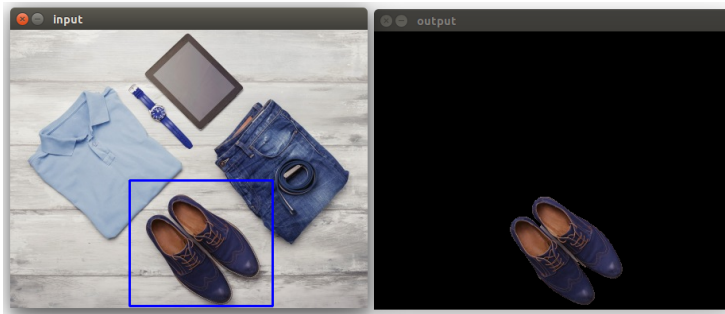


ASSIGNMENT 2

CS4186 COMPUTER VISION AND IMAGE PROCESSING

PART-A: GRAB CUT ALGORITHM IN OPENCV

Grabcut is an algorithm for semi-automatic extraction of object from image. In the example below, grabcut algorithm extracts the contour of a pair of shoes from the image, when the bounding box of shoes is given as input.



Your task is to explore grabcut algorithm in OpenCV, and extract the contours of (a) basket ball, (b) left Donald duck and (c) statue from the given three images. (30%)

PART-B: RELATIVE HEIGHT (3D) ESTIMATION

Given three stereo image pairs, you are required to write a program with OpenCV to:

- Reconstruct the disparity map
- Estimate the relative height of two objects (Hint: may use grabcut algorithm to semi-automatically extract the objects)

To complete the task, you need to explore the following OpenCV functions:

- `xfeatures2d.SIFT_create()` // SIFT
- `BFMatcher()` // feature matching
- `findFundamentalMat()` // fundamental matrix
- `computeCorrespondEpilines()` // epipolar line
- `stereoRectifyUncalibrated()` // image rectification
- `warpPerspective()` // perspective warping

Show the following for each image pair:

- Epipolar lines of any four corresponding points (15%)
- Disparity map (15%)

The remaining 30% of marks will depend on the accuracy of relative height estimation between two objects (ratio between the objects on the left and on the right in terms of their heights).

Pair-1: Estimate the relative height of two traffic cones. (10%)

Pair-2: Estimate the relative height of two bottles. (10%)

Pair-3: Estimate the relative height of the statue and the right stone. (10%)

Submission

Report itself will carry 10% marks. Please zip the followings and submit to Canvas:

- ✓ *Computer program*: You can use either Python 2 or Python 3.
- ✓ *Report*

DEADLINE

The submission should be done before **22-April**, 11:59pm.

Penalty on late submission: 20% of marks will be deducted per day. No submission will be allowed after five days from the deadline. *Do NOT copy code from the internet and do not borrow other people's code. Remember that PLAGIARISM is a serious offense for which you may fail the class or even be expelled from the university.*

CONTACT PERSON

Please email Teaching Assistant Alan (Email: tnguyenhu2-c@my.cityu.edu.hk) for technical question.