5 Software description

Software distributed with this package is source code of four types feature extractors described in section 4.1 and summarization algorithm which consists in another three standalone applications.

Source code is prepared to compile on Linux platform, dependencies are described for each application separately. All applications could be easily ported to Windows platform if needed.

1. Feature extraction application

   - **Purpose:** This application's output is used in summarization algorithm and object detection, in this case conversion to proper format of next SVM implementation training procedure is required.

   - **Subdirectory:** fe

   - **Input:** Video file.

   - **Output:** File containing feature vectors for each frame in input video.

   - **Example command line arguments:** ./fe -All video.mkv

   - **Dependencies:** OpenCV 2.0, libavformat, libavcodec, libswscale

   - **Notes:** Input video format depends on the capabilities of libavformat and libavcodec libraries. There is very recommended to use MKV container format in which the length of the video input should be retrieved without issues. In particular, MPEG-2 Transport Stream and Program Stream should be converted to MKV before running this tool.

2. Clustering application

   - **Subdirectory:** clustering

   - **Input:** Feature file from first application.

   - **Output:** File containing output clusters.

   - **Example command line arguments:** ./clustering -f video.features -o video.clusters

   - **Dependencies:** OpenCV 1.1.0

- **Notes:** OpenCV 1.1.0 dependency means problem at this time, but in Makefile is built-in automatic downloader of this library. Command "make opencv" automatically downloads this version and compiles and installs this library to local subdirectory, the "make" command then successfully creates the Clustering application.

3. Videoediting application

   - **Subdirectory:** sequence
   - **Input:** Clusters file from second application.
   - **Output:** Videoedit file.
   - **Example command line arguments:** ./sequence video.clusters 0.02
   - **Dependencies:** none

4. Output renderer application

   - **Subdirectory:** renderer
   - **Input:** Videoedit file from third application, input MKV video file.
   - **Output:** Summarized output AVI file.
   - **Example command line arguments:** ./summ -i video.mkv -c video.videoedit
   - **Dependencies:** OpenCV 2.0, libavformat, libavcodec, libswscale

5.1 Expected Technical parameters

This section introduces recommended hardware requirements for all applications and shows computation time of each application on a model hardware configuration.

1. Feature extraction

   - **OS:** Linux
   - **CPU:** AMD Athlon X2 7000 and higher or Intel Core 2 Duo E6600 and higher

- **RAM:** 2 GB
- **CPU usage:** 100%.

2. Summarization

   - **OS:** Linux
   - **CPU:** AMD Athlon X2 7000 and higher or Intel Core 2 Duo E6600 and higher
   - **RAM:** 1 GB
   - **CPU usage:** 100%.

3. Content detection

   - **OS:** Linux
   - **CPU:** AMD Athlon X2 7000 and higher or Intel Core 2 Duo E6600 and higher
   - **RAM:** 1 GB
   - **CPU usage:** 100%.
   - **Reliability of object recognition:** 50% – 80% of objects detected, depends on input data structure.
   - **Note:** Big amount of classifiers with different c and g parameters have to be created, computation time depends on input data structure and c and g parameter combination. Estimated computation time is from 1 hour to 10 hours per job, in this case computing cluster (for example SGE [11]) usage is recommended.

Model Hardware description

- **OS:** 64-bit Linux, all applications compiled as 64-bit binary images

- **CPU:** AMD Athlon X2, real clock 2100 MHz

- **RAM:** 4 GB

Video file for summarization parameters

- **Container:** MKV