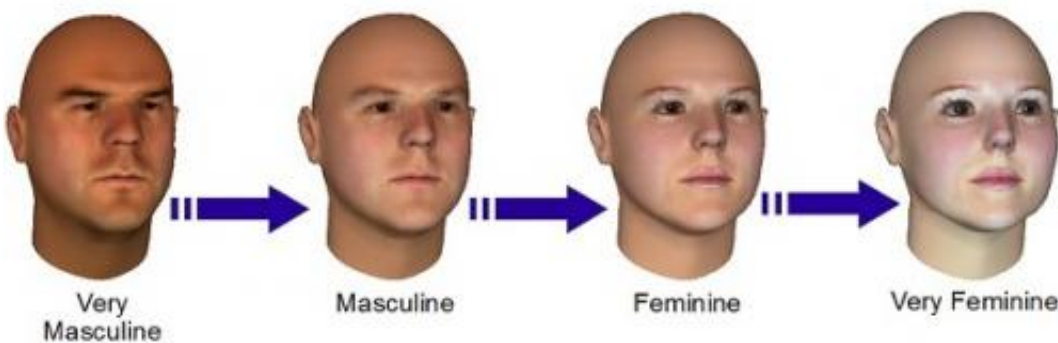# Face 'model' accurately weighs gender points

July 11 2014, by Carys Garland

The figure shows morphed 3D images of the same individual with gender varying from highly masculine to highly feminine. Credit: Gilani et al

A mathematical model has been developed to determine how feminine or masculine a person's face is, and researchers believe they are a step closer to diagnosing autism through using the same model.

To make the model, researchers from UWA obtained 64 3D face scans (without texture) and asked 75 people of similar backgrounds to assess the degree of femininity or masculinity of each face, assigning a gender score.

Researchers then developed their own mathematical model, taking into account the 3D contours of the face, to compare with the mean perceptual scores given by the raters.
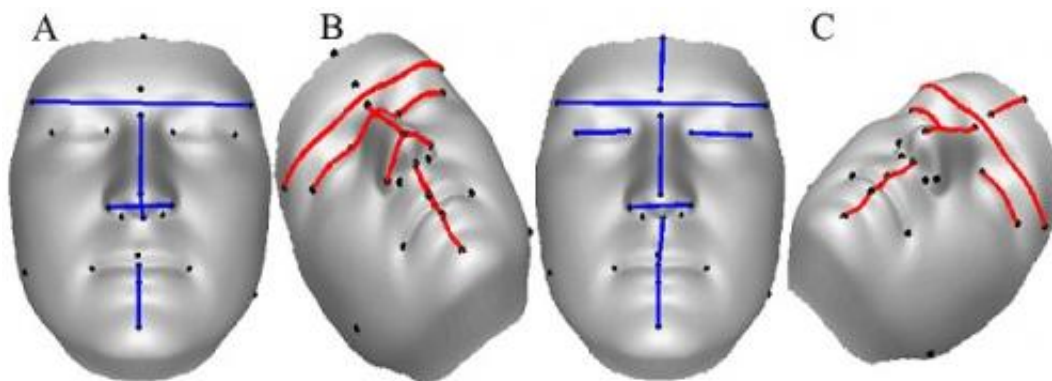
There was an 86 per cent correlation between the mathematically generated gender score and human score for females, and 79 per cent for males.

UWA researcher and study co-author Syed Gilani says autism is believed to be linked with the male sex hormone testosterone and affects the shape and features of the autistic person's face.

"If we are able to find gender scores using 3D faces, we might be able to predict, using the same features, the amount of autism present in an individual," Mr Gilani says.

"The algorithm can definitely be used for diagnosing autism once thorough testing has been done."

Mr Gilani says rating someone's gender is similar to determining the level of autism in a person because both gender and autism are subjective.

Most discriminating features between males and females found in the three

experiments.(A) Euclidean distances only. (B) Geodesic distances only. (C) Combined Euclidean and geodesic distances.Credit: Gilani et al, PLOS ONE

"Autism is also a continuum; everyone is autistic, it just depends how autistic somebody is," he says.

Mr Gilani says understanding how autism changes the shape of the face is the next step in his research.

Model correlates with human perception

He says studies like this have been carried out before, but their mathematical gender scores did not align with those given by the human raters.

"Essentially these studies have been using two dimensional photographs of faces for this purpose," he says.

"What we have done is used three dimensional photographs and used two different types of distances."

These two distances are a direct distance between two points on the face, or a Euclidean distance, and a three dimensional distance that considers depth, or geodesic distance.

Multiple industries to benefit

Mr Gilani says the study and its results can be applied in many different industries.

For example, in psychology, studies have tried to find correlation

between facial masculinity/femininity and trustworthiness, attractiveness, and the perceived health of a person.

Mr Gilani says gender score is also an interest to cosmetic surgeons, who plan surgery based on facial rating for attractiveness and sexual dimorphism.

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