CV Homework Set #3 – Multiple Object tracking

Due: 14/6/16

Submission: 1) HW will be tested interactively with the checker. Times will be posted.
2) HW code should be submitted to HW checker either via DOK or
by email to:
imageprocessinghaifau@gmail.com

Goal: Measure heights of objects in single image.

General: You will be using the Computer Vision Open Source library **OpenCV**.
You may choose the programming code of your choice (C++, Java, Python, Matlab)
to interface with the OpenCV code.
Unfortunately, no technical support will be given in this course. A discussion forum
has been opened in the Moodle site for this course.

Grading: Grade will be given based on actively running the program on images.
Some example images you will be tested on will be available for you to test on.
Additional new images will be used for testing as well.
Grade will be based on quality of segmentation, as well as convenient interfacing,
organization and documentation of code, ext.

Submission:

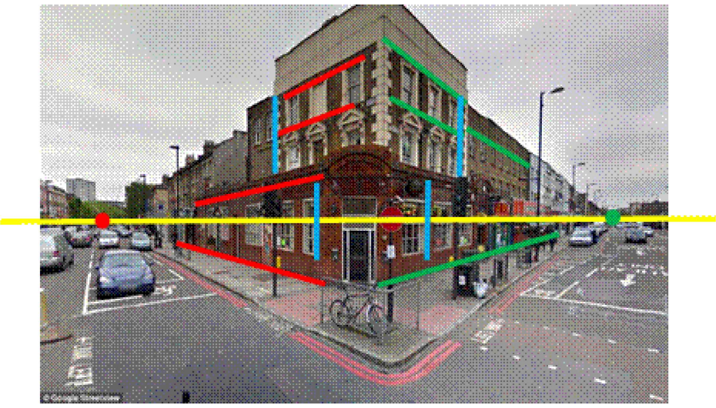
Submit all necessary files to run the code.
Submit a **Readme file** explaining how to compile, make, and prepare the code (including
Makefile if necessary).
Submit **Instructions file** explaining how to run the program, (explain inputs, interface, howto, etc).
Do not forget to put Names and Student I.D. in all files.

HW4 Instructions:

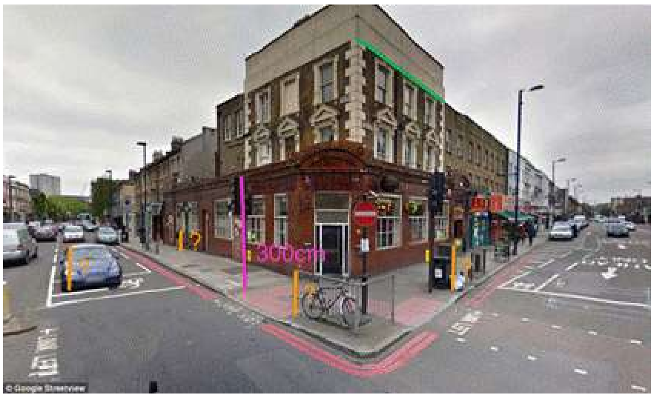
Write an interactive program that calculates heights of objects in an image.
Calculations are based on single-image metrology.

1) Image is given as input and displayed.
2) User marks segments in image.
a) These segments are used to determine the vanishing points in the image: 2 vanishing points of the ground

plane (green + red) and a vanishing point of the
vertical direction (blue) – [note – the perpendicular vanishing point might be in inf.]
Require at least 3 segments per vanishing point. (consider how you find the best
intersecting point of the multiple lines).
b) The 2 ground vanishing points serve to calculate the vanishing line.
3) Image is shown with vanishing points and vanishing line overlayed.



4) User marks top and bottom of vertical reference object and provides metric height of the object.
5) User then marks additional objects and for each object, height is computed
and provided as output (can be printed out in command line).



Allow user to select any number of objects iteratively.
Allow user to enter new reference object and height.

Notes:
During marking by user, allow an option to zoom into the image, since markings
should be exact.

Use the image files found here.

You may use OpenCV functions (cross product, cross ratios etc).

Source:
Class slides.

Criminisi paper: short
https://www.cs.cmu.edu/~ph/869/papers/Criminisi99.pdf

Criminisi Paper long (section 2.1):
http://dhoiem.cs.illinois.edu/courses/vision_spring10/sources/criminisi00.pdf

Good review:
https://www.nada.kth.se/utbildning/grukth/exjobb/rapportlistor/2012/rapporter12/vester_johan_12040.pdf