University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Applied Science

of

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BSc (Azad University, 2010)

"Towards Robust Identification of Slow Moving Animals in Deep-sea Imagery by Integrating Shape and Appearance Cues"

Department of Electrical and Computer Engineering

July 24, 2015
10:30 A.M.
Engineering and Computer Science Building
Room 660

Supervisory Committee:
Dr. Alexandra Branzan Albu, Department of Electrical and Computer Engineering, University of Victoria (Co-Supervisor)
Dr. David Capson, Department of Electrical and Computer Engineering, UVic (Co-Supervisor)

External Examiner:
Dr. Florin Diacu, Department of Mathematics and Statistics, UVic

Chair of Oral Examination:
Dr. Verna Tunnicliffe, Department of Biology, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Underwater video data are a rich source of information for marine biologists. However, the large amount of recorded video creates a ’big data’ problem, which emphasizes the need for automated detection techniques.

This work focuses on the detection of quasi-stationary crabs of various sizes in deep-sea images. Specific issues related to image quality such as low contrast and non-uniform lighting are addressed by the pre-processing step. The segmentation step is based on color, size and shape considerations. Segmentation identifies regions that potentially correspond to crabs. These regions are normalized to be invariant to scale and translation. Feature vectors are formed by the normalized regions, and they are further classified via supervised and non-supervised machine learning techniques.

The proposed approach is evaluated experimentally using a video dataset available from Ocean Networks Canada. The thesis provides an in-depth discussion about the performance of the proposed algorithms.