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Closed-form solution of visual-inertial structure from motion. (English) Zbl 1328.68248

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Summary: This paper investigates the visual-inertial structure from motion problem. A simple closed form solution to this problem is introduced. Special attention is devoted to identify the conditions under which the problem has a finite number of solutions. Specifically, it is shown that the problem can have a unique solution, two distinct solutions and infinite solutions depending on the trajectory, on the number of point-features and on their layout and on the number of camera images. The investigation is also performed in the case when the inertial data are biased, showing that, in this latter case, more images and more restrictive conditions on the trajectory are required for the problem resolvability.

MSC:

68T45 Machine vision and scene understanding

68T40 Artificial intelligence for robotics

Keywords:

sensor fusion; structure from motion; inertial sensors; robotics

Software:

MonoSLAM

Full Text: [DOI](#)

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