Social Navigation Evaluation Scenarios and Why They're Kinda Bogus

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***Abstract*—Put the abstract here.**

I. Introduction

This paper is organized as follows: section **??** presents the background and current evaluation techniques.

II. Background

Social navigation algorithms aim to solve a path planning problem in a scenario both humans and robots. The introduction of human agents radically changes the objectives of, and, consequentially, the methods for evaluating, these algorithms. The main goal shifts from maximizing the global efficiency of all agents to avoiding excessive interaction with and hindrance of the human agents.

- SNA solve a modified path planning problem
  - Heterogeneous simulation (human and robits)
  - This changes the game completely for evaluation
    - Previous Goal: Maximize global efficiency
    - New Goal: Don't mess with the humans but still get to your goal fast
  - Current approaches
    - DRL
      - [**?**]
    - DL
      - NaviGAN

Methods of evaluation for social navigation algorithms can be broadly separated into three distinct classes. The first is to utilize existing pedestrian interaction datasets. The agents initial positions are set to the pedestrian positions at some time τ. As the both the agents and pedestrians positions progress as time goes on the difference between the two can be measured. This can be thought of as a measure of how human-like the agents movements are. This is attractive method because there is a wealth of pedestrian data online. However, the pedestrians in these datasets are not in the mindset of interacting with robots, therefore the results from this measure might not map directly to the goodness of an algorithm.

- Simulation Techniques
  - Utilizing existing pedestrian-pedestrian interaction
    - Datasets are widely available
    - Deterministic metrics for evaluation (same trajectories each time)
    - Pedestrians are trying to interact with pedestrians, vibes are all wrong
    - [**?**]
- Completely simulating pedestrians
  - Can run trials until your CPU explodes
  - Dependent on how good your pedestrian algorithms are and how realistic the simulation is
- Using real humans to interact, even in simulation or real life
  - Ideal
- Datasets are required, no matter the technique choice
  - Crowd datasets are required for 1. and there is a finite amount
  - For the last two
    - Realistic start and goal positions are required
    - Hypothesis: These start and goal positions are normally bogus
      - Circle is bogus
      - Two groups not much better

A. Human in the Loop

[**?**]

B. Simulation

Evaluating the navigation algorithm in the presence of simulated [**?**] **

III. Conclusion

References

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