A picture containing furniture, rug, photo, sitting

Description automatically generatedA close up of the front of it

Description automatically generated

A close up of a screen

Description automatically generatedA blurry image of a building

Description automatically generated

A black and white photo

Description automatically generatedA picture containing outdoor, white, black, photo

Description automatically generatedA picture containing building, grass, photo, white

Description automatically generatedA picture containing black, photo, white, sitting

Description automatically generatedA picture containing furniture, building, rug, brick

Description automatically generated

A close up of a logo

Description automatically generated

A close up of a logo

Description automatically generatedA picture containing food

Description automatically generated

A close up of a logo

Description automatically generatedA close up of a logo

Description automatically generated

**Conclusion:**

* Convolving with a Gaussian makes the edge detection insensitive to noise at a scale smaller than sigma.
* Sigma and Lambda act as a threshold for the edge detectors for the noise.
* We are unable to see many variations with a very highly noised image of size 80\*80.

A close up of an animal

Description automatically generatedA picture containing bird

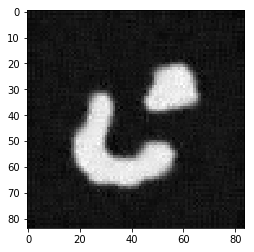
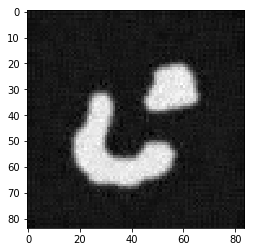
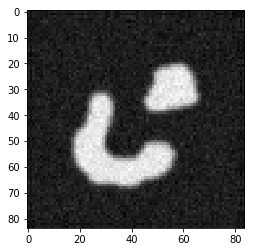
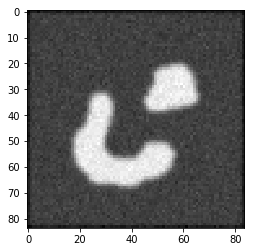
Description automatically generated

A close up of a tree

Description automatically generatedA picture containing bird, flower

Description automatically generated

Results in Python:



original linear-isotropic nonlinear-isotropic non-linear anisotropic

**Conclusion:**

* Anisotropic diffusion does both reduction of noise and protection of edges.
* Anisotropic diffusion smoothens along the edges using eigenvalues and diffusivity involving the tensor product.
* Linear diffusion is capable of removing all the noise, but the image becomes completely blurred and edges get blurred (correspondence problem).
* In nonlinear isotropic diffusion, edges are hardly effected. Noise elimination and stable edge structure.
* Anisotropic diffusion enhances the image by smoothening isotopically within a region and anisotropic way along edges.
* The anisotropic diffusion filter permits existence, uniqueness, and regularity result and convergences to a constant steady-state as t-> infinity.
* Anisotropic diffusion takes care of gray level shift-invariance and reverses contrast invariance.
* Corresponding filters should be chosen depending on the initial noised image as Anisotropic diffusion can smoothen (make it a bit curvy) the sharp edges of an image that has to be preserved.