Intelligence (IJCAI)*. July 2019, pp. 6388–6392. DOI: 10.24963/ijcai.2019/893. URL: [https://joydeepb.com/Publications/ijcai2019\\_early\\_career\\_spotlight.pdf](https://joydeepb.com/Publications/ijcai2019_early_career_spotlight.pdf).
- [11] Sadegh Rabiee and Joydeep Biswas. “A Friction-Based Kinematic Model for Skid-Steer Wheeled Mobile Robots.” In: *IEEE International Conference on Robotics and Automation (ICRA)*. IEEE. 2019, pp. 8563–8569. DOI: 10.1109/ICRA.2019.8794216. URL: [https://joydeepb.com/Publications/icra2019\\_skid\\_steer.pdf](https://joydeepb.com/Publications/icra2019_skid_steer.pdf).
- [12] Sadegh Rabiee and Joydeep Biswas. “IVOA: Introspective Vision for Obstacle Avoidance.” In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE. 2019, pp. 1230–1235. URL: [https://joydeepb.com/Publications/iros2019\\_ivoa.pdf](https://joydeepb.com/Publications/iros2019_ivoa.pdf).
- [13] Justin Svegliato, Kyle Hollins Wray, Stefan J. Witwicki, Joydeep Biswas, and Shlomo Zilberstein. “Belief Space Metareasoning for Exception Recovery.” In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE. 2019, pp. 1224–1229. DOI: 10.1109/IROS40897.2019.8967676. URL: [https://joydeepb.com/Publications/iros2019\\_belief.pdf](https://joydeepb.com/Publications/iros2019_belief.pdf).
- [14] Kyle Vedder and Joydeep Biswas. “X\*: Anytime Multiagent Path Planning With Bounded Search.” In: *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*. 2019, pp. 2247–2249. ISBN: 9781450363099. URL: [https://joydeepb.com/Publications/aamas2019\\_xastar.pdf](https://joydeepb.com/Publications/aamas2019_xastar.pdf).
- [15] David Balaban, Alexander Fischer, and Joydeep Biswas. “A Real-Time Solver For Time-Optimal Control Of Omnidirectional Robots with Bounded Acceleration.” In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2018, pp. 8027–8032. DOI: 10.1109/IROS.2018.8594306. URL: [https://joydeepb.com/Publications/iros2018\\_tsocs.pdf](https://joydeepb.com/Publications/iros2018_tsocs.pdf).

- [16] Jarrett Holtz, Arjun Guha, and Joydeep Biswas. “Interactive Robot Transition Repair With SMT.” In: *International Joint Conference on Artificial Intelligence (IJCAI)*. 2018, pp. 4905–4911. DOI: 10.24963/ijcai.2018/681. URL: [https://joydeepb.com/Publications/ijcai2018\\_srtr.pdf](https://joydeepb.com/Publications/ijcai2018_srtr.pdf).
- [17] Samer Nashed and Joydeep Biswas. “Human-in-the-Loop SLAM.” In: *AAAI Conference on Artificial Intelligence (AAAI)*. 2018, pp. 1503–1510. URL: [https://joydeepb.com/Publications/aaai2018\\_hitl-slam.pdf](https://joydeepb.com/Publications/aaai2018_hitl-slam.pdf).
- [18] Samer Nashed, David Ilstrup, and Joydeep Biswas. “Localization under Topological Uncertainty for Lane Identification of Autonomous Vehicles.” In: *IEEE International Conference on Robotics and Automation (ICRA)*. 2018, pp. 6000–6005. URL: [https://joydeepb.com/Publications/icra2018\\_lutu.pdf](https://joydeepb.com/Publications/icra2018_lutu.pdf).
- [19] Sourish Ghosh and Joydeep Biswas. “Joint Perception And Planning For Efficient Obstacle Avoidance Using Stereo Vision.” In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE. 2017, pp. 1026–1031. URL: <https://joydeepb.com/Publications/jpp.pdf>.
- [20] Jarrett Holtz and Joydeep Biswas. “Automatic Extrinsic Calibration of Depth Sensors with Ambiguous Environments and Restricted Motion.” In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE. 2017, pp. 2235–2240. URL: [https://joydeepb.com/Publications/delta\\_calibration.pdf](https://joydeepb.com/Publications/delta_calibration.pdf).
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