Yu "Tony" Zhang

Yochan Research Group
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RESEARCH INTEREST

Human-robot teaming, Multi-agent systems, Automated planning, Robot planning and execution, Distributed robotic systems, Human-robot interaction, Combinatorial Optimization.

EDUCATION

Doctor of Philosophy, Computer Science
Department of Electrical Engineering and Computer Science
The University of Tennessee, Knoxville, TN, USA
Aug. 2012, GPA: 4.00/4.00

Master of Science, Computer Science
Department of Electrical Engineering and Computer Science
The University of Tennessee, Knoxville, TN, USA
2009, GPA: 3.96/4.00

Bachelor of Science, Software Engineering
School of Software Engineering
Huazhong University of Science and Technology, Wuhan, P.R.China
2002 - 2006, GPA: 87.55/100

RESEARCH EXPERIENCE

1. Post-doctoral Scholar: Yochan Research Group
Supervisor: Prof. Subbarao Kambhampati, *AAAI Fellow*
CSE, Arizona State University, Tempe, AZ, USA, Since Summer 2013

ARO and ONR funded projects on Planning for human-robot teaming:

This project is to study various topics on planning in human-robot teaming. It is also aimed to learn and understand the limitations of current planning capabilities, and propose novel models and techniques to achieve more efficient human-robot teaming. This research is more broadly related to planning with human in the loop and multi-agent planning. Many research directions are being explored, which include human-robot teaming, human-robot interaction, and multi-agent planning with multiple humans and robots. Current research applications include, for example, urban search and rescue, and proactive decision support.

2. Research Assistant: Distributed Intelligence Laboratory
Advisor: Prof. Lynne E. Parker, *IEEE Fellow*
EECS, The University of Tennessee, Knoxville, TN, USA, Fall 2008 - Fall 2012

NSF funded project on multi-robot cooperation:

The goal is to bridge the gap between coalition formation and execution in distributed systems with heterogeneous robots. For forming coalitions, a semantic reasoning architecture is introduced that can flexibly construct dynamic robot groups to cooperatively accomplish a task with capability sharing. For executing coalitions, an information theoretic approach is presented, which can guide coalition execution while maintaining the desired configurations in a robust and flexible manner, even for overlapping coalitions. This research represents the first general architecture to achieve coalition level autonomy for tightly coupled multi-robot tasks. The proposed architecture can not only be used to implement various applications with distributed robotic systems, but also facilitate more autonomy in human-robot interaction with teams of multiple humans and robots.

3. Undergraduate Thesis
Advisor: Prof. Liqun Huang
SSE, Huazhong University of Science and Technology, China, Summer 2006

Efficient travel schedule building based on pervasive computing:

Efficient travel schedule building based on pervasive computing: The goal is to utilize the location and local map information from the distributed data centers to build path plans online based on points of interest. The software is implemented in C++ with only local database accesses.

GRANT WRITING

1. Instrumentation for Research on Planning for Human-Robot Teaming in Open Worlds, ARO, W911NF-14-1-0503. PI: Kambhampati. (7/29/14 - 7/31/15). $112,864.

Co-write the proposal to obtain funding to purchase robots for our human-robot teaming research projects.

2. RADAR: A Framework for Human-in-the-Loop Planning and Data-Based Decision-Support, ONR, PI: Kambhampati. (1/1/15 - 31/12/15). $148,505. Funding for two more years is pending on the availability of ONR funds.

Co-write the proposal to support our research on proactive decision support systems with emphasis on human-in-the-loop planning.

RECENT HONORS AND AWARDS

1. Doctoral Consortium member (as a mentor), International Conference on Automated Planning and Scheduling (ICAPS), 2014

2. University of Tennessee Chancellor's Citation Award for Extraordinary Professional Promise, 2012

3. University of Tennessee Athletic Department Graduate Student Award: Fellowship
Selected by College of Engineering, the University of Tennessee, Knoxville, 2010 - 2011

4. Undergraduate Excellent Dissertation Award (score $\geq$ 90 out of 100)
Huazhong University of Science and Technology, Wuhan, China, 2006

5. Undergraduate Academic Award (top 10%)
Huazhong University of Science and Technology, Wuhan, China, 2003 - 2006

STUDENT MENTORED

PhD student: Kangjin Kim
Master student: Vignesh Narayanan, Joe Campbell
Undergraduate student: Nathaniel Mendoza, Wyatt Tyree

TEACHING EXPERIENCE

Guest Lecturer: COSC 494/529
Autonomous Mobile Robotics
EECS, The University of Tennessee, Knoxville, TN, USA, Fall 2011
Responsibilities: Lecturing on obstacle avoidance and multi-robot path planning

Teaching Assistant: CS581
Autonomous Mobile Robotics
EECS, The University of Tennessee, Knoxville, TN, USA, Fall 2008
Responsibilities: Leading lab sessions and answering students' questions

Teaching Assistant: CS140
Data Structures and Algorithms
EECS, The University of Tennessee, Knoxville, TN, USA, Spring 2008
Responsibilities: Leading lab sessions and answering students' questions

Teaching Assistant: CS100
Introduction to Computers and Computing
EECS, The University of Tennessee, Knoxville, TN, USA, Fall 2007
Responsibilities: Leading lab sessions and answering students' questions

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RECENT EMPLOYMENT

1. Postdoctoral Research Scholar: Arizona State University
Yochan Research Group, CIDSE, Tempe, ASU, AZ, Since Jul. 2013

2. Member of Technical Staff: Riverbed Technology
Team: Central Management Console (CMC), Sunnyvale, CA, Oct. 2012 - Jun. 2013

3. Research Assistant: Distributed Intelligence Laboratory
Department of Electrical Engineering and Computer Science, UTK, TN, 2008 - 2012

4. Teaching Assistant:
Department of Electrical Engineering and Computer Science, UTK, TN, 2007 - 2008

5. Software Engineer: BCM
Infosys Technologies (China) Co. Ltd., Shanghai, China, 2006 - 2007

6. Software Engineer (Intern):
(One of the 96 selected interns from 17 topmost universities in China)
Infosys Technologies Ltd., Mysore & Banglore, India, 2005 - 2006

PUBLICATIONS

1 (c). Y. Zhang and S. Kambhampati, Learning of Agent Capability Models with Applications in Multi-agent Planning, in conference submission, 2014.

2 (c). V. Narayanan, Y. Zhang, N. Mendoza and S. Kambhampati, Plan or not: Remote Human-robot Teaming with Incomplete Task Information, in conference submission, 2014.

3 (c). Y. Zhang and S. Kambhampati, A Formal Analysis of Required Cooperation in Multi-agent Planning, in conference submission, 2014.
An extension of the workshop paper in DMAP.

4 (j). Y. Zhang and L. E. Parker, FLOW: Information Flow-based Coalition Execution for Tightly Coupled Multirobot Tasks, re-submitted to *IEEE Transactions on Robotics*, 2014. *Ranked* 1*st in Robotics journal based on JCR 2013.*

5 (c). Y. Zhang, K. Kim and G. Fainekos, DisCoF: Cooperative Pathfinding in Distributed Systems with Limited Sensing and Communication Range, to appear in *International Symposium on Distributed Autonomous Robotic Systems*, 2014.

6 (w). Y. Zhang and S. Kambhampati, A Formal Analysis of Required Cooperation in Multi-agent Planning, in DMAP Workshop in *International Conference on Automated Planning and Scheduling (ICAPS)*, 2014.

7 (c). Y. Zhang, L. E. Parker and S. Kambhampati, Coalition Coordination for Tightly Coupled Multirobot Tasks with Sensor Constraints, in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, 2014.

8 (c). Y. Zhang and L. E. Parker, Multi-Robot Task Scheduling, in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, 2013.

9 (j). Y. Zhang and L. E. Parker, IQ-ASyMTRe: Forming Executable Coalitions for Tightly-Coupled Multi-robot Tasks, *IEEE Transactions on Robotics*, 29(2): 400-416, 2013. *Ranked* 1*st in Robotics journal based on JCR 2013.*

10 (j). Y. Zhang and L. E. Parker, Considering Inter-Task Resource Constraints in Task Allocation, *Journal of Autonomous Agents and Multi-Agent Systems*, vol. 26, pp. 389-419, 2013.

11 (d). Y. Zhang, Coalition Formation and Execution in Multi-robot Tasks. *PhD diss., University of Tennessee*, 2012..

12 (c). Y. Zhang and L. E. Parker, Task Allocation with Executable Coalitions in Multirobot Tasks, in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, 2012.

13 (c). Y. Zhang and L. E. Parker, Solution Space Reasoning to Improve IQ-ASyMTRe in Tightly-Coupled Multirobot Tasks, in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, 2011.

14 (c). Y. Zhang and L. E. Parker, IQ-ASyMTRe: Synthesizing Coalition Formation and Execution for Tightly-Coupled Multirobot Tasks, in *Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2010.

15 (c). Y. Zhang and L. E. Parker, A General Information Quality Based Approach

for Satisfying Sensor Constraints in Multirobot Tasks, in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, 2010.

Several other papers are being prepared for submission.

TALKS

1. Y. Zhang, S. Kambhampati, A Formal Analysis of Required Cooperation in Multi-agent Planning, in *International Conference on Automated Planning and Scheduling (ICAPS)*, Portsmouth, NH, 2014.

2. Y. Zhang and L. E. Parker, Coalition Coordination for Tightly Coupled Multi-robot Tasks with Sensor Constraints, in *IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, 2014.

3. Y. Zhang and L. E. Parker, Multi-Robot Task Scheduling, in *IEEE International Conference on Robotics and Automation (ICRA)*, Karlsruhe, Germany, 2013.

4. Y. Zhang and L. E. Parker, Task Allocation with Executable Coalitions in Multi-robot Tasks, in *IEEE International Conference on Robotics and Automation (ICRA)*, Saint Paul, Minnesota, 2012.

5. Y. Zhang and L. E. Parker, Solution Space Reasoning to Improve IQ-ASyMTRe in Tightly-Coupled Multirobot Tasks, in *IEEE International Conference on Robotics and Automation (ICRA)*, Shanghai, China, 2011.

6. Y. Zhang and L. E. Parker, IQ-ASyMTRe: Synthesizing Coalition Formation and Execution for Tightly-Coupled Multirobot Tasks, in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Taipei, Taiwan, 2010.

7. Y. Zhang and L. E. Parker, A General Information Quality Based Approach for Satisfying Sensor Constraints in Multirobot Tasks, in *IEEE International Conference on Robotics and Automation (ICRA)*, Anchorage, Alaska, 2010.

REVIEWER

AAAI Conference on Artificial Intelligence (Program Committee)
Artificial Intelligence
Autonomous Robots
IEEE Transactions on Mobile Computing
Journal of Intelligent and Robotic Systems
IEEE International Conference on Robotics and Automation (ICRA)
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

SOCIETIES

IEEE Student Member, Since 2009; IEEE Member, since 2013.

REFERENCES

Available upon request.
