

Elec4622 Lab 5, 2007 S2

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1 Introduction

These laboratory exercises are intended to provide you with some exposure to block based motion estimation and motion compensation. These exercises build the foundation for Project 4.

2 Basic Exercises

1. Start by downloading the “motion_example” workspace from the course web-site.
2. Also download the “calendar.zip” file from the course web-site. This zip archive contains several frames from a video sequence, known as “mobile and calendar” – all frames are stored as monochrome BMP images, for simplicity. If you would like to watch the video, you can supply the names of all video frames to the Media Interface module, “read_frame”, as you have done in the past.
3. Read carefully through the program and make sure you understand what it is doing.
4. Add some code to compute and print out the mean squared error between the target frame and the motion compensated frame.
5. Modify the code which writes the output image, so that it overlays motion information on the generated image. One way to do this is as follows:
 - (a) Make the output an RGB image, rather than just monochrome.
 - (b) Write the original target frame samples, divided by 2 and offset by 128 (i.e., add 128) into all colour planes.
 - (c) For each block, set those green samples to 0 which lie along a line, running from the location \mathbf{c} to $\mathbf{c} + \mathbf{v}$, where \mathbf{c} denotes the centre of the block and \mathbf{v} denotes the motion vector for the block. To visit the samples which belong to such a line, you should scan horizontally if $|v_2| > |v_1|$ and vertically otherwise.
6. Experiment with a variety of block sizes and search ranges, to determine the impact on motion compensated error and the motion vector field.