

Project 3: Template Matching

In this project, filters are used as templates for finding simple patterns in the image. Correlation (or convolution, they are the same if the filter is symmetric) of an image with a filter can be viewed as comparing a template of what one wants to find against all local regions in the image. It is generally the case that the filter responds most strongly when it encounters an image pattern that looks like the filter. This is sometimes called matched filtering.

To compare template with a candidate region, normalized correlation is typically used to removed effects due to large, overall changes in brightness. Use normalized correlation, `normxcorr2()` in this project. For all color images, you can first convert them to gray-scale images using `rgb2gray()`.

Finding Stones

The following image displays Go (Wei Qi), a Chinese board game with white and black stones on the grid. Use *template matching* to find as many white and black stones in the image as you can. To create a stone template, you can crop one stone from the image.

- (1) Apply template matching to find the stones in the image. Display the correlation map and the detected stones in a bounding box overlaid on the original image. Discuss the detection results.
- (2) Discuss the conditions under which template matching works the best.

