

Cascading Neural Networks for Upper-body Gesture Recognition

Ra'eesah Mangera, Fred Senekal

Council for Scientific and Industrial Research
Meiring Naudé Road, Brummeria, Pretoria, South Africa
rmangera@csir.co.za, fred.senekal@gmail.com

Fred Nicolls

University of Cape Town, Department of Electrical Engineering
Lovers Walk St, Cape Town, South Africa
fred.nicolls@uct.ac.za

Abstract

Gesture recognition has many applications ranging from health care to entertainment. However for it to be a feasible method of human-computer interaction it is essential that only intentional movements are interpreted and that the system can work for a wide variety of users. To date very few systems have been tested for the real-world where users are inexperienced in gesture performance resulting in data which is noisier in terms of gesture-starts, gesture motion and gesture-ends. In addition, few systems have taken into consideration the dominant hand used when performing gestures. The work presented in this paper takes this into consideration by firstly selecting key-frames from a gesture sequence then cascading neural networks for left and right gesture classification. The first neural network determines which hand is being used for gesture performance and the second neural network then recognises the gesture. The performance of the system is tested using the VisApp2013 gesture dataset which consists of four left and right hand gestures. This dataset is unique in that the test gesture samples have been performed by untrained users to simulate a real-world environment. By key-frame selection and cascading neural networks the system accuracy improves from 79.8% to 95.6%.