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著者名	Toui Sato, Ryuma Matsumoto, Yasuharu Kunii, Takao Maeda				

SPET: Swarm Probability Exploration Tracker for Stochastic Distributed Exploration System toward Wide Area Exploration

Toui Sato, Ryuma Matsumoto, Yasuharu Kunii, Takao Maeda

Abstract

Robots such as exploration rovers are widely used in planetary missions and tasks on the earth. The missions of these robots are mainly resource discovery and sample return, and various other tasks can be considered. Because it is a large robot, it can have many mounted devices and functions. On the other hand, as the size of the system increases, the development cost becomes enormous, and a long development period is required. In addition, because the loss cost of the robot is high, the robot is run with safety as a priority, and it cannot be said that search efficiency is good. In order to counter these problems, we have proposed a distributed exploration system using multiple small robots. This exploration system is examining a jumping parent robot and a ground traveling child robot. In this paper, the ground running robot SPET which is a child robot is explained. The child robot acts based on the positional relationship with the parent rover. In addition, since it is possible to travel on uneven terrain, posture estimation is also necessary.

So, a compact and lightweight attitude / position estimation system for a compact robot with limited mass resources is needed. SPET has been developed to verify the exploration algorithm of the exploration system. In recent years, robots on the earth are expected to perform similar tasks at disaster sites and construction sites. In the future, the airframe will be improved, and practical applications in ground environments such as construction sites are being considered.

■理工学研究所との関連

研究代表者	國井　康晴	研究グループ	電気	年度	2017-2019
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