Visual and Spatial Robotic Task Planning Using an Augmented Reality Authoring Interface

This technology uses Augmented Reality and the Internet of Things with a handheld device to directly and spatially program robot navigation and interactive functions for location and time-based tasks without needing external tracking systems.

Task planning for mobile robots is an important topic in the general robotics area. Many previous works have adopted an Augmented Reality (AR) interface for robot task planning and animation authoring because of its ability to bridge the digital authoring interface with the physical world. However, they all use an external computer vision approach, i.e. with image markers or object recognition methods, to localize the robot during the manipulation and navigation. Being able to program the robot to perform a series of location and time-based sequential tasks has the potential to greatly help us in daily life.

Researchers at Purdue University have developed a lightweight design for robot task planning with a spatially situated approach. This technology utilizes AR interfaces, Robot Assistants (RA), and the interactive Internet of Things (IoT) to program robots and machines using a smart phone. With a handheld device, the user can move around to directly and spatially author the robot's navigation path and interactive functions with room-level navigation without needing an external tracking system.

Advantages:

-Direct visual authoring

-Easy to install

-Ready to use

Potential Applications:

-Robotics

Technology ID

2018-RAMA-68259

Category

Robotics & Automation/Perception & Sensing
Robotics & Automation/AI-Based Motion Planning & Navigation

Authors

Yuanzhi Cao
Karthik Ramani
Zhuangying Xu

Further information

Matt Halladay
MRHalladay@prf.org

Erinn Frank
EEFrank@prf.org

View online

-Internet of Things

TRL: 3

Intellectual Property:

Provisional-Patent, 2018-04-23, United States

PCT-Patent, 2019-04-23, WO

NATL-Patent, 2020-10-23, United States

Keywords: robot task planning, mobile robot task planning, augmented reality robot programming, AR robot interface, spatially situated approach, visual authoring for robotics, Robot Assistants (RA), Interactive Internet of Things (IoT), robot navigation path authoring, AR-SLAM, Augmented Reality, Computer Technology, Robot Navigation, Robotic Task Planning, Sequential Task Authoring, SLAM