Deep Reinforcement Learning Driven SLAM and Navigation System for Airport Robots

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Abstract

A DRL-driven SLAM and Navigation System for airport robots could enable robots to find the most efficient paths, reducing travel time and increasing productivity. However, to solve the practical challenges, our team has devoted to increasing the accuracy and improving the algorithm performance.

1 SLAM Technology

SLAM (Simultaneous Localization and Mapping) in navigation is an important and complex topic. It is one kind of technology that allows a robot or an automated navigation system to localize its own position and build a map of the environment while exploring it. SLAM is extensively employed in dynamic navigation, e.g., unmanned vehicles, and indoor robots. However, it also faces numerous challenges, including maintaining accuracy in dynamic environments and computational performance optimization.

2 Deep Reinforcement Learning

2.1 Theoretical foundation

Deep Reinforcement Learning (DRL) is an advanced field in Artificial Intelligence that combines the principles of deep learning and reinforcement learning. It is a powerful method for training algorithms to make a range of decisions by interacting with complex, uncertain environments. It can help with high-dimensional data and complex environments, and is able to adapt to changing environments, learning the best strategies through continuous feedback.

2.2 Innovation Idea