Assignment 1

Calculating the Difference between Two Consecutive Images

Goal:
Extract a moving object from two consecutive images (pulled from a video) and save the resulting image to disk.

Idea:
1. Load two frames from the same video.
2. Calculate the pixel intensity difference between the two frames.
3. Perform thresholding on the difference image to get areas of movement in binary format.
4. Change the threshold values to see different results.
5. Save the resulting image to disk.

Hints:
1. Load two frames from the same video.
    a) The source images can be found in the folder "images01".
    b) Img02_0076.bmp, Img02_0077.bmp, and Img02_0078.bmp are from video1.
    c) park466.bmp, park467.bmp, and park468.bmp are from video2.
2. The source images have three channels (Red, Green, Blue), in order to calculate the difference between two images, you have to convert the RGB images into Gray-level images.
3. Implement a trackbar to adjust the threshold values [0, 255].

Helpful Methods:

Helpful Methods	**Description**
Mat imread(const string& filename, int flags=1)	Load a image.
void namedWindow(const String& winname, int flags)	Create a Window.
void imshow(const String& windowname, inputArray mat)	Display a image in a window.
void cvtColor(InputArray src, OutputArray dst, int code, int dstCn=0)	Converts an image from one color space to another.
MatExpr abs(const Mat& m)	Calculates an absolute value of each matrix element.
double threshold(InputArray src, OutputArray dst, double thresh, double maxval, int type)	Applies a fixed-level threshold to each array element.
bool imwrite(const string& filename, InputArray img, const vector<int>& params=vector<int>())	Saves an image to a specified file.
Simple GUI	**Description**
int createTrackbar(const String& trackbarname, const String& winname, int* value, int count, TrackbarCallbackonChange=0, void* userdata=0)	Creates a trackbar and attaches it to the specified window.

Note: Qt is recommended for GUI design.

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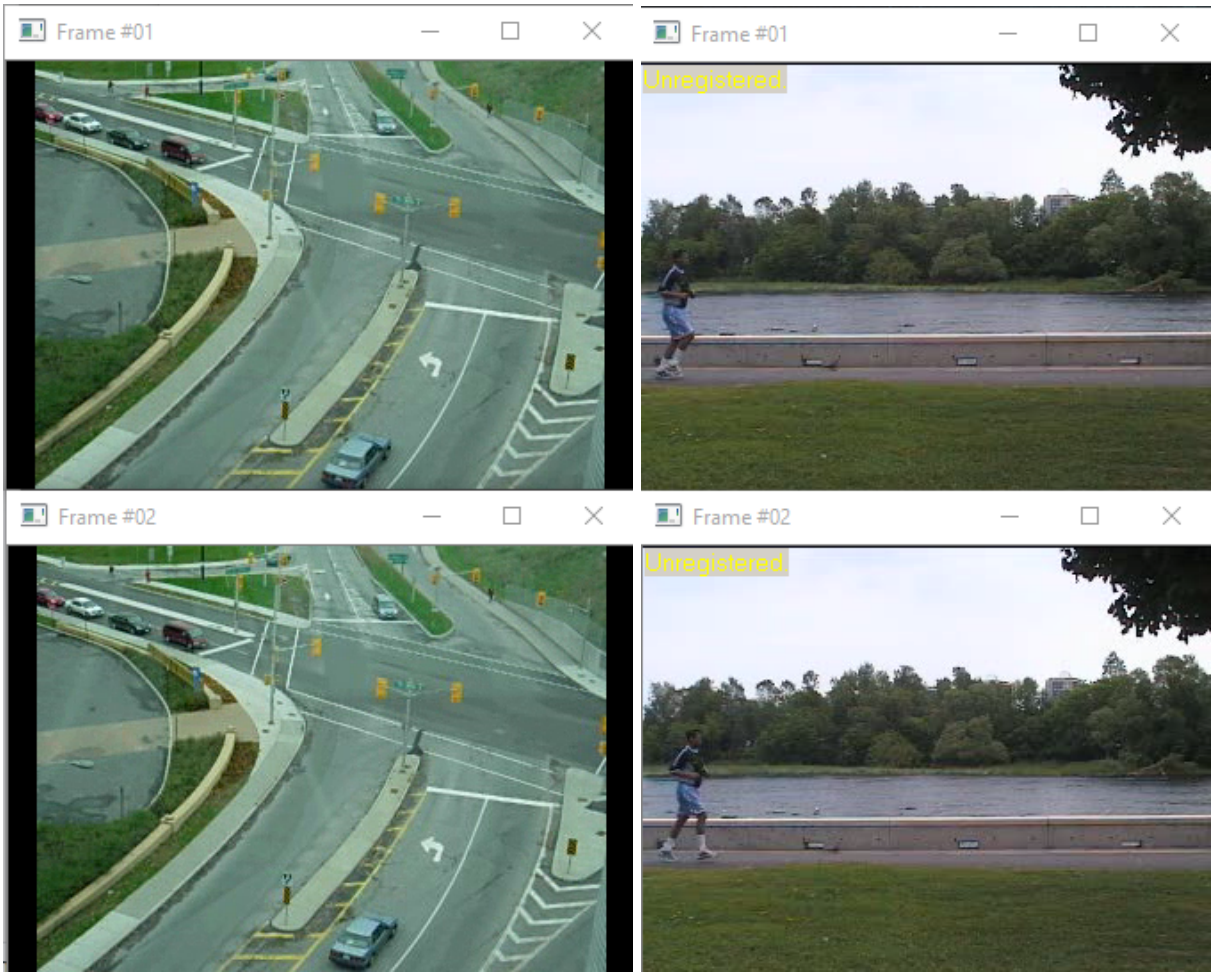
Example:

1. Load and display the frames from videos.



2. Threshold control and results display.