

Mobile TV Coding

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Problem Statement

Mobile devices are small and environmental conditions are far from being optimal. Hence, only few details can be perceived by the mobile user. The main aim of this demonstration consists in optimizing Standard Television content in respect to Mobile TV constraints.

Proposed Idea

This aim is realized by dividing the source video in two regions: the foreground and the background. In order to improve the visual quality for Mobile TV, these regions are treated separately. We decided to put the focus on the foreground by accentuating its visual parameters and by decreasing visibility of the background. This implies that the majority of available bitrate is dedicated to the foreground.

To distinguish these two video elements, several methods have been proposed. One of these is the Bayesian background modelling for foreground detection¹. It has already been implemented by taking advantage of Graphics Processing Units².

Fig.1 shows the original file and Fig.2 the separation into the two regions.



Fig.1: original



Fig.2: separated

We performed numerous tests with different settings for back- and foreground, i.e. contrast, saturation, hue and blur. We received the best results with changing the saturation and adding some blur (Fig.4). Thus the foreground gets more visible without disruptive transitions. In particular, it can be observed in Fig. 4 that the yellow light in the background has less impact

on the Human Visual System (HVS) whereas the faces as well as the actress hair are more intensively coloured. Furthermore, the skyscrapers are blurred. Hence, observers focus is put on the acting part of the movie.



Fig.3: original



Fig.4: saturation and blur

Results

The results can be summarized in two points:

- By blurring the background and decreasing its saturation as well as increasing saturation of the foreground, better visibility of essential video parts is achieved and hence quality is improved.
- already marginal background changes reduce the bitrate of the resulting video



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Prof. Helmut Hlavacs currently leads a research group in the size of ten collaborators in the context of the project "Content Aware Coding for Mobile TV"³. This project focuses on the study of user conditions for mobile TV and the influence of technical parameters on the dramaturgic aspects of formats and contents.

Furthermore, he is involved in other projects such as the European Network of Excellence Euro-NF, SoftNet Austria and ambient assisted shared living (AMASL).

He worked for several companies, including IBM and Bank Austria, until he joined the ESPRIT project BISANTE as researcher at the Department of Distributed Systems.

Prof. Hlavacs is the author of one textbook, publications presented at international conferences and journals articles.

¹ Porikli, F.; Tuzel, O., "Bayesian Background Modeling for Foreground Detection", ACM International Workshop on Video Surveillance and Sensor Networks (VSSN), ISBN: 1-59593-242-9, pp. 55-28, November 2005

² <http://www.merl.com/projects/gpusurveillance/>