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on

Self-organized Underwater Image Enhancement

by

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Abstract: This presentation will cover three self-organized methods for enhancing underwater imagery. The term 'self-organize' means that the models can automatically achieve optimal performance. First, a Metalantis framework is introduced, which uses variations such as submergence, relief, and ebb in indoor scenes to simulate Atlantis-like conditions. It leverages virtually generated data to optimize underwater imaging configurations. Second, a transparent white box model is proposed that automatically selects image processing methods and tunes parameters to achieve the best underwater visual representation. Third, another enhancement model improves visual quality and boosts object detection performance by focusing on increasing detection scores during training. Reinforcement learning is a common thread among these methods, proving to be an effective strategy in various underwater enhancement scenarios.

Biography: Peng Ren received the BEng and MEng degrees both in electronic engineering from Harbin Institute of Technology, China, and PhD in computer science from the University of York, UK. He is currently a full professor with the College of Oceanography and Space Informatics, China University of Petroleum (East China). He is the director of Shandong Youth Innovative Team of Offshore Unmanned Observation and also the director of Qingdao International Research Center of Intelligent Forecast and Detection of Oceanic Catastrophes. He received the K. M. Scott Prize from the University of York, and the Eduardo Caianiello Best Student Paper Award from 18th International Conference on Image Analysis and Processing as one co-author. He serves as associate editors of IEEE TGRS, IEEE JOE, and PR. His research interests include learning based underwater imaging and remote sensing, and on-orbit FPGA computation, etc. He is an OES distinguished lecturer.

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