How to calculate the energy and correlation of an image

I think you are looking for `graycomatrix` and `graycoprops`. From the `graycoprops` documentation, two properties that can be computed:

```
'Correlation'   statistical measure of how correlated a pixel is to its
                neighbor over the whole image. Range = [-1 1].
                Correlation is 1 or -1 for a perfectly positively or
                negatively correlated image. Correlation is NaN for a
                constant image.

'Energy'        summation of squared elements in the GLCM. Range = [0 1].
                Energy is 1 for a constant image.
```

To compute these properties, first compute the graylevel co-occurrence matrix via `graycomatrix`, then call `graycoprops`. For example,

```
I = imread('circuit.tif');
GLCM = graycomatrix(I,'Offset',[2 0;0 2]);
stats = graycoprops(GLCM,{'correlation','energy'})
```

You just need to decide on the `Offset` parameter for `graycomatrix`. A thorough choice would be `offset = [0 1; -1 1; -1 0; -1 -1];`

To compute entropy for the GLCMs, you can't use `graycoprops`, so you'll have to do it yourself:

```
p = bsxfun(@rdivide,GLCM,sum(sum(GLCM,1),2)); % normalize each GLCM to probs

numGLCMs = size(p,3);
entropyVals = zeros(1,numGLCMs);
for ii=1:numGLCMs,
    pi = p(:,:,ii);
    entropyVals(ii) = -sum(pi(pi>0).*log(pi(pi>0)));
end
```