Deep Q-Network for Navigation in Gazebo Simulator

Authors : Xabier Olaz Moratinos

Abstract : Drone navigation is critical, particularly during the initial phases, such as the initial ascension, where pilots may fail due to strong external interferences that could potentially lead to a crash. In this ongoing work, a drone has been successfully trained to perform an ascent of up to 6 meters at speeds with external disturbances pushing it up to 24 mph, with the DQN algorithm managing external forces affecting the system. It has been demonstrated that the system can control its height, position, and stability in all three axes (roll, pitch, and yaw) throughout the process. The learning process is carried out in the Gazebo simulator, which emulates interferences, while ROS is used to communicate with the agent.

Keywords : machine learning, DQN, Gazebo, navigation
Conference Title : ICAADE 2023 : International Conference on Automated Algorithm Design and Evaluation
Conference Location : Vancouver, Canada
Conference Dates : May 22-23, 2023