Using Deep Learning to Automate Boat Detection for Fishing Effort Estimates

ISSAM H. LARADJI[1], MARK SCHMIDT[1], BRETT T vanPOORTEN[2], THERESA GODIN[3], SAUL GREENBERG[4]

[1]Department of computer Science, University of British Columbia, 201-2366 Main Mall, Vancouver, BC, V6T 1Z4

[2]British Columbia Ministry of Environment, 315-2202 Main Mall, Vancouver, BC, V6T 1Z4

[3]Freshwater Fisheries Society of British Columbia, 315-2202 Main Mall, Vancouver, BC, V6T 1Z4

[4]Department of Computer Science, University of Calgary, Calgary, AB T2N 1N4

Estimating angling efforts is an important statistical measure for managing recreational fishing on lakes. One common strategy is to capture lake images over long periods of time and count the number of anglers. However, analyzing lake images takes a vast amount of human effort and time. We are developing a Computer Vision algorithm that attempts to perform these counts automatically, and here we report on our progress to date. Using fully-convolutional neural networks (with the help of data augmentation) the system learns and then determines the regions where boats are located in the lake images. When comparing the algorithmic results with manual counting, our results over a single set of lake images were reasonably accurate: about 10% false positive rate and false negative rate were seen. Our work to date has exposed many challenges that remain to be overcome, but the progress is promising. Our future work will test the algorithm on a variety of data sets and will analyze images for shore anglers as well as boats. If successful, we expect automation to significantly reduce the workload on human experts, where their job is to confirm or reject predictions rather than laboriously search for and count anglers and boats in lake images.