Object Classification and Segmentation Based on Deep Learning Using Underwater Mapping Data

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The recent development of underwater robots and measurement equipment, it has become possible to achieve high-quality underwater mapping using acoustic survey equipment with high resolution. The underwater mapping data obtained by these methods are expressed by the intensity of sound reflection and do not have color information. As a result, object identification from the acquired data depends on discrimination by professional engineers and it is not only difficult to identify objects automatically and quickly, but also involves human error due to differences in the experience of the engineer and routine tasks.

In this presentation, a fast and accurate classification method for underwater objects using underwater mapping data obtained by a small Autonomous Underwater Vehicle (AUV) and autonomous surface vehicle (ASV) is presented. For the mapping data, in addition to underwater acoustic reflection intensity images, water depth data, point cloud data and backscattering reflection intensity data are employed. We propose the automatic classification and semantic segmentation method on deep learning using a convolutional neural network (CNN) and PointNet. In order to verify the effectiveness of the present method, we applied it to the measured several underwater mapping data.