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Lenna

Lenna or **Lena** is the name given to a standard test image widely used in the field of image processing since 1973.[1] It is a picture of the Swedish model Lena Söderberg, shot by photographer Dwight Hooker, cropped from the centerfold of the November 1972 issue of *Playboy* magazine. The spelling "Lenna" came from the model's desire to encourage the proper pronunciation of her name. "I didn't want to be called *Lee*na," she explained. [2]

Contents

Image of Lena Söderberg used in many image processing experiments. *(Click on the image to access the actual 512×512px standard test version.)*

History

Before Lenna, the first use of a *Playboy* magazine image to illustrate image processing algorithms was in 1961. Lawrence G. Roberts used two cropped 6-bit grayscale facsimile scanned images from *Playboy's* July 1960 issue featuring Playmate Teddi Smith (born Delilah Henry), in his MIT master's thesis on image dithering.[3]

Intended for high resolution color image processing study, the Lenna picture's history was described in the May 2001 newsletter of the IEEE Professional Communication Society, in an article by Jamie Hutchinson:[4]

> Alexander Sawchuk estimates that it was in June or July of 1973 when he, then an assistant professor of electrical engineering at the University of Southern California Signal and Image Processing Institute (SIPI), along with a graduate student and the SIPI lab manager, was hurriedly searching the lab for a good image to scan for a colleague's conference paper. They got tired of their stock of usual test images, dull stuff dating back to television standards work in the early 1960s. They wanted something glossy to ensure good output dynamic range, and they wanted a human face. Just then, somebody happened to walk in with a recent issue of *Playboy*.
>
> The engineers tore away the top third of the centerfold so they could wrap it around the drum of their Muirhead wirephoto scanner, which they had outfitted with analog-to-digital converters (one each for the red, green, and blue channels) and a Hewlett Packard 2100 minicomputer. The Muirhead had a fixed

> resolution of 100 lines per inch and the engineers wanted a 512×512 image, so they limited the scan to the top 5.12 inches of the picture, effectively cropping it at the subject's shoulders.

This scan became one of the most used images in computer history.[5] In a 1999 issue of *IEEE Transactions on Image Processing* "Lena" was used in three separate articles,[6] and the picture continued to appear in scientific journals throughout the beginning of the 21st century.[4] Lenna is so widely accepted in the image processing community that Söderberg was a guest at the 50th annual Conference of the Society for Imaging Science and Technology (IS&T) in 1997.[7] The use of the photo in electronic imaging has been described as "clearly one of the most important events in [its] history".[8] In 2015, Lena Söderberg was also guest of honor at the banquet of IEEE ICIP 2015.[9] After delivering a speech, she chaired the best paper award ceremony.

To explain Lenna's popularity, David C. Munson, editor-in-chief of *IEEE Transactions on Image Processing*, noted that it was a good test image because of its detail, flat regions, shading, and texture. However, he also noted that its popularity was largely because an image of an attractive woman appealed to the males in a male-dominated field.[10]

While *Playboy* often cracks down on illegal uses of its material and did initially send out notices to research publications and journals that used the image,[11] over time it has decided to overlook the wide use of Lena. Eileen Kent, VP of new media at *Playboy* said, "We decided we should exploit this, because it is a phenomenon."[12]

Criticism

The use of the image has produced controversy because *Playboy* is "seen (by some) as being degrading to women",[10] and the Lenna photo has been pointed to as an example of sexism in the sciences, reinforcing gender stereotypes.

In a 1999 essay on reasons for the male predominance in computer science, applied mathematician Dianne P. O'Leary wrote:

> Suggestive pictures used in lectures on image processing ... convey the message that the lecturer caters to the males only. For example, it is amazing that the "Lena" pin-up image is still used as an example in courses and published as a test image in journals today.[6]

A 2012 paper on compressed sensing used a photo of the model Fabio Lanzoni as a test image to draw attention to this issue.[13][14][15][16]

The use of the test image at the magnet school Thomas Jefferson High School for Science and Technology in Fairfax County, Virginia provoked a guest editorial by a senior in *The Washington Post* in 2015 about its detrimental impact on aspiring female students in computer science.[17]

In 2017 the Journal of Modern Optics published an editorial titled "On alternatives to Lenna"[18] offering three images (Pirate, Cameraman and Peppers) that "are reasonably close to Lenna in feature space".

In 2018, the Nature Research family of journals announced that they would no longer consider articles using the Lenna image[19].

Remastering

As of 2001, Jeff Seideman, of the Society for Imaging Science and Technology, was noted as working with the archivist of *Playboy* to rescan the image from the original negatives.[20][5]

See also

- Carole Hersee
- Lorem ipsum
- Shirley cards
- Stanford bunny
- Suzanne
- Utah teapot
- China Girl

Notes

1. "Playboy centrefold photo shrunk to width of human hair" (https://www.bbc.co.uk/news/technology-19260550). *BBC News Online*. 14 August 2012. Retrieved 15 August 2012.

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15. "Every Picture Tells A Story" (http://www.claremontmckenna.edu/news/every-picture-tells-a-story/). Claremont McKenna College. May 2, 2013. Retrieved 2017-02-03.

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External links

- Lenna 97: A Complete Story of Lenna (http://www.ee.cityu.edu.hk/~lmpo/lenna/Lenna97.html)
- The Lenna Story (http://www.lenna.org/) - The original story of Lenna and an un-cropped scan of the original Playboy photograph