Tianyi Gu

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Research Interests

Artificial intelligence, robotics, motion planning, heuristic search, operations research.

Education

University of New Hampshire — Ph.D. in Computer Science, 2015–present
Research on real-time heuristic search, bounded suboptimal search, metaresoning. Advisor: Prof. Wheeler Ruml.
Relevant coursework (GPA: 3.9/4.0):
- Planning for Robots (Prof. Wheeler Ruml)
- Topics in Reinforcement Learning (Prof. Marek Petrik)
- Probabilistic AI and Machine Learning (Prof. Christopher Amato)
- Topics in Multi-Agent and Multi-Robot Systems (Prof. Christopher Amato)
- Introduction to Artificial Intelligence (Prof. Wheeler Ruml)
- Introduction to Mobile Robotics (Prof. Momotaz Begum)
- Introduction to Information Retrieval (Prof. Laura Dietz)

Shanghai Maritime University — M.E. in Logistics Engineering, 2012
Thesis: *Planning for Yard Systems in Container Terminals using Genetic Mechanism-based Approach.* Advisor: Prof. Chengji Liang.

Shanghai Maritime University — B.E. in Logistics Engineering, 2010
Thesis: *SAIC Global Powertrain Development Process Lean Analysis.* Advisor: Prof. Ziqi Xu.

Refereed Archival Publications

Maximilian Fickert, Tianyi Gu, and Wheeler Ruml, "Bounded-Cost Search Using Estimates of Uncertainty." *Proceedings of the Thirtieth International Joint Conference on Artificial Intelligence (IJCAI-21)*, 2021.

Maximilian Fickert, Tianyi Gu, Leonhard Staut, Wheeler Ruml, Joerg Hoffmann, and Marek Petrik, "Beliefs We Can Believe In: Replacing Assumptions with Data in Real-Time Search." *Proceedings of the Thirty-fourth AAAI Conference on Artificial Intelligence (AAAI-20)*, 2020.

Sajay Arthanat, Momotaz Begum, Tianyi Gu, Dain P. LaRoche, Dongpeng Xu, and Naiqian Zhang, "Caregiver Perspectives on A Smart Home-based Socially Assistive Robot for Individuals with Alzheimer's Disease and Related Dementia." *Disability and Rehabilitation: Assistive Technology*, 15(7), pp. 789-798, 2020.

Reazul H. Russel, Tianyi Gu, and Marek Petrik, "Robust Exploration with Tight Bayesian Plausibility Sets," *Proceedings of the 4th Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, 2019.

Scott Kiesel, Tianyi Gu, Wheeler Ruml, "An Effort Bias for Sampling-based Motion Planning," *Proceedings of the IEEE/RSJ Conference on Intelligent Robots and Systems (IROS)*, 2017.

Yi Ding, Xujun Wei, Yang Yang, and Tianyi Gu, "Decision-support-based automatic container sequencing system using heuristic rules," *Cluster Computing*, 20(1), pp. 239-252, 2017.

Chengji Liang, Miaomiao Li, Bo Lu, Tianyi Gu, Jungbok Jo, and Yi Ding, "Dynamic Configuration of QC Allocating Problem Based on Multi-objective Genetic Algorithm," *Journal of Intelligent Manufacturing*, 28(3), pp. 847-855, 2017.

Yi Ding, Shuai Jia, Tianyi Gu, and Chung-Lun Li, "SGICT Builds an Optimization-based System for Daily Berth Planning," *Interfaces*, 46(4), pp. 281-296, 2016.

Chengji Liang, Tianyi Gu, Bo Lu, and Yi Ding, "Genetic Mechanism-based Coupling Alogrithm for Solving Coordinated Scheduling Problems of Yard System in Container Terminals," *Computer & Industrial Engineering*, 89, pp. 34-42, 2015.

Yi Ding, Tianyi Gu, GuoLong Lin, and Chengji Liang, "The Establishment and Solution of Coupling Model on Coordinated Scheduling of Handling Facilities in Container Terminals," *Applied Mathematics & Information Sciences*, 6(3), pp. 915-924, 2012.

Refereed Non-Archival Publications

Maximilian Fickert, Tianyi Gu, Leonhard Staut, Sai Lekyang, Wheeler Ruml, Joerg Hoffmann, and Marek Petrik, "Real-time Planning as Data-driven Decision-making." *Proceedings of the ICAPS Workship on Bridging the Gap Between AI Planning and Reinforcement Learning (PRL-20)*, 2020.

Tianyi Gu, Momotaz Begum, Naiqian Zhang, Dongpeng Xu, Sajay Arthanat, and Dain P. LaRoche, "An Adaptive Software Framework for Dementia-care Robots." *Proceedings of the ICAPS Workshop on Planning and Robotics (PlanRob-20)*, 2020.

Bence Cserna, Wiliam J. Doyle, Tianyi Gu, and Wheeler Ruml, "Safe Temporal Planning for Urban Driving," *Proceedings of the AAAI Workshop on Artificial Intelligence Safety (SafeAI-19)*, 2019.

Professional Experience

University of New Hampshire

Graduate Research Assistant September 2020–present

- Build theoretical foundation for online planning. Seek answers for how to plan in an uncertain environment under time pressure.

Graduate Teaching Assistant September 2015–May 2020

- Involved in creating assignments, exams and conducting recitation sessions for Algorithms (C), Intro to AI, Intro to Computer Science (Java, Python), Intro to Software Engineering, Intro to Computer Security, Database Programming (C#), Scripting Languages (Shell).

Motional

Research Intern May 2020-August 2020

- Propose and develop a learning-based approach to enhance the planner. The feature was integrated to the next generation planner for autonomous vehicles.

Cognitive Assistive Robotics Lab

Robotics Intern May 2019-August 2019

- Build a smart home based service robot framework that can provide real-time Alzheimer's disease care.
- Build a AI planner based on ROSPlan that performs real-time online task planning.

Realtime Robotics

Robotics Intern May 2018-August 2018

- Build a real-time planner for an autonomous vehicle that is able to safely drive in a crowded urban area. Successfully handed off to daily usage.
- Build a real-time planning framework that enabled handling a dynamic world online.
- Build a simulation environment to demostrate flagship product to major new customers.

Shanghai International Port Group

Research Software Development Engineer July 2012-August 2015

- Member of the team that design, build, and deploy a new automated container terminal operations management system, including algorithm development for the crane allocation and scheduling module.
- Help launch previous terminal operating management system.

Alcatel-Lucent

Software Engineer Intern March 2011-September 2011

- Build and deploy a global electrical elements database, including web interface and database maintenance software.

Skills *Programming Languages:* C++, Python.
Dev tools: Linux, Git, Vim, tmux.

Awards Shanghai Outstanding Graduate 2012

University Activities Co-founder and Vice President of Artificial Intelligence Student Organization 2017–Present
Co-founder and Vice President of Shanghai Tongji Table Tennis Club 2005–2015

Citizenship China.
U.S.A visa: F-1.