Community-based mosquito surveillance: an automatic mosquito-on-human-skin recognition system with a deep learning algorithm

ABSTRACT

Public community engagement is crucial for mosquito surveillance programs. To support community participation, one of the approaches is assisting the public in recognizing the mosquitoes that carry pathogens. Therefore, this study aims to build an automatic recognition system to identify mosquitos at the public community level. We construct a customized image dataset consisting of three mosquito species in either damaged or un-damaged body conditions. To distinguish the mosquito in harsh conditions, we explore two state-of-the-art deep learning (DL) architectures: (i) a freezing convolutional base, with partial trainable weights, and (ii) training the entire model with most of the trainable weights. We project a weighted feature map on different layers of the model to visualize the morphological region used by the model in classification and compared it with the morphological key used by the expert.