RobotDockCenter: A Novel and Supervised Learning Approach to Robot Docking Using Monocular Vision

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Abstract

Robot docking is a critical task in autonomous systems. It allows a robotic entity to continue its designated workflow without the need for human intervention. Autonomous docking solutions have typically been centered on using and combining various sensors including LIDAR scanners and ultrasonic sensors, and even combining such sensors with cameras [Jia et al., 2023]. In the world of robotics, reinforcement learning has recently played a major role in further developing autonomy. In this paper, we propose an alternative approach to robot docking using monocular vision without the need of additional sensors or reinforcement learning. We use basic deep learning techniques to predict the next action based on a single input frame containing the target docking station. Our approach is supervised and does not require any form of reward function or policy optimization.

1 Introduction

2 Related Work

The work of Jia et al. [2023] provides a comprehensive review of existing docking methods.

3 Methodology

4 Experimental Results

5 Discussion

6 Conclusion

References

Feiyu Jia, Misha Afaq, Ben Ripka, Quamrul Huda, and Rafiq Ahmad. Vision- and lidar-based autonomous docking and recharging of a mobile robot for machine tending in autonomous manufacturing environments. *Applied Sciences*, 13(19), 2023. ISSN 2076-3417. doi: 10.3390/app131910675. URL `https://www.mdpi.com/2076-3417/13/19/10675`.