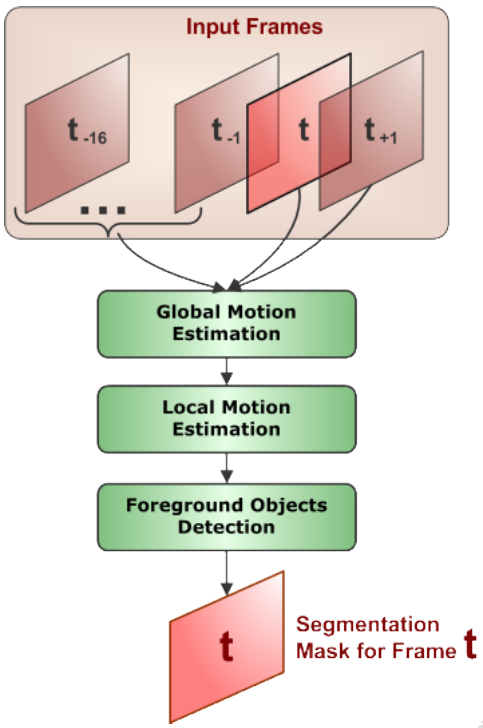
YUV Segmentation Technology

Automatic segmentation and tracking of foreground objects in video

The YUV Segmentation technology classifies objects in each frame as either foreground or background objects, so that each frame can be represented as a combination of two layers, each tracked over time.

Primary Applications

- Content-based representation of multimedia data
- Improvement of coding efficiency in video codecs
- Sophisticated video query and retrieval
- Systems for content-based access and manipulation of multimedia data
- Production of object-based information to be used in multimedia data standards
- Other content-based functionalities for multimedia applications



Key Features

- Several segmentation precision levels
- No manual segmentation required
- Numerous control parameters for tuning
- Adjustable speed/quality trade-off

Basic Deliverables

- Source code for a reference implementation in C
- C and assembly language source code for an implementation optimized for the PC (if required)
- Algorithm description
- Software description
- Verification instructions

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Specification

- Several levels of segmentation precision, ranging from a 1x1 to a 16x16 pixel block
- No user assistance required during segmentation
- Several presets for adaptation to specific application
- Foreground object detection in cases of ultra-slow motion
- Takes into account 16 backward frames and 1 forward frame
- Can trace several foreground objects, distinguishing them one from another
- Scene change auto-detection with necessary initialization of segmentation
- Performance of non-optimized C reference model for 8x8 block mode is 1.5 fps for a CIF (352x288) video on an AthlonXP 2500+
- Sophisticated multiparameter global motion model used

Original frame

8x8 block mode result

4x4 block mode result

Pixel mode result

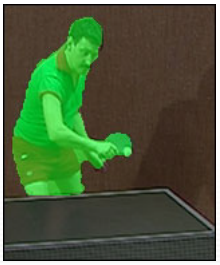
Comparison with Competitors

"Table Tennis" stream with complex motion due to movements of player:

- University of Florida method

Original frame

University of Florida result
(different segments are marked by different colors)



YUV Segmentation result

Our Advantages

- More accurate detection of segment mask
- Absence of noise in the segmentation result

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