FND: Mutually Aware Social Navigation

Aaron Steinfeld, Robotics Institute, Carnegie Mellon University
tbd.ri.cmu.edu

Lead Students: Allan Wang (PhD, current) & Abhijat Biswas (MS, graduated)

Collaborators: Henny Admoni (RI), Jean Oh (RI), Zakia Hammal (RI), Christoforos Mavrogiannis (UW), Francesca Baldini (Caltech), & Peter Trautman (Honda Research Institute USA)

Challenge

1. Improve the way robots reason about human spatial behavior.

2. Develop navigation methods that lead to understandable and appropriate motion patterns in social environments.

Scientific Impact

Create human-aware navigation using methods that incorporate the social norms which govern human physical space into robot planning.

Provide resources for other research teams and developers.

Research Activities (this year)

- Released an open dataset of robot-perspective, ground-truth position, public behavior dataset. This includes labels in metric space. More data collection is planned in the coming year. tbd.ri.cmu.edu/tbd-social-navigation-datasets
- SocNavBench: a simulator with photo-realistic capabilities and curated social navigation scenarios grounded in real-world pedestrian data. github.com/CMU-TBD/SocNavBench

- Co-organizing ICRA 2022 Workshop on Social Robot Navigation. seannavbench2022.netlify.app
- CoRL 2022: group-based motion prediction for navigation in crowded environments. openreview.net/forum?id=knObbYqSowX
- A detailed, collaborative survey article documenting the core challenges of social robot navigation (in review).
- Continuing work on algorithmic advances for group motion and personal space (in preparation).

Society

Identify appropriate and accepted robot motion behaviors in public settings.

Education & Outreach

Establish a sharable dataset and software pipelines for benchmarking.

Potential Impact

Accelerate system development through open-source technology and datasets.