Emerging Tech
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Women's attractiveness judged by software

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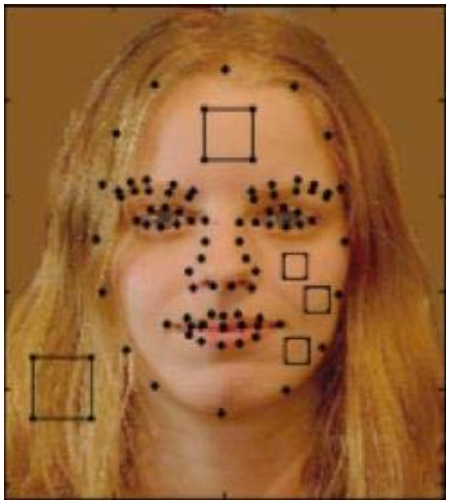
According to *Haaretz*, an Israeli team of computer scientists has developed a software that ranks facial attractiveness of women. Instead of identifying basic facial characteristics, this software has been designed to make aesthetic judgments — after training. The lead researcher said this program 'constitutes a substantial advance in the development of artificial intelligence.' It is interesting to note that the researchers focused on women only. Apparently, men' faces are more difficult to grade. But read more...



The picture on the left shows how the system is initially calibrated: "Facial coordinates with hair and skin sample regions as represented by the facial feature extractor. Coordinates are used for calculating geometric features and asymmetry. Sample regions are used for extracting color values and smoothness." (Credit: Amit Kagian, Tel Aviv University, Israel).

This software has been developed by Amit Kagian, a Tel Aviv University (TAU) student, for his master's thesis in computer science. He has been supervised by Gideon Dror, an associate professor in computer science at the Academic College of Tel-Aviv-Yaffo and Eytan Ruppin, a TAU professor who manages the Complex Network Systems Lab.

Here are some details about how the software was tested. "In the first stage, 30 human participants were asked to rate from 1-7 the beauty of several dozen pictures. Participants did not say why they ranked certain faces as more beautiful than others. The pictures were then processed and mathematically mapped. 'We came up with 98 numbers that represent the geometric shape of the face, as well as characteristics like hair color, smoothness of skin and facial symmetry,' Kagian explains. Participants' rankings of the pictures were also input in the computer."

But what was the second stage? "'We input new pictures of faces into the computer and it graded them based on the information it had.' Human subjects were then asked to rank the new pictures too. 'The computer produced impressive results: the rankings were very similar to the rankings people gave.' According to Kagian, the key achievement is that the computer operated according to certain perceptions of beauty that were not input into it, but learned by processing the data it received."

For more information, the researchers published their latest results in *Vision Research*, an Elsevier journal, under the name "A machine learning predictor of facial attractiveness revealing human-like psychophysical biases" (Volume 48, Issue 2, January 2008, Pages 235-243).

Here is a link to the abstract. "Recent psychological studies have strongly suggested that humans share common visual preferences for facial attractiveness. Here, we present a learning model that automatically extracts measurements of facial features from raw images and obtains human-level performance in predicting facial attractiveness ratings. The machine's ratings are highly correlated with mean human ratings, markedly improving on recent machine learning studies of this task. Simulated psychophysical experiments with virtually manipulated images reveal preferences in the machine's judgments that are remarkably similar to those of humans." And here is a link to the full paper (PDF format, 10 pages, 625 KB).

And here is a paragraph excerpted from the conclusions. "Our analysis has revealed that symmetry is strongly related to the attractiveness of averaged faces, but is definitely not the only factor in the equation since about half

of the image-features relate to the ratings of averaged composites in a similar manner as the symmetry measure. This suggests that a general movement of features toward attractiveness, rather than a simple increase in symmetry, is responsible for the attractiveness of averaged faces."

The same researchers presented their previous results at the Neural Information Processing Systems (NIPS) conference held in Vancouver, Canada, on December 4-9, 2006. Here is a link to this presentation called "A Humanlike Predictor of Facial Attractiveness" (PDF format, 8 pages, 78 KB). Here is the first paragraph. "This work presents a method for estimating human facial attractiveness, based on supervised learning techniques. Numerous facial features that describe facial geometry, color and texture, combined with an average human attractiveness score for each facial image, are used to train various predictors. Facial attractiveness ratings produced by the final predictor are found to be highly correlated with human ratings, markedly improving previous machine learning achievements. Simulated psychophysical experiments with virtually manipulated images reveal preferences in the machine's judgments which are remarkably similar to those of humans."

As you can see, there some shared words between these two works. The figure above is featured in both papers.

Finally, why did the researchers limit themselves to women? *Haaretz* says men's faces are more difficult to rank.

Sources: Ofri Ilani, Haaretz, Israel, March 21, 2008; and various websites

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Roland Piquepaille lives in Paris, France, and he spent most of his career in software, mainly for high performance computing and visualization companies. For disclosures on Roland's industry affiliations, click here.