Real-time model to recognize Sinhala sign language based on CNN-LSTM approach

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Around the world, hearing-impaired and speech-impaired people are using different kinds of sign languages to communicate with each other and others. In Sri Lanka, they use Sinhala Sign Language (SSL) to communicate. SSL consists with more than 2000 sign-based words which cover the basic three parts of sign language which are isolated signs (Static signs), continuous signs, and annotations. Apart from the people who are using, others find it difficult to understand SSL. Due to the fact, the impaired people are facing difficulties in day-to-day communication. To address this difficulty in communication, a prototype model was proposed to translate the SSL signs to words in real-time by capturing the hand gestures of SSL with the aid of video processing, MediaPipe and Long Short-term Memory (LSTM) techniques. As a starting point, the proposed model was developed to recognize selected static SSL signs. Mobile phone captured 250 videos of the selected signs from impaired persons were used as inputs to the model. 30 extracted frames from each input video are then used to extract right hand, left hand, and face landmarks. Finally, the extracted landmarks are fed into a well-trained Convolutional Neural Network model. This development reached an overall accuracy of over 65% for the selected static SSL gestures. The model will be further developed to a simple and efficient mobile application to convert isolated signs (Static signs), continuous signs, and annotations made by an impaired person.