The Playboy centrefold at the centre of computer science

May 11 2015, by Richard Matthews

The original Lenna test image from the University of Southern California Signal and Image Processing Institute. Credit: SIPI Image Database

The November 1972 issue of Playboy magazine is the magazine's best selling issue of all time. This is not because of the articles, but due to the proliferation of one iconic image from the magazine: that of centrefold model Lena Söderberg.

The original image was digitised by researches at the University of Southern California Signal and Image Processing Institute (SIPI) in 1973. Alexander Sawchuk, the assistant professor of electrical engineering, his graduate student and the SIPI lab manager were frantically looking for a new image for a research paper.

They had already exhausted the stock of usual test images. It was at this moment – according to legend – that a colleague walked in with the November 1972 issue of Playboy. Seeing the predicament that the researches were in, he tore a 5.12 inch strip from the top of the centrefold and fed it to their scanner. As it had a resolution of 100 lines per inch, the resulting image was the perfectly cropped head and shoulders image 512 x 512 pixels in size.

This image has since been used widely in imaging processing circles. That's because the nature of the image makes it amenable for testing a wide range of image processing algorithms.

The image contains a mixture of detail, colour, shading, focus, textures, reflections and flat regions that allow testing of multiple algorithms. These algorithms range from edge detection to denoising and even include shrinking the image down to the size of a human hair.

Pornography in the lab

Given the provenance of the image, its use is not without controversy. In a recent article in the Washington Post, a student from the Thomas Jefferson High School for Science and Technology in the US, Maddie Zug, suggested the school's use of the image in her computer science course was evidence that the school's culture unfairly marginalises women in an already male-dominated subject.

Maddie isn't the only one to have taken offence or look for alternatives. In a 2013 paper by Deanna Needell and Rachel Ward, the authors got permission from the agent of Fabio Lanzoni to use the popular male model's likeness rather than use Lena.

The outrage over Lena is less about the intrinsic properties of the image itself, but rather about the image's provenance. Maddie argued that by using the Lena image, women are turned away from computer science.

(a) (b) (c)

Figure 4: (a) Original 256×256 Fabio image corrupted with Gaussian noise and its reconstruction from 20% randomly-selected Fourier coefficients using (b) total-variation minimization and (c) ℓ_1-minimization of its bivariate Haar coefficients

Fabio Test Image

Yet Needell and Ward, two female researchers in this space, saw it as an opportunity to highlight gender issues in society at large by replacing the image with one of a male model instead.

Heidi Norton, a second year PhD student from the University of Pennsylvania, and co-founder of the website Beta Pleated Chic, which is devoted to women in STEM, has argued that the source of the image is due to the bygone era when academia was perceived as an "Old Boys' Club".

Norton says:

[…] in some ways, I felt like my strong negative reaction towards this image was unjustified […] I realised the (provenance) had nothing to do with the image itself. It had more to do with the fact that our culture historically (and often at present) values the beauty of women much more than their intelligence or talents.

It is accepted that all STEM fields need to attract more women into their ranks to achieve greater gender equality and diversity. However, the use of the Lena image is not an example of causation to correlation.

Disregarding the provenance of the Lena test image, we see that it is like many others within the SIPI database. The fact that the image is of an attractive woman should not weigh into this discussion for its use. Art in all of its many forms exists to capture beauty. Is it, therefore, not a logical conclusion that subjects of beauty, like Fabio and Lena, are going to turn up in our tests?

Computer Science Lecturer Hannah Dee, from Aberystwyth University, summed the issue up perfectly when she wrote for the the Software and Sustainability Institute in March of 2014:

[…] despite my avowedly feminist stance, I'm somehow unable to get that annoyed about [Lena].

The fact that there's a historic Playboy image at pretty much every conference I go to, and on the walls of my colleague's labs, and downloaded with every single image processing library I use, well… on the one hand, it's part of that drip-drip-drip of strangeness that comes from working in a male-dominated field, where the topics of conversation and the general attitude can be a little disconcerting. But on the other hand, with changing cultural attitudes, and the effect the internet has had on pornography, the entire centrefold (yes, you can easily find it online if you look) seems very tame indeed by today's standards. And the crop that is used in image processing research is, well… I've developed quite an affection for the picture. It's one of the quirks of computer science. So when I was asked what picture we should use to illustrate this blog post, there was only one choice.

But is it appropriate?

Still, the moral issue remains: did the Jefferson High School for Science and Technology do anything wrong when they asked students to Google the Lena image and use it to test the students algorithms? Potentially.

Given the ease with which a simple Google image search could yield nudity, perhaps in future the school should simply direct link to the image in the SIPI image database. This way it will shield the students from accidentally accessing something they shouldn't and will also provide them with several images to test their algorithms on. Something I am sure even Maddie would appreciate.

Should the field in general stop using the Lena image? My personal view is: no. The use of the Lena test image is a quirk of the industry that should be celebrated. That being said, it should be used alongside others

equally. Blue Steel anyone?

Warning: searching the internet for "Lena Söderberg" or the "Lenna image" may yield results that are not safe for work.

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