
COMPUTER VISION NOTES

OBJECT LOCALISATION AND MOTION DETECTION

MY PERSONAL NOTES ON

OBJECT LOCALISATION TECHNIQUES; COLOUR MATCHING, MEAN SHIFT TRACKING, OPTICAL FLOW, LUKAS
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1 Histogram-Based Methods

1.1 Histogram backprojection

1.1.1 Intuition - model and target histogram

In image processing, we are usually interested in histograms of greyscale images. However, often the colour histogram can be used to identify an image region or object. RGB histograms are practically not good enough for matching as the R, G, B components are strongly correlation with the illumination hitting the object. In practice, objects are converted from RGB to HSV (Hue, Saturation, Value) domain. Hue represents the colour type (blue, yellow, etc.), saturation represents the vibrancy (how vivid or neutral it is) and value represents the brightness of the colour. Therefore when performing matching we are only interested in the H and S components, which map to a 2D histogram. More about the HSV domain in A.1.

Histogram backprojection answers the question “where in the image are the colors that belong to the object being looked for (the target)?”. We do this by defining a model image (the object we search for) and the target (the image we search in), probing the model over target and calculating their histogram similarity at each position.

Just to illustrate the idea, assume that we want to match the greyscale (instead of the 2D) histogram of the garlic in the below image. A part of the top garlic has been chosen as the model. The histogram of the model is shown as well as that of two matching candidates. The question attempted to be answered in the next section is “how do we measure the similarity of the histogram of the match candidate to that of the model?”.

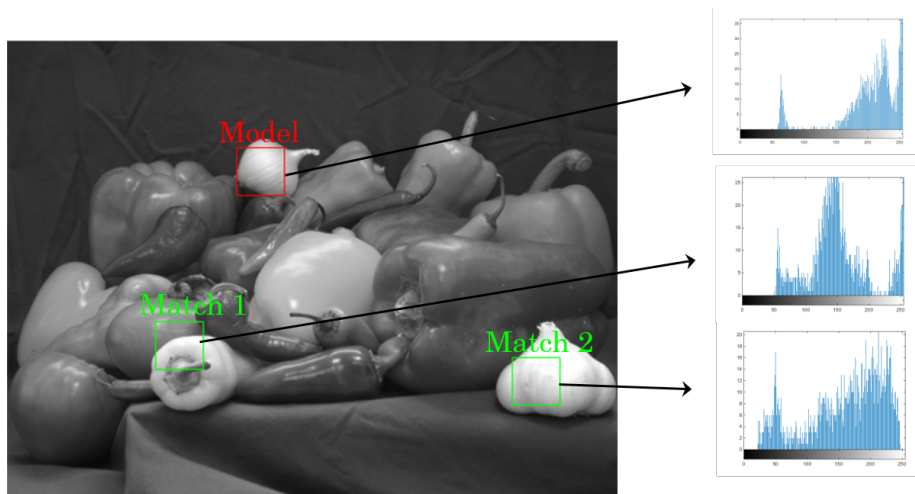


Fig. 1. Model and two matches’ greyscale histograms.

1.1.2 Histogram backpropagation algorithm

A Appendices

A.1 HSV domain