

Region-Based Predictive Decoding of Video with Applications to Delay Reduction and Whole-Frame Concealment

Yue-Meng Chen and Ivan V. Bajić

School of Engineering Science, Simon Fraser University, Burnaby, BC, V5A 1S6, Canada

Please acknowledge the use of our programs by referring to the relevant publications.

This demo software includes an implementation of the Region-Based Predictive Decoding (RBPDP) algorithm described in the following paper:

1. Yue-Meng Chen and Ivan V. Bajić, "Region-Based Predictive Decoding of Video with Applications to Delay Reduction and Whole-Frame Concealment," submitted to *IEEE Trans. Circuits Syst. Video Technol.*, Apr. 2008, revised Feb. 2009, and Aug. 2009.

The current demo program incorporates Xvid MPEG-4 Video codec implementation (www.xvid.org).

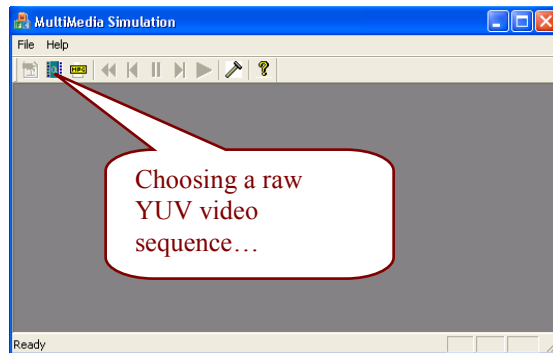
This document describes how to encode a video sequence into MPEG-4 format using the provided executable (MultiMediaSim.exe), and how to perform predictive decoding on the resulting bitstream. The executable was developed in Microsoft Visual Studio 2005 (VC++8), and tested under Windows (XP, Professional 2002, Service Pack 2).

Notes:

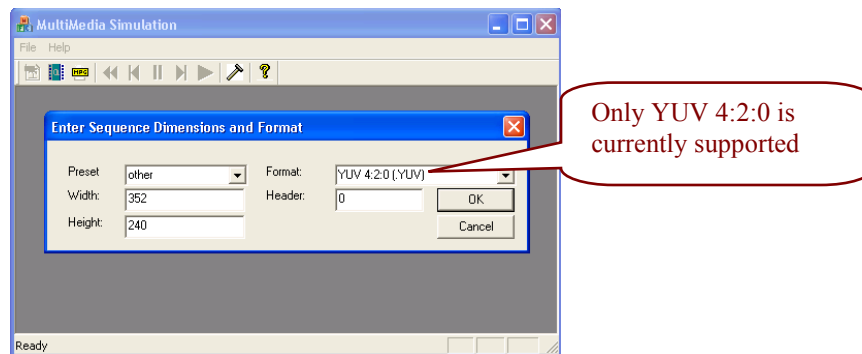
1. MPEG-4 video encoding
 - Input YUV files are encoded using the Xvid MPEG-4 video encoder to generate the bitstream.
2. Predictive decoding of MPEG-4 video bitstreams includes two modes:
 - Block-based: We implemented the block-based whole-frame concealment algorithm from P. Baccichet, D. Bagni, and A. Chimienti, "Frame concealment for H.264/AVC decoders," *IEEE Trans. Consumer Electronics*, vol. 51, no. 1, pp. 227-233, Feb. 2005., and adapted it for the purpose of predictive decoding. It serves as a reference system against which the proposed method is compared.
 - Region-based: This is the RBPDP algorithm proposed in our paper.

How to generate a MPEG-4 bitstream?

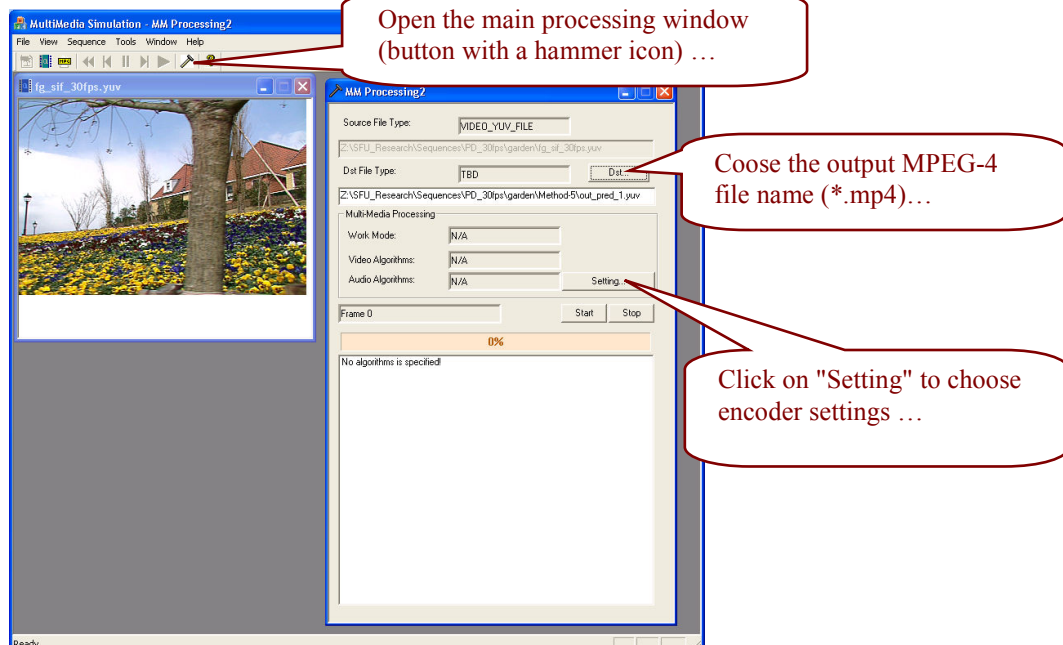
1. Open MultiMediaSim.exe. Choose an input YUV sequence (*.yuv).



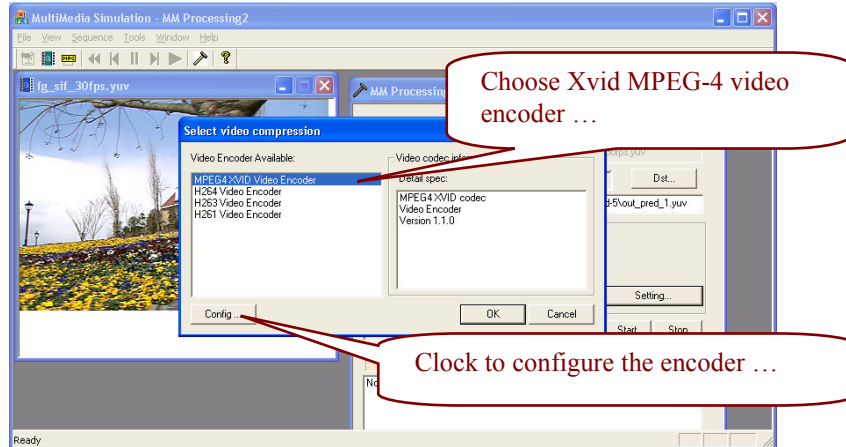
2. Describe the format of the input YUV file.



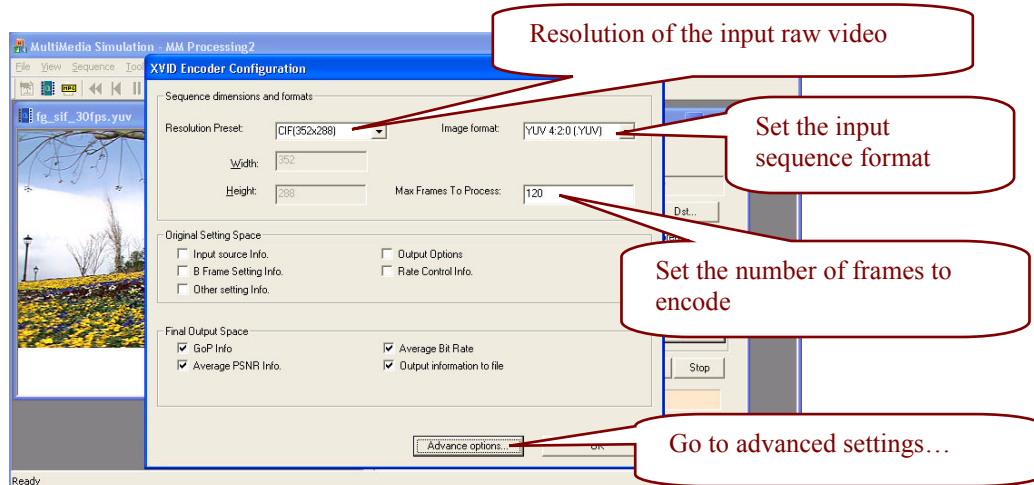
3. Open the main processing window.



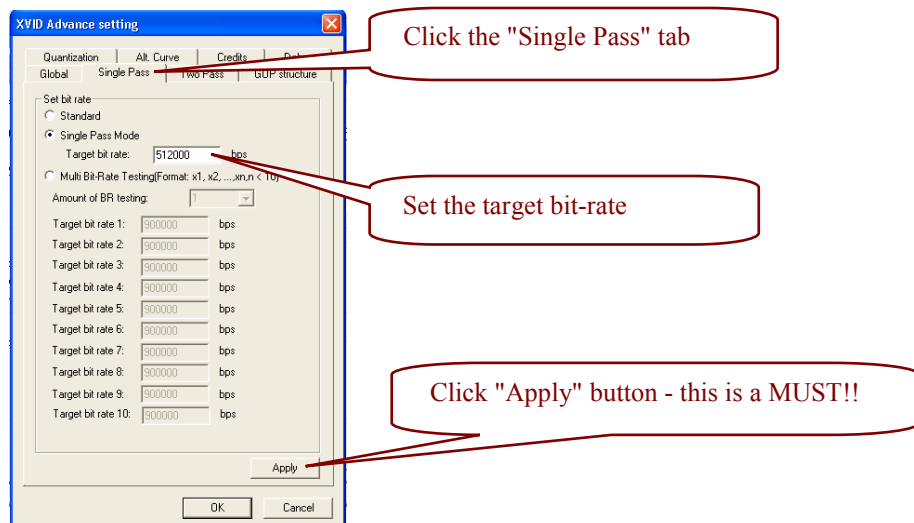
4. Select the video encoder.



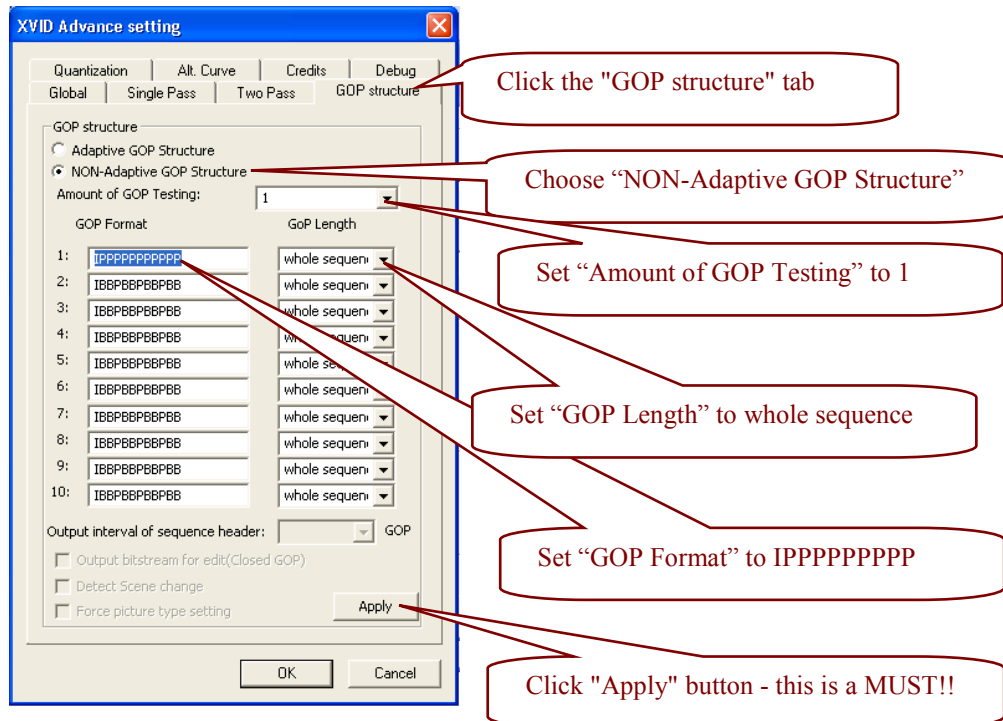
5. Encoder settings.



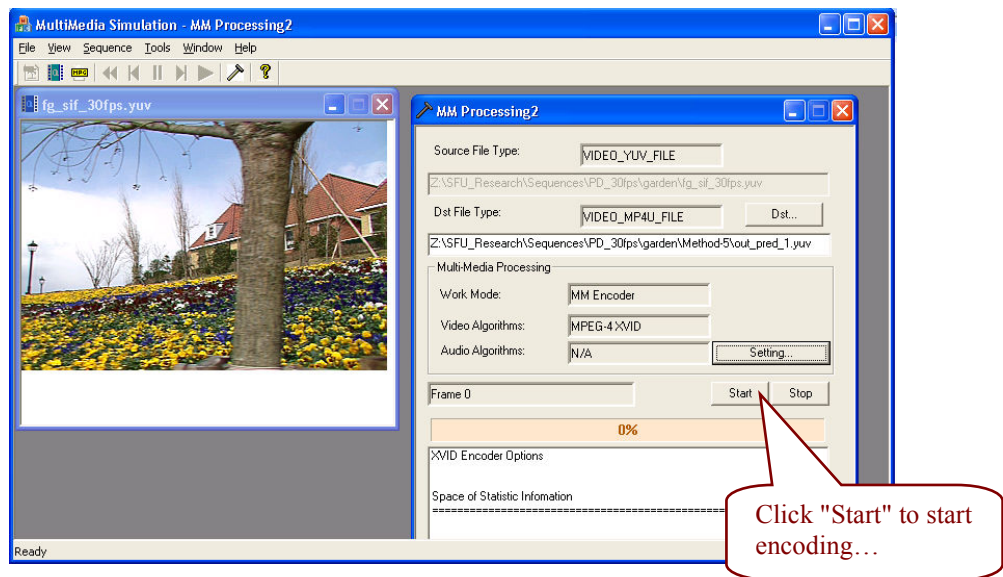
6. Advanced encoder settings (Single Pass).



7. Advanced encoder settings (GOP structure).

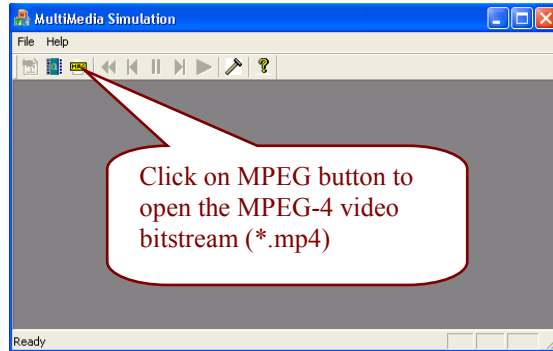


8. Encode the video.

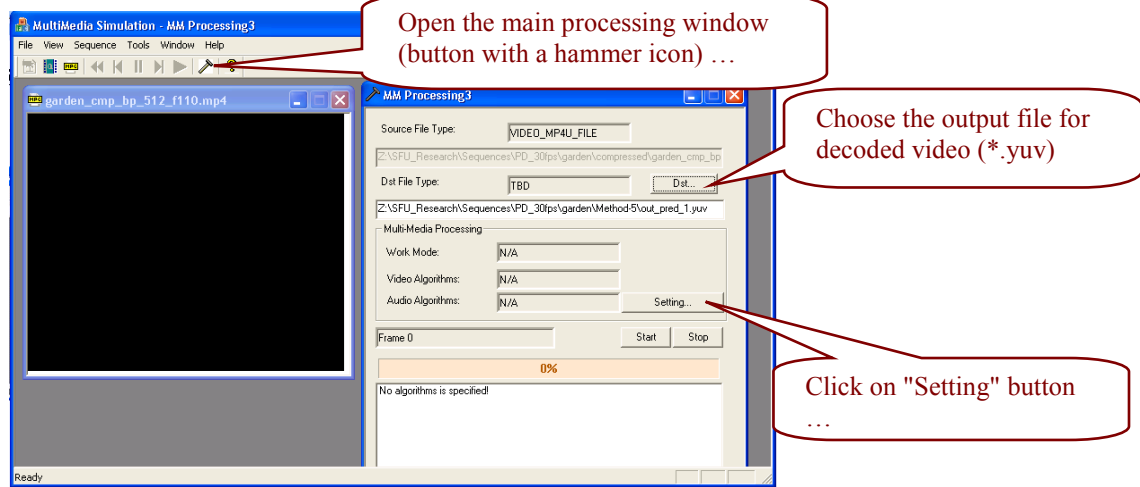


Predictive decoding of MPEG-4 video bitstreams

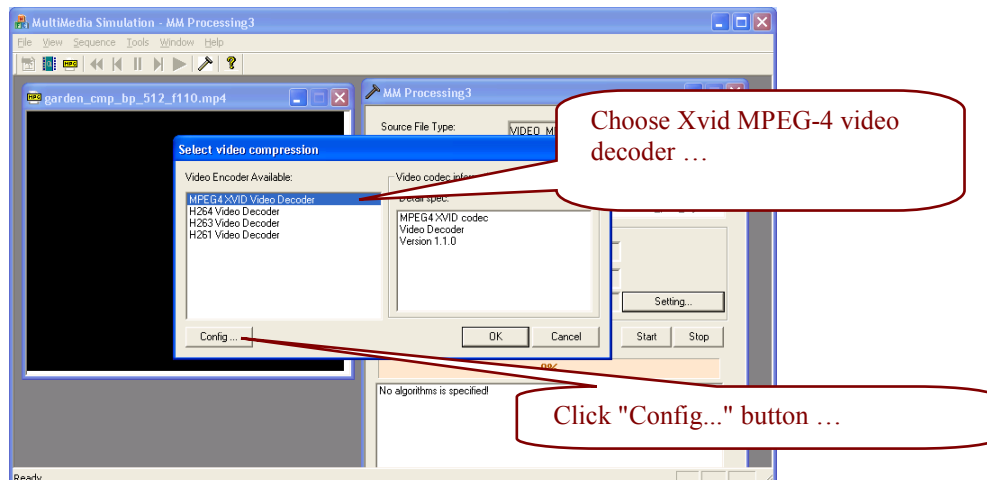
1. Choose the input MPEG-4 video bitstream stream (*.mp4), generated as above.



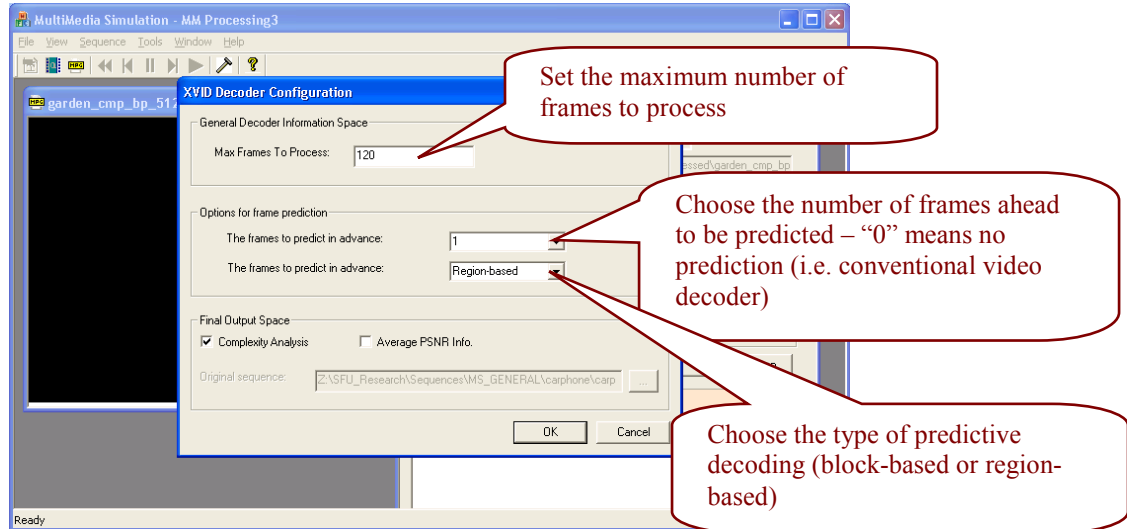
2. Open the main processing window.



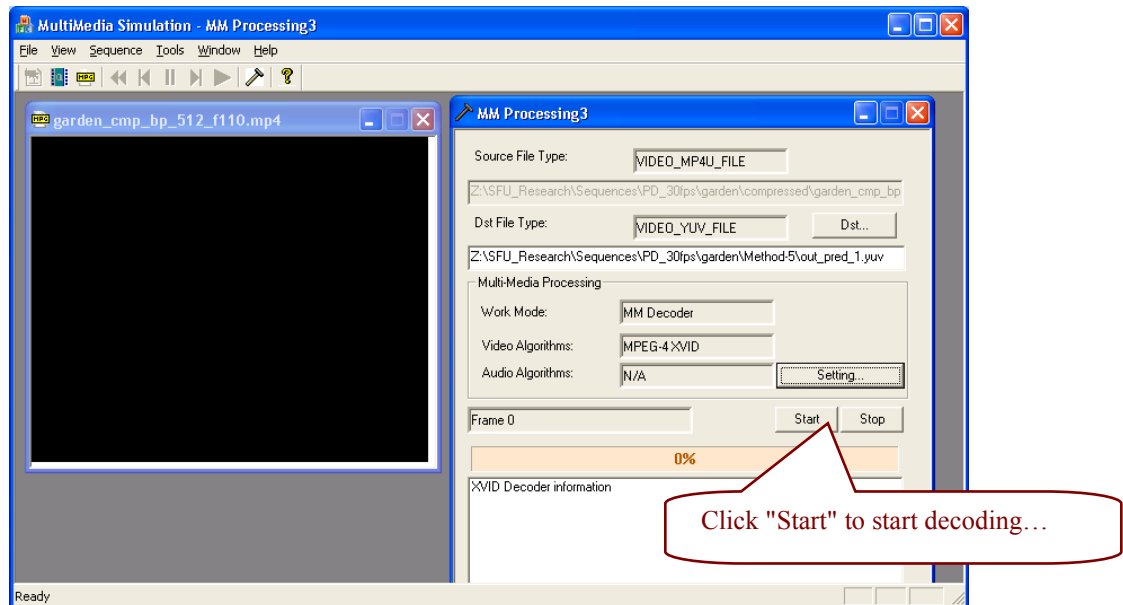
3. Select the decoder.



4. Configure predictive decoding.



5. Start decoding.



6. The resulting YUV file can be viewed in any of the YUV viewers.

Note: You can choose to output complexity information or average PSNR in the decoder configuration menu (step 4 above).