

Detection and Classification of Snake Species in Sri Lanka Using Deep Learning

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Sri Lanka has a large number of snake species. The identification of the snake type is a vital yet challenging task because of its shape, skin colour, and the environmental background. Difficulty to identify snakes from the visible characteristics is a major cause of deaths. The identification of snake types is important for the diagnosis process to reduce the number of deaths and to avoid people from unnecessarily killing harmless snakes which ensures the biodiversity that enriches nature. The purpose of this study is to provide a model to classify snake images in different brightness levels which were taken in day and night time. The Convolutional Neural Networks (CNNs) have been used for snake detection and classification in a number of research. The CNN technique with transfer learning for object recognition is used to train the model on a large dataset and transfer its knowledge to a smaller dataset. In the earliest phase of this research, the VGG-16 CNN model was used to train the model which provided a training accuracy of 92.82% and a validation accuracy of 87.78% as a result for the same data set. The pretrained VGG-19 CNN model consists of 19 layers used with Adam optimizer in this study to achieve a higher accuracy. Different brightness level 2500 images of five most venomous snake species in Sri Lanka such as Cobra, Sri Lankan Krait, Russel's Viper, Green Pit Viper and Hump-nosed Viper were used with enhancement techniques for the detection and classification. The VGG-19 achieved 95.7% accuracy in training 92.6% accuracy in validation for different brightness level images including day and night time. For the different brightness level images, the VGG -19 CNN model provided a higher accuracy than the VGG-16 model.

Keywords: CNN, Snake Detection and Classification, VGG-16, VGG-19