

Towards an objective geometrical description of antique busts

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Archaeologists distinguish the different types of portraits of Emperor Augustus primarily by counting the various strands of hair. Little effort was made to capture his identity using the characteristic geometry of his face. What makes humans - his fellow Romans as well as ourselves 2000 years later - recognize his portrait at the first glance? Which of the statues' features were inspired by the classical concept of beauty and god-like appearance, and which features can be attributed to the real Augustus.

We have started a unique project to build a statistical model that geometrically describes the facial characteristics of Augustus. Therefore, we started to scan busts of the famous emperor. The key ingredient to build this statistical representation is a set of dense point correspondences between all samples of his digitized facial geometry.

Starting from a sparse set of manually placed correspondences, we first compute the best fitting rigid-transformation and scaling between a common template mask and all available portraits. This effectively compensates for different positions, orientations and sizes of the scanned busts. Starting from this initial alignment, we fit the common template mask to all acquired scans by means of non-rigid registration to obtain a dense set of correspondences between all datasets.

Based on the obtained correspondences, a statistical face model is computed. This model objectively describes the mathematical space spanned by all acquired faces by means of a mean face and the most common deviations from this norm. This allows us to visually explore the artistic variations in the Emperors' portrait.

The grey busts in the figure on the right are the foundation of our statistical model. The mask on the left of the figure represents the statistical model and has dense correspondences to all the busts in our database. Therefore, it can seamlessly blend between the different geometries of all faces in the data base.



In the future, we plan to enlarge our database by scanning busts of the emperor and other rulers all over Europe and to compute descriptors based on the statistical model which will allow us to distinguish Augustus – and possibly even his family – from portraits of the other classical rulers.



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