論文 / 著書情報
Article / Book Information

論題(和文)	
Title(English)	Real-Time Self-Localization Method for Nonstop Moving Autonomous Mobile Robot
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出典(和文)	, , , , P-104
Citation(English)	, , , , P-104
会議名称(和文)	
ConferenceName(English)	IEEE EDS WIMNACT-37: Future Trend of Nanodevices and Photonics
発行日 / Pub. date	2013, 2

Real-Time Self-Localization Method for Nonstop Moving Autonomous Mobile Robot

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Introduction

In case nonstop moving autonomous mobile robot cannot take plural landmark at a time, using triangulation as self-localization is inappropriate. Because when the robot measures a distance to the landmark and a direction to the landmark, positional relation between the robot and the other landmark get out of shape. This study proposes real-time self-localization method using stereo pan-tilt camera for the robot and is verified an efficacy of the method.

Experimental Procedure

This method uses particle-filter[1] and a landmark. A particle of particle-filter points to the robot location. While the robot running, particle-filter estimates an error of the robot and diffuses particles. But, diffused particles decrease reliability of the robot location. The robot is given the landmark location in an environmental map. The robot looks a landmark using stereo pan-tilt camera, convergences particles and estimates unique location.

While the robot runs in the environmental map, the pausing robot self-localization using the landmark result is equals with the nonstop robot self-localization result at a time. First case, the stopping robot localizes using the landmarks. Second case, the pausing robot localizes using the landmark. If second case result is as equal as first case result, this method is efficacy.

Results and Discussion

The robot has run to a goal in the environmental map using each case. The robot has been able to verify an efficacy of the method. The robot

Conclusion

The robot can do self-localization if the robot looks stably a landmark.

Acknowledgement

This study was supported by the Japan Science and Technology Agency.

References

[1] Tomoyuki HIGUCHI: “Particle Filter”, Institute of Electronics Information and Communication Engineers, Vol.8, No.12, pp.989-994, 2005

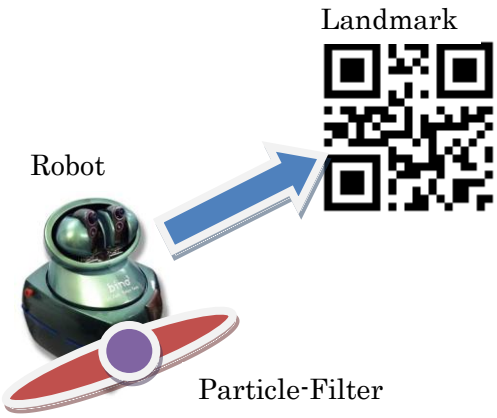

Figure 1 Self-Localization