Your face can predict metabolic disorders

A team of scientists from Beijing, China have developed a thermal face image analysis program called ThermoFace (TF) that could predict biological age and metabolic disorders with 80-90% accuracy. They trained their program on thermal and 2D visible images of 2,811 Han Chinese individuals - 1,339 females and 1,472 males. They made a face mesh, by dividing the face into smaller triangulated regions. A combination of different areas formed clusters. Specific clusters were found to be associated with age and other metabolic disorders. They observed that aging-associated changes start from 50 years of age. The whole face was a better predictor of age than these clusters alone. Furthermore, men and women have different clusters associated with aging; thus, they were analyzed separately.

ThermoFace as metabolic disease predictor

TF was positively correlated with metabolic disease parameters such as BMI, fasting blood glucose, and apolipoprotein B levels. Comparatively, three-dimensional (3D) facial images were better in predicting chronological age but TF was better in predicting biological age, as a direct indicator of cellular metabolism. At the cellular level, TF was well correlated with the known changes in the aging-associated gene expression changes in the individuals' blood cells (peripheral blood mononuclear cells). Diabetes is known to increase the aging process. The TF predicts 6.28 years on average more aging in the diabetes population as compared to healthy people. Moreover, it could predict hypertension in females with 78.2% accuracy and fatty liver in males and females with 80% accuracy. Interestingly, taking medicine had a negligible effect on these disease predictions.

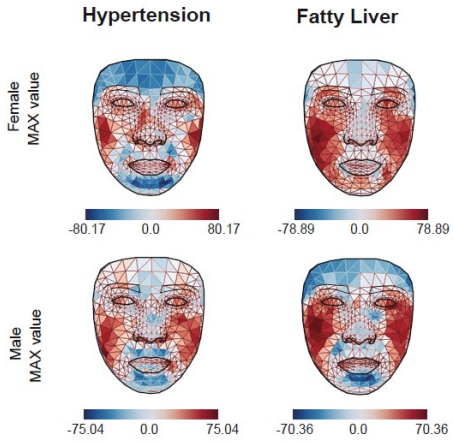

Image excerpted from the article

Effect of exercise

Various cardio exercises are known to improve overall health. Thus, the authors put a cohort of people on 2 weeks of jump training exercises consisting of greater than 800 jumps for more than 10 min. They found that with just 2 weeks of exercises, TF could predict an average decrease of 5 years in biological age.

Limitations of the study and further research:

1. This study was done only on the Chinese population. Further studies are needed to include other ethnic groups.

2. They did not consider the circadian rhythm-based effect on the thermal images, which can be the basis of future studies.
3. They observed improvement in biological age with 2-week of exercise. It would be interesting to assess the long-term effect of exercise.
4. Lastly, the effect of emotion and environment can be studied on these images and biological health.

Further details on the article can be found here.