# Detecting Irregularities in images and in video [ Boiman, Irani ICCV 2005]

* The objective here is to detect “irregularities” from images and video i.e:

1. Suspicious behaviours
2. Salient behavior
3. Image saliency and attention

* Inference by “synthesis”: (Building a puzzle)
  + Construct new observations from chunks of data from examples in database. Large continuous chunks imply high likelihood, whereas small fragmented chunks imply low likelihood (irregular)
* Ensemble of patches:
  + Star graph configuration
  + Locations (l), descriptors (d), origins (c)
  + Descriptors based upon absolute values of derivatives of 7x7 or 7x7x4 patches
* Probabilistic graphical model formulation:
  + Summarized by the following figure from the paper
  + 
* Similarity between pair of ensembles is captured by the likelihood ( joint probability P(x,y) )
* MAP inference : message passing algorithm.
  + Message passing algorithm is made efficient with “progressive elimination” of the search space using geometric arrangement information and multi scale search is used.
* Applications:
  + Detecting unusual image configurations
  + Spatial saliency in a single image
  + Detecting suspicious behaviors
  + Spatio-temporal saliency in video