

Perspective

Quantitative Analysis of the Degree of Symmetry of Human Face

Abraham Tamir*

Department of Chemical Engineering, Ben-Gurion University of the Negev, Israel

PERSPECTIVE ARTICLE

In a previous article (June 2007) the author discussed qualitatively the symmetry of human face. From the original image (Figure 1) of a certain person that appears at the center of each triplet, two symmetrical combinations were constructed that are based on the left part of the image and its mirror image (left-left) and on the right part of the image and its mirror image (right-right). It was enough to observe at the two symmetrical combinations of the images to conclude qualitatively the degree of symmetry of the central image.

In the present article the author made a quantitative analysis, to his opinion for the first time, in order to calculate a single number that characterizes the degree of symmetry of human face. By applying computer software that enables to determine length, surface area and perimeter of any geometrical shape, the following sizes were measured for each triplet: face perimeter and area; distance between the pupils; mouth length, its perimeter and area; nose length and face length, usually below the ears. Likewise the area and perimeter of the pupils was measured. Then for each of the above measurements the following ratio C was calculated $C = [(B-A)/A] * 100$, where A is

*Corresponding author

Abraham Tamir, Department of Chemical Engineering, Ben-Gurion University of the Negev, Beer-Sheba, Israel, Email: atamir4@012.net.il

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the numerical magnitude of each of the above quantities in the original image, B corresponds to the symmetrical image and C is the relative deviation.

In the pictures, each image is characterized by two numerical quantities written below. On the right appears the average of all measured C quantities that characterizes the degree of symmetry of the real image with respect to the combinations right-right and left-left. A high value of C indicates a low symmetry where as the value is decreasing the symmetry is increasing. The magnitude on the left relates to the pupils and compares the difference between the area and perimeter of the two pupils.

The portraits were arranged in an increasing order of symmetry. The image of Leonid Brezhnev is the less symmetrical of all images, where that of Dr. Ron Avni, comptroller of Ben Gurion University of the Negev in Israel is the most symmetrical one. It should be emphasized that our personal qualitative observation should also be applied because the quantitative analysis does not control all symmetry components. And finally is a more symmetrical image nicer as researches claim? You decide.



Figure 1 Two symmetrical combinations of the images to conclude qualitatively the degree of symmetry of the central image.