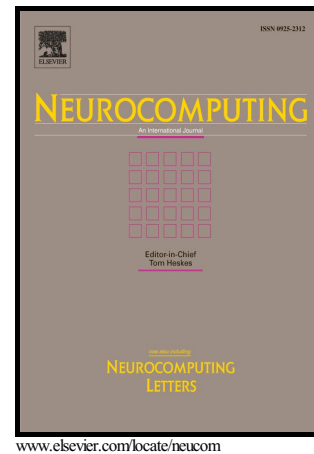


# Author's Accepted Manuscript

Video pornography detection through deep learning techniques and motion information

Mauricio Perez, Sandra Avila, Daniel Moreira, Daniel Moraes, Vanessa Testoni, Eduardo Valle, Siome Goldenstein, Anderson Rocha



PII: S0925-2312(16)31492-8  
DOI: <http://dx.doi.org/10.1016/j.neucom.2016.12.017>  
Reference: NEUCOM17834

To appear in: *Neurocomputing*

Received date: 16 July 2016  
Revised date: 28 October 2016  
Accepted date: 6 December 2016

Cite this article as: Mauricio Perez, Sandra Avila, Daniel Moreira, Daniel Moraes, Vanessa Testoni, Eduardo Valle, Siome Goldenstein and Anderson Rocha, Video pornography detection through deep learning techniques and motion information, *Neurocomputing*  
<http://dx.doi.org/10.1016/j.neucom.2016.12.017>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

# Video pornography detection through deep learning techniques and motion information

Mauricio Perez<sup>a</sup>, Sandra Avila<sup>b</sup>, Daniel Moreira<sup>a</sup>, Daniel Moraes<sup>a</sup>,  
Vanessa Testoni<sup>c</sup>, Eduardo Valle<sup>b</sup>, Siome Goldenstein<sup>a</sup>, Anderson Rocha<sup>a,\*</sup>

<sup>a</sup>*Institute of Computing, University of Campinas, Brazil*

<sup>b</sup>*School of Electrical and Computing Engineering, University of Campinas, Brazil*

<sup>c</sup>*Samsung Research Institute Brazil, Brazil*

---

## Abstract

Recent literature has explored automated pornographic detection — a bold move to replace humans in the tedious task of moderating online content. Unfortunately, on scenes with high skin exposure, such as people sunbathing and wrestling, the state of the art can have many false alarms. This paper is based on the premise that incorporating motion information in the models can alleviate the problem of mapping skin exposure to pornographic content, and advances the bar on automated pornography detection with the use of motion information and deep learning architectures. Deep Learning, especially in the form of Convolutional Neural Networks, have striking results on computer vision, but their potential for pornography detection is yet to be fully explored through the use of motion information. We propose novel ways for combining static (picture) and dynamic (motion) information using optical flow and MPEG motion vectors. We show that both methods provide equivalent accuracies, but that MPEG motion vectors allow a more efficient implementation. The best proposed method yields a classification accuracy of 97.9% — an error reduction of 64.4% when compared to the state of the art — on a dataset of 800 challenging test cases. Finally, we present and discuss results on a larger, and more challenging, dataset.

*Keywords:* Pornography classification, Deep learning and motion information, Optical flow, MPEG motion vectors, Sensitive video classification

---

## 1. Introduction

Filtering sensitive media (pornographic, violent, gory, etc.) has growing importance, due to the booming consumption of online media by people of all ages; and among sensitive media types, pornography is often the most unwelcome. A

---

\*Corresponding author: anderson.rocha@ic.unicamp.br

Download English Version:

<https://daneshyari.com/en/article/4947817>

Download Persian Version:

<https://daneshyari.com/article/4947817>

[Daneshyari.com](https://daneshyari.com)