Project No.	Project Title	
2021-01-011	Computer vision system to monitor crustacean larvae growth in industrialized ponds	
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Abstract

Fish products account for about 16% of the human diet worldwide. In the process of growing and producing these products, the counting action is a significant component. Growers must count the fish accurately mainly to manage an accurate feeding strategy and plan a schedule and quantities for marketing and sales. To save the cost time and inaccuracy of manual counting, advanced methods and tac solutions are needed.

In this study, a computer vision system was designed and implement for automatic counting of crustacean's larvae. The system includes an iPhone 11 camera and a 16-liter white bucket used as a background specially placed inside the industrial pool. 200 images on 3024X4032 resolution were acquired for 9-10 larvae's growing stages. An algorithm that automatically counts the number of edible crustaceans in a growing industrial pool was developed.

A CNN model was developed to perform the count of larvae in each image. The model developed during this research was inspired by 'EfficientDet' D0. EfficientDet is a type of object detection model developed by Google, which utilizes several optimization and backbone tweaks. The challenge in this study was the size of the objects. The larvae are very small – their body length is 7 mm. To get over it, the images has been cropped to 2100X2100 resolution, and the smallest bounding-boxes were increased. Testing on the dataset resulted in detection mAP of 0.6. Future studies will deal with the effect of larvae growth stage on the ability to count them, and on development of the system itself.

Key words: Computer vision, Larvae, EfficientDet, algorithm, object detection.