

A Feasibility Study of Using Color Indexing for Reef Fish Identification

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Abstract: The colorful reef fishes are always most conspicuous and attractive by their vibrant colors in an aquarium. Usually, aquarium provides the visitors with pictures and some description of the reef fishes in the exhibition tank. However, an aquarium equipping with an automatic reef fish recognition system can add attractions and help aquarium to educate people about these fishes. For assistance in distinguishing among different species of reef fish, the coloration could be an important identifying feature for this task. In 1991, Swain and Ballard first proposed the algorithm of color indexing for identifying an object in a known location and locating a known object. They demonstrated that color histograms of multicolored objects provide a robust cue for indexing into a large database of models. Their results showed the potential of the color indexing algorithm in processing color images for object identification. Based on this idea, this paper explores the use of color indexing to identify species of reef fish exhibited at the National Museum of Marine Biology and Aquarium in Taiwan. To identify reef fish based on their color histograms, the similarity of the color histogram of a fish image to the color histograms in the database should be able to be judged. Therefore, a matching method called histogram intersection is utilized to compare histograms for recognition. To assess the usefulness of color indexing, the robustness of fish identification to problems of distractions in the background of the fish, viewing the object from a variety of viewpoints, occlusion, and varying image resolutions is evaluated. The result of this research would provide how useful color is for identification in biological systems.