Socially CompliAnt Navigation Dataset (*SCAND*): A Large-Scale Dataset Of Demonstrations For Social Navigation

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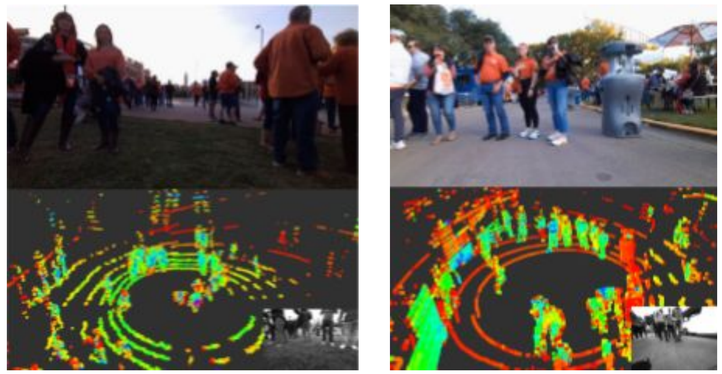
Abstract

- **Social Navigation** is a complex, multi-objective, multi-agent problem for which defining a reward / cost function is hard.
- We instead take the **imitation learning** approach since demonstrating socially compliant navigation is easy.
- To address the lack of datasets for socially compliant robot navigation, we introduce **SCAND** - A large scale **dataset** of **socially compliant** navigation **demonstrations**.
- Using SCAND, we show that policies learned via **Imitation Learning** generates behaviors that are perceived to be more safer and socially compliant, compared to a baseline navigation stack.



Two example scenes from *SCAND*, showing **navigation through large crowds** of people

What does SCAND contain ?

- **138 Trajectories**, **8+ hours** of rich interaction data
- **Multi-modal** sensor information such as Velodyne point clouds, Odometry, RGB, surround view monocular images, Localization, Joystick commands
- Collected in both **indoor and outdoor** environments in the wild
- **Annotations** of 12 different social interactions
- Data from **2 robots** - wheeled Jackal + legged Spot

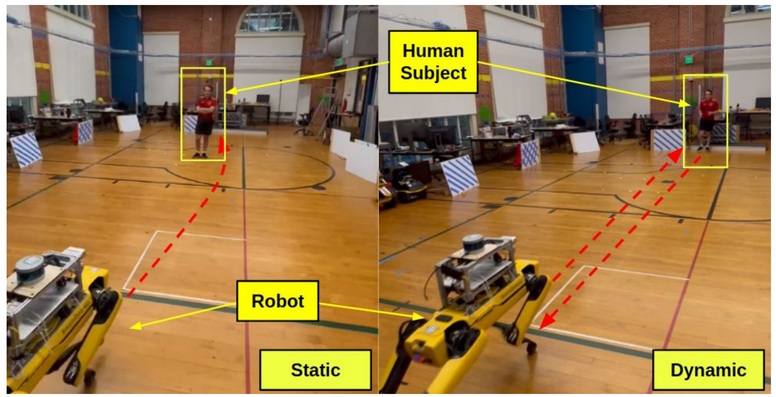
SCAND is a **large-scale dataset of socially compliant navigation demonstrations**, collected in indoor and outdoor environments in the wild

SCAN ME!

https://arxiv.org/abs/2203.15041

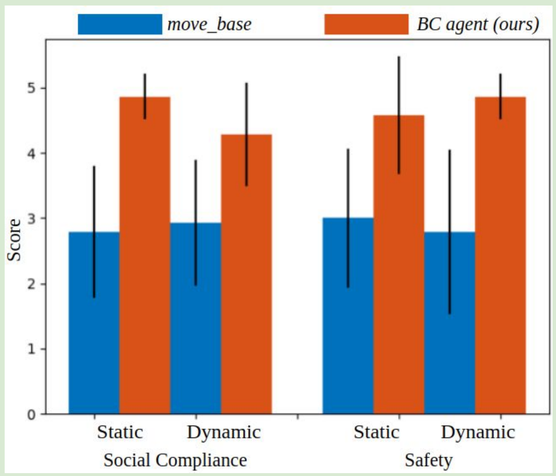
Imitation Learning

- We train a socially compliant **local controller** using **behavior cloning** on the SCAND dataset.
- Through human trials, we validate that the local planner is **more socially compliant and safe**, compared to *move_base*.



Indoor *Static* and *Dynamic* human trials

Experimental Results



The BC agent learned from SCAND was perceived by 14 human participants as "**safer**" and more "**socially compliant**"