

RSS 2021 Social Robot Navigation Workshop Proposal

Title: RSS Workshop on Social Robot Navigation

Organizers:

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Workshop or Tutorial:

Workshop

URL:

<https://socialrobotnavigation.github.io>

Description

The social navigation and prediction community has reached a crucial point. Despite the large volume of publications, we lack a “common language.” Broadly speaking, we have yet to reach consensus about

- The most meaningful skills, capabilities, and behaviors that a social navigation system should have.

- Validation standards. Practitioners adopt different scenarios, experimental setups, robot platforms, baselines, and metrics.
- The representations best suited for prediction/planning/control in social navigation settings.
- What constitutes a good social navigation dataset and how to make *use* of datasets (e.g., for training or validation).

Motivated by these observations, we would like to call a diverse, multidisciplinary audience to participate in an interactive, discussion-oriented workshop. We would like to hear from roboticists, social scientists, and designers about how to develop best practices for social robot navigation research. The workshop will be organized around focus topics, which are narrow “common language” challenges. After our invited speakers present short motivational talks about a focus topic, workshop participants will break off into multiple workgroups. These workgroups will be composed of the invited speakers, the organizers, and the workshop attendees.

The theme of our workshop is inherently interdisciplinary. As such, we are targeting researchers, developers, and practitioners from both academia and industry and from a wide variety of fields, including robotics, human-robot interaction, and machine learning, but also communities not traditionally part of RSS such as computer graphics, human-computer interaction, psychology, sociology, the performing arts, and designers.

Plans to Encourage Participation

Our goal is to organize a truly interactive, discussion-oriented workshop. To this end, we will organize our workshop around a series of focus topics. We will ask keynote speakers to introduce these topics in their talks. After the keynotes, participants will break off into multiple workgroups. These workgroups will consist of workshop attendees, invited speakers, and organizers. After the breakout sessions, the workgroups will merge into the main room and engage in an open discussion. Through this format, we will encourage the community to drive the conversation around the focus topics.

We will be soliciting participation in the workshop through contributed papers. These will be presented with lightning talks and poster presentations in between the keynotes. We will target a multidisciplinary, diverse audience in the following ways:

- Spreading the word with targeted emails to parties of interest within academia and industry.
- Spreading the word within our home departments both in academia and industry.
- Sharing to mailing lists including robotics-worldwide, eurobotics, Women in ML, Women in Robotics, Machine Learning News, Black in robotics.

Discussion Topics

Here is a tentative list of the focus topics we intend to cover:

Focus topic 1: What are the most important variables that influence social robot navigation performance? In other words, what levers should we be exploring?

- What robot behaviors will enable untrained bystanders/pedestrians to navigate effectively around robots? What behavior models and interaction metaphors are most effective for enabling effective robot navigation -- human-like, dog-like, what else?
- What social robot navigation performance metrics should we optimize for? How should we measure them? What are appropriate benchmarks? What are some good baselines? How do we ensure that these metrics are accessible to the community?
- How do we design social robot navigation studies to address and get beyond novelty effects in our data?

Focus topic 2: What are the best abstractions for social robot navigation from the perspective of perception, planning, and control?

- What are the appropriate representations to capture important properties of crowd behavior?
- What is the right level of detail to include in context models? How does this change depending on the experimental setting?
- How do we encode behavior specifications into objective or reward functions?
- How do we verify that a robot navigation framework is correct and safe? How do we manage a safety critical system without safety guarantees?

Focus topic 3: How should we collect (or generate) and use data for social robot navigation?

- What properties should a social navigation dataset capture? How do we deal with uncontrollable variables in experimental settings?
- What aspects of human behavior can be simulated? What aspects of human behavior are most important for social navigation?
- How do the limitations of simulation inform our understanding of reinforcement learning? For example: if we train on social forces agents, can we quantify performance boundaries when deploying in real world settings?
- What role does supervised (e.g. deep) learning play in social navigation? How do we verify that we have not learned dataset specific artifacts?
- How do address transfer/out of distribution performance for both reinforcement or supervised learning approaches? How does the fragility of RL and supervised learning inform future approaches?
- What role does active learning play in social navigation? For example, specific people might have specific preferences for interactive robot behavior---can we such things during field deployment?

Special Requirements

None.

Invited Speakers and Panelists

Confirmed Speakers

Anca Dragan, UC Berkeley, anca@berkeley.edu [topic 3]

Jonathan How, Massachusetts Institute of Technology, jhow@mit.edu [topic 2]

Wendy Ju, Cornell Tech, wj23@cornell.edu [topic 1]

Takayuki Kanda, Kyoto University, kanda@atr.jp [topic 1]

Todd Murphey, Northwestern University, t-murphey@northwestern.edu [topic 3]

Reid Simmons, Carnegie Mellon University, rsimmons@andrew.cmu.edu [topic 2]

Tentative Schedule

Time (e.g., Eastern timezone)	Description
9:00-9:15	Welcome, Introductions and agenda
9:15-9:40	Keynote 1 (20min), QA (5min)
9:40-10:05	Keynote 2 (20min), QA (5min)
10:05-10:30	Spotlight Session I
10:30-11:55	Break
11:55-11:20	Keynote 4 (20min), QA (5min)
11:20-11:45	Keynote 5 (20min), QA (5min)
11:45-13:00	Lunch break
13:00-13:25	Spotlight Session II
14:05-14:30	Keynote 5 (20min), QA (5min)
14:30-15:30	Breakout Session
15:30-16:00	Break
16:00-17:00	Panel Discussion
17:00-17:10	Closing and next steps

Acknowledgement to Attend Organizers Meeting

Acknowledged.