Ankit Shah

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Research Interests

Learning from demonstrations, Specification inference for hybrid continuous and discrete systems, Interpretability in decision systems, Probabilistic Inference

Education

June 2020 (Expected) **Massachusetts Institute of Technology**, *Ph.D.*
Aeronautics and Astronautics

June 2016 **Massachusetts Institute of Technology**, *S.M.*
Aeronautics and Astronautics

August 2013 **Indian Institute of Technology Bombay**, *B. Tech.*
Aerospace Engineering

Publications

Journal Articles

[J1] A. Shah, L. Blumberg, and J. Shah, "Planning for manipulation of interlinked deformable linear objects with applications to aircraft assembly," *IEEE Transactions on Automation Science and Engineering*, 2018

[J2] A. Shah, P. Kamath, S. Li, P. Craven, K. Landers, K. Oden, and J. Shah, "Supervised bayesian specification inference from demonstrations," in *(under review)*, 2019

Peer-reviewed Conferences

[C1] J. Kim, C. Muise, A. Shah, S. Agarwal, and J. Shah, "Bayesian inference of linear temporal logic specifications for contrastive explanations," in *International Joint Conference on Artificial Intelligence*, 2019

[C2] A. Shah, P. Kamath, S. Li, and J. Shah, "Bayesian inference of temporal task specifications from demonstrations," in *Conference on Neural Information Processing Systems*, 2018

[C3] A. J. Shah and J. A. Shah, "Towards manipulation planning for multiple interlinked deformable linear objects," in *Robotics and Automation (ICRA), 2016 IEEE International Conference on*, IEEE, 2016

Workshops and Symposia

[W1] J. Kim, C. Muise, A. Shah, S. Agarwal, and J. Shah, "Bayesian inference of temporal specifications to explain how plans differ," in *ICAPS 2019 Workshop on explainable AI in planning*, 2019

[W2] A. Shah and J. Shah, "Towards specification learning from demonstrations," in *Robotics: Science and Systems, Workshop on Learning From Demonstrations for High-Level Robotics Tasks*, 2018

[W3] M. Gombolay and A. Shah, "Appraisal of statistical practices in hri vis-a-vis the t-test for likert items/scales," in *2016 AAAI Fall Symposium Series*, 2016

Thesis

[T1] A. Shah, "Planning for manipulation of interlinked deformable linear objects with applications to aircraft assembly," Master's thesis, Massachusetts Institute of Technology, 2016

Academic Service

Reviewer
- IEEE/RSJ International Conference on Intelligent Robots and Systems
- IEEE International Conference on Robotics and Automation
- AAAI Conference on Artificial Intelligence
- ACM/IEEE International Conference on Human Robot Interaction
- Robotics Science and Systems
- IEEE Conference of Decision and Control
- Conference on Neural Information Processing Systems

Invited Talks

October 2018 Brown University Robotics

March 2019 University of Colorado Boulder

May 2019 University of Washington

Award and Honors

- IIT-B Institute Silver Medal 2013 for the best academic performance in Aerospace Engineering batch of 2013
- IIT-B Boeing Academic Award (2009)
- IIT-B Institute Academic Award (2009, 2010, 2011)
- Gold Medal at the Indian National Physics Olympiads 2009 (Awarded to top-35 students across the country)

Teaching Experience

Fall 2013 **Teaching Assistant**, *16.06 Principles of Automatic Control*.
Undergraduate control theory class

Work Experience

Jan 2014 – Jan 2017 **Research Assistant**, *Robotics in Final Assembly tasks*, Interactive Robotics Group, MIT.
- Developed a task planning algorithm for installation of interlinked cables.
- Developed a perception algorithm to estimate cable shape using depth images.

Jan 2017 – Present **Research Assistant**, *Intelligent Mission Analysis and Review Systems*, Interactive Robotics Group, MIT.
- Developed data-driven models for supervised trajectory segmentation and mission phase annotation.
- Developed a Bayesian inference framework to learn temporal logic specifications from mission demonstrations.

May – Jul 2011 **Summer Intern**, *National Aerospace Laboratories*, Bengaluru, India.
- Developed software routines to compute aircraft drag polars given airframe geometry

Other Projects

May 2010 – May 2013 **Pratham: IITB Student Satellite Project**, IIT-B.
- Head of attitude determination and control subsystem.
- Designed performance verification simulations for attitude control and power distribution systems.

Mentorship

Undergraduate Researchers

Jan 2016 – Jan 2017 **Pravina Samaratunga**.
- Estimation of deformable object shape from depth images.

May 2017 – Jan 2018 **Lotta Blumberg**.
- Simulation and evaluations of task planning algorithms for deformable object manipulation.
- Supervised learning for mission trajectory segmentation.

Feb 2018 – Jun 2018 **David Amirault**.
- Recovering interpretable data structures from temporal logic formulas.
- Design of priors over temporal logic formulas as probabilistic programs.

Sep 2018 – March 2019 **Josh Rosenkranz**.
- Comparison of Seq-2-Seq learning with Bayesian specification inference for simulated air-combat excercise assessment.