From Earth Missions to Deep Space Exploration (05)
Poster Session (P)

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EFFICIENT NAVIGATION AND MAPPING TECHNIQUES FOR THE KAPVIK ANALOGUE MICRO-ROVER

Abstract

Planetary rover missions carry a high cost which limits potentially risky but valuable exploration opportunities on Mars or the Moon. By using micro-rovers to scout ahead and map an area for larger rovers or human explorers, the risk to a mission can be reduced. However, micro-rovers will have limited power and computation ability compared to their larger counterparts.

This paper explores an efficient method of analyzing external mapping data from LIDAR or stereo vision using neural networks. This is combined with a unique navigation framework for a micro-rover scout. The proposed algorithm is tested in simulation and the real world on the Kapvik Canadian micro-rover, demonstrating the importance of Earth analogue missions as precursors to missions to Mars and the Moon.