

[Home](#) [Browse](#) [Search](#) [My Settings](#) [Alerts](#) [Help](#)

Quick Search Title, abstract, keywords Author
 ? search tips Journal/book title Volume Issue Page

Robotics and Autonomous Systems

Volume 47, Issue 4, 31 July 2004, Pages 251-267

[Abstract](#)
[Full Text + Links](#)
[PDF \(718 K\)](#)

[Add to my Quick Links](#)

[Cited By](#)

[E-mail Article](#)

[Save as Citation Alert](#)

[Export Citation](#)

doi:10.1016/j.robot.2004.03.014 [Cite or Link Using DOI](#)

Copyright © 2004 Elsevier B.V. All rights reserved.

[View Record in Scopus](#)
[Cited By in Scopus \(8\)](#)

Image-based memory for robot navigation using properties of omnidirectional images

Emanuele Menegatti^a, Takeshi Maeda^b and Hiroshi Ishiguro^c

^a Intelligent Autonomous Systems Laboratory, Department of Information Engineering (DIE), Faculty of Engineering, The University of Padua, Via Gradenigo 6/a, 35131, Padova, Italy

^b VStone Co. Ltd., Shimaya 4-2-7, Konohana, Osaka 554-0024, Japan

^c Department of Adaptive Machine Systems, Osaka University, Suita, Osaka 565-0871, Japan

Received 25 July 2003; Revised 22 February 2004; accepted 8 March 2004. Available online 9 June 2004.

Abstract

This paper proposes a new technique for vision-based robot navigation. The basic framework is to localise the robot by comparing images taken at its current location with reference images stored in its memory. In this work, the only sensor mounted on the robot is an omnidirectional camera. The Fourier components of the omnidirectional image provide a signature for the views acquired by the robot and can be used to simplify the solution to the robot navigation problem. The proposed system can calculate the robot position with variable accuracy (‘hierarchical localisation’) saving computational time when the robot does not need a precise localisation (e.g. when it is travelling through a clear space). In addition, the system is able to self-organise its visual memory of the environment. The self-organisation of visual memory is essential to realise a fully autonomous robot that is able to navigate in an unexplored environment. Experimental evidence of the robustness of this system is given in unmodified office environments.

Author Keywords: Omnidirectional vision; Image-based navigation; Fourier transform; Hierarchical localisation; Mobile robot



Corresponding author. Tel.: +39-049 827 7856; fax: +39-049 827 7799.

Robotics and Autonomous Systems

Volume 47, Issue 4, 31 July 2004, Pages 251-267

[Home](#) [Browse](#) [Search](#) [My Settings](#) [Alerts](#) [Help](#)

[About ScienceDirect](#) | [Contact Us](#) | [Terms & Conditions](#) | [Privacy Policy](#)

Copyright © 2007 [Elsevier B.V.](#) All rights reserved. ScienceDirect® is a registered trademark of Elsevier B.V.