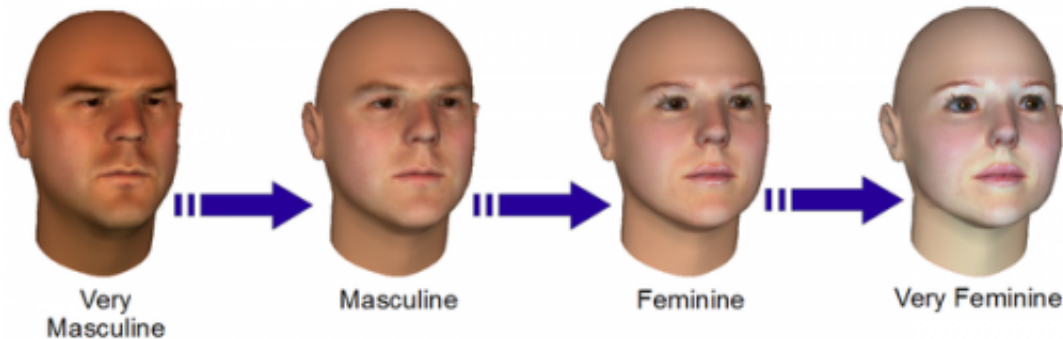


Computer gender-perception a valuable tool

June 18 2014, by David Stacey



The photo shows morphed 3D images of the same individual with gender varying from highly masculine to highly feminine. Which geometric features do human observers employ for ascribing a score to this variation and can such scores be replicated by computer algorithms?

Computers can mimic human perception of gender, according to new research published in the prestigious international journal *PLOS One*.

A multi-disciplinary team of three computer scientists and two [human anatomy](#) experts at The University of Western Australia has, for the first time, developed a [mathematical model](#) that matches the [gender](#) scores people give to human faces ranging on a continuum from very masculine to very feminine.

Lead author, highly acclaimed PhD candidate Syed Zulqarnain Gilani, said the model will be useful in quickly and accurately evaluating gender scores in research such as investigating the relationship between

masculinity and femininity and health, and in evaluating cosmetic facial surgery in terms of attractiveness, pre- and post-operation.

"Until now the tool-of-choice for getting a gender score has been to call in subjects - sometimes as many as 300 per study - and to recruit raters to give each subject's face a score. Sometimes almost 700 raters might be needed for a study, giving as many as more than 22,000 ratings which then have to be evaluated," he said. "This is a very cumbersome and slow process."

Syed and his team recruited 34 female and 30 male UWA students aged about 20 and of different races, and invited 75 raters to give each of the 64 faces a gender score. Having analysed the raters' scores, the team developed an algorithm that combines the two forms of distances.

"Our results suggest that the human cognitive system employs a combination of Euclidean (ruler) and geodesic distances (contours) between biologically significant landmarks of the face for gender scoring," Syed said.

"Our mathematical model is able to automatically assign an objective gender score to a 3D face with a correlation of up to 0.895 with the human subjective scores," he said.

Syed's next project, a logical step from this, is to work with colleagues at UWA, Telethon Kids Institute and Princess Margaret Hospital to analyse the 3D faces of children to see if autism (which is believed to be related to testosterone levels) can be detected, and treated, early.

More information: Gilani SZ, Rooney K, Shafait F, Walters M, Mian A (2014) "Geometric Facial Gender Scoring: Objectivity of Perception." *PLoS ONE* 9(6): e99483. [DOI: 10.1371/journal.pone.0099483](https://doi.org/10.1371/journal.pone.0099483)

Provided by University of Western Australia

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