Projecting Robot Navigation
Paths: Hardware and Software for Projected AR

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Motivation: Where Are They Going?

Projecting Robot Navigation Paths

Before

After
Goal of this Code Paper

● **Detail empirical evidence**
  ○ Directional projections – arrow, gradient bands, or lines – were all proven effective and improved perception

● **Share a robot-agnostic implementation**
  ○ ROS – works on more robots
  ○ rviz – no computer graphics library needed
  ○ Hardware setup details
    ■ Robot, projector and power

Main Features

- **Arrows for paths**
  - Evenly spaced

- **Circle for destination**

- **Generalizability**
  - Any rviz visualization: Point cloud, spheres, cubes, and more

- **Extra evaluation**

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How to Project Navigation Paths

1. **Hardware**
   1.1. Robot with power
   1.2. Mount off-shelf projector & add TF frame

2. **Software**
   2.1. Convert probabilistic global path
   2.2. Subscribe output in Rviz via rviz camera_stream plugin
   2.3. Output rviz camera image

Main Takeaways

1. **Projecting navigation paths** is a proven way to convey nav. intent

2. With our code, you can **mount a projector** and use ROS & rviz to achieve it (and **any rviz visualizations**)!

3. Read our paper for a **hardware setup** and more: [bit.ly/hri22](http://bit.ly/hri22)