ICES CM 2016/H:68

Automatic recognition of otoliths which have a high shape similarity

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Abstract. Otolith has a distinctive external form which is usually a characteristic of fish species. The external shape of the Otolith varies according to species, but it's substantially constant in the same species. This can be used as a characteristic of fish species recognition. Identification of fish species using Otoliths is a major issue in many marine ecological studies. For example, the Otoliths recovered from the stomach or feces could be used to determine the food spectrum. In recent years, several approaches have been proposed in the recognition of fish species using the otolith shape, some techniques give good recognition results when otoliths have different forms, but when we have a high shape similarity the recognition is not completely successful. In this paper, we present a new approach for recognition of fish species by image analysis based on the extraction of the normal angles of an 8-connected otoliths contour, this contour is described by Fourier descriptors. To show the efficiency of the approach proposed, we have tested this approach on an otoliths database which have a high similarity in external otolith form. This database of otoliths is from Moroccan Atlantic ocean and it contains 162 otoliths image of three species of merluccius family (merluccius merluccius, merluccius polli and merluccius senegalensis), the correct classification rate obtained was 96%.

Keywords: Fish, Otoliths, Shape analysis, otolith recognition, Classification, normal angles , Fourier descriptors, 8-connected contour.

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