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VISUAL NAVIGATION OF UNDERWATER VEHICLE FOR LOCAL MANEUVERING

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ABSTRACTS

To reconstruct the underwater vehicle path, the information from on-board video cameras is used. Technologies based on optimization methods, robust "generation and testing" schemes, Hough transformation, etc. have already been investigated in different studies. Particularly algorithms of optical flow calculation with regard for environmental features are applied. However search and survey of environmental features limit the applied methods due to inaccuracy while frame-by-frame video surveying, namely localization and estimation errors. To eliminate "bad" features and localization errors as well as to navigate, Random Sample Consensus (RANSAC) is used. The problem is to determine the real-time underwater robot location according to the sequence of stereo video images. The algorithm is based on modified RANSAC method using 3D-point clouds of environmental features. For extracting and tracking 2D-multitude of environmental features KLT-tracker is used. The estimations evidence to the effectiveness of the proposed method of visual navigation for underwater vehicle local maneuver purposes. In prospect we are planning to apply parallel computing according to CUDA technology in real-time operation.

Key words: visual navigation, optical flow, Random Sample Consensus, environmental features, 3D-point clouds.

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