

DEEP LEARNING FOR SNAKE IDENTIFICATION IN SRI LANKA

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This research work investigates the possibility of using deep learning techniques to identify snakes using images. There are 103 snake species found in Sri Lanka. Most of them share common attributes, body shape, head shape, color-patterns, color patches, and other physical attributes. Therefore, it is difficult to identify these snakes separately. This research proposes to use deep learning as an approach to differentiate various types of snakes. Nowadays Deep Neural Networks have become a popular technique for image recognition. Generally, large numbers of example images are used as inputs to these convolutional neural networks. 1500 images of four highly venomous snake species – Indian Cobra, Russell’s Viper, Common Krait, Saw Scaled Viper and moderately venomous Hump Nosed Viper, of each were collected. Next, those images were labelled into five classes and were separated into training and validation sets. The CNN contained five hidden layers and two fully connected layers. The hidden layers consisted of convolution layers and pooling layers. Convolutional Layers extracted features of the input image by using a filter (kernel). A filter was a matrix consists with weight values. Convolution preserved the relationship between pixels by learning image features and produce feature maps. Rectified Linear Unit - ReLU was used as the activation function in order to make the output non-linear. Pooling Layers reduced the special size of the output through replacing values in the kernel by a function of those values. Fully Connected Layers were used to flatten the input representation into a feature vector to predict the probabilities of outputs. The model was tested using data sets which contained both real-size and re-sized images and achieved satisfactory results. In all tests, the model achieved training accuracy rates and validation accuracy rates over 0.98. However, the main limitation of the proposed model is the limited scope. The model can identify the most venomous snakes but it fails to consider the other snakes is a major hindrance for practical use. Therefore, the main future development is identified as expansion of the number of snakes it can identify.

Keywords: Snake classification, Venomous snake, Deep learning, CNN, Deep neural networks