Nrityabodha: Towards understanding Indian classical dance using a deep learning approach

Aparna Mohanty, Pratik Vaishnavi, Prerana Jana, Anubhab Majumdar, Alfaz Ahmed, Trishita Goswami, Rajiv R. Sahay

www.elsevier.com/locate/image

PII: S0923-5965(16)30084-4
DOI: http://dx.doi.org/10.1016/j.image.2016.05.019
Reference: IMAGE15097

To appear in: *Signal Processing : Image Communication*

Received date: 15 October 2015
Revised date: 26 May 2016
Accepted date: 29 May 2016

Cite this article as: Aparna Mohanty, Pratik Vaishnavi, Prerana Jana, Anubhab Majumdar, Alfaz Ahmed, Trishita Goswami and Rajiv R. Sahay, Nrityabodha: Towards understanding Indian classical dance using a deep learning approach *Signal Processing : Image Communication* http://dx.doi.org/10.1016/j.image.2016.05.019

Nrityabodha: Towards understanding Indian classical dance using a deep learning approach

Aparna Mohanty

Computational Vision Laboratory
Department of Electrical Engineering, Indian Institute of Technology Kharagpur, India

Pratik Vaishnavi

Department of Electronics and Communication Engineering
Sardar Vallabhbhai National Institute of Technology, Surat, India

Prerana Jana, Anubhab Majumdar, Alfaz Ahmed, Trishita Goswami

Department of Computer Science and Technology
Indian Institute of Engineering Science and Technology, Shibpur, Kolkata, India

Rajiv R. Sahay

Department of Electrical Engineering, Indian Institute of Technology Kharagpur, India

Abstract

Indian classical dance has existed since over 5000 years and is widely practised and performed all over the world. However, the semantic meaning of the dance gestures and body postures as well as the intricate steps accompanied by music and recital of poems is only understood fully by the connoisseur. The common masses who watch a concert rarely appreciate or understand the ideas conveyed by the dancer. Can machine learning algorithms aid a novice to understand the semantic intricacies being expertly conveyed by the dancer? In this work, we aim to address this highly challenging problem and propose deep learning based algorithms to identify body postures and hand gestures in order to comprehend the intended meaning of the dance performance. Specifically, we propose a convolutional neural network and validate its performance on standard datasets for poses and hand gestures as well as on constrained and real-world datasets of classical dance. We use transfer learning to show that the pre-trained deep networks can reduce the time taken during training and also improve accuracy.