

Chernoff face graphs as an efficient way of creating comprehensive Patient Profiles in SAS®

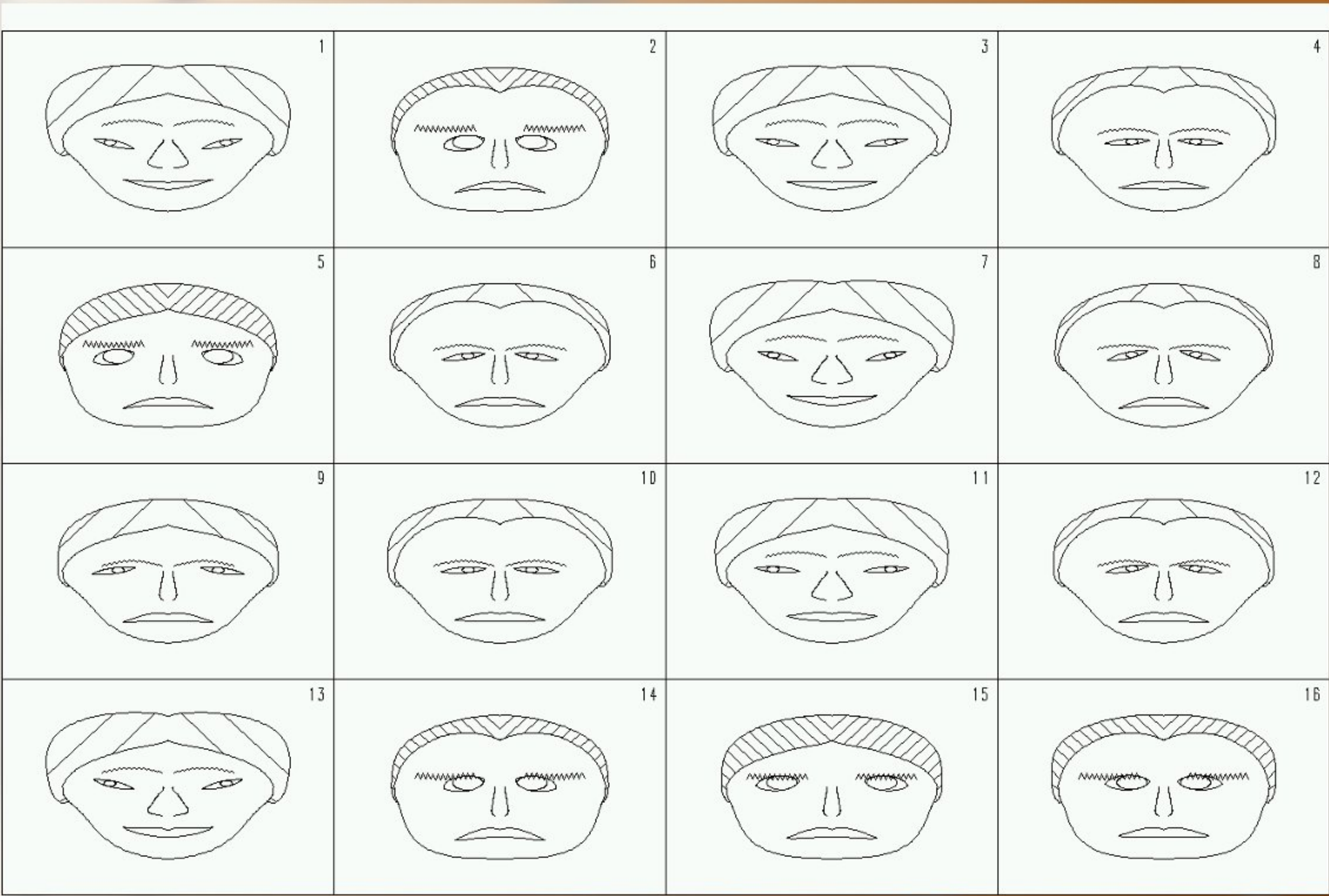
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THE IDEA

Let's have clinical multivariate data represented by faces, with variables attributed to...

- lengths
 - shapes
 - colors
- ...of elements of a face.

A result is a face representation of patient profile. Patient multivariate 'looks' can then be searched for repeating/outstanding patterns.



DOES IT WORK FOR YOU?

Can you see groups of subjects above? How many groups can you distinguish? Check with the picture in the bottom right of the poster.

If your answer does not match, either the method or the example are not correct.

HOW WAS THE EXAMPLE CREATED?

Dummy data has been generated for the purpose of this article, with some clinical data assigned values close to average among healthy people. It has been slightly manipulated by superimposing conditions related to diabetes mellitus and pregnancy, while allowing for some differences between subjects that are not related to the two states mentioned. While all the face parameters have been assigned a variable, some variables are assigned to multiple parameters, and the faces remain symmetrical.

The data used is rather "over-pure" - the patients are very close to what is presumed a norm, and only selected patients have been attributed traces of an extraordinary state.

IT IS EASY

There's a macro available from Michael Friendly for drawing charts with faces.

THE CRITIQUE

Robert Kosara provides an extensive critique of Chernoff faces. The author analyses phenomena such as face perception mechanism and pareidolia. In his critique, Kosara has proven that this technique does not currently allow an audience to read values attributed to certain features based on multivariate data. The conclusion is that there is more research on face perception needed to better understand the relationships the human brain makes between the elements of a face.

CONCLUSION

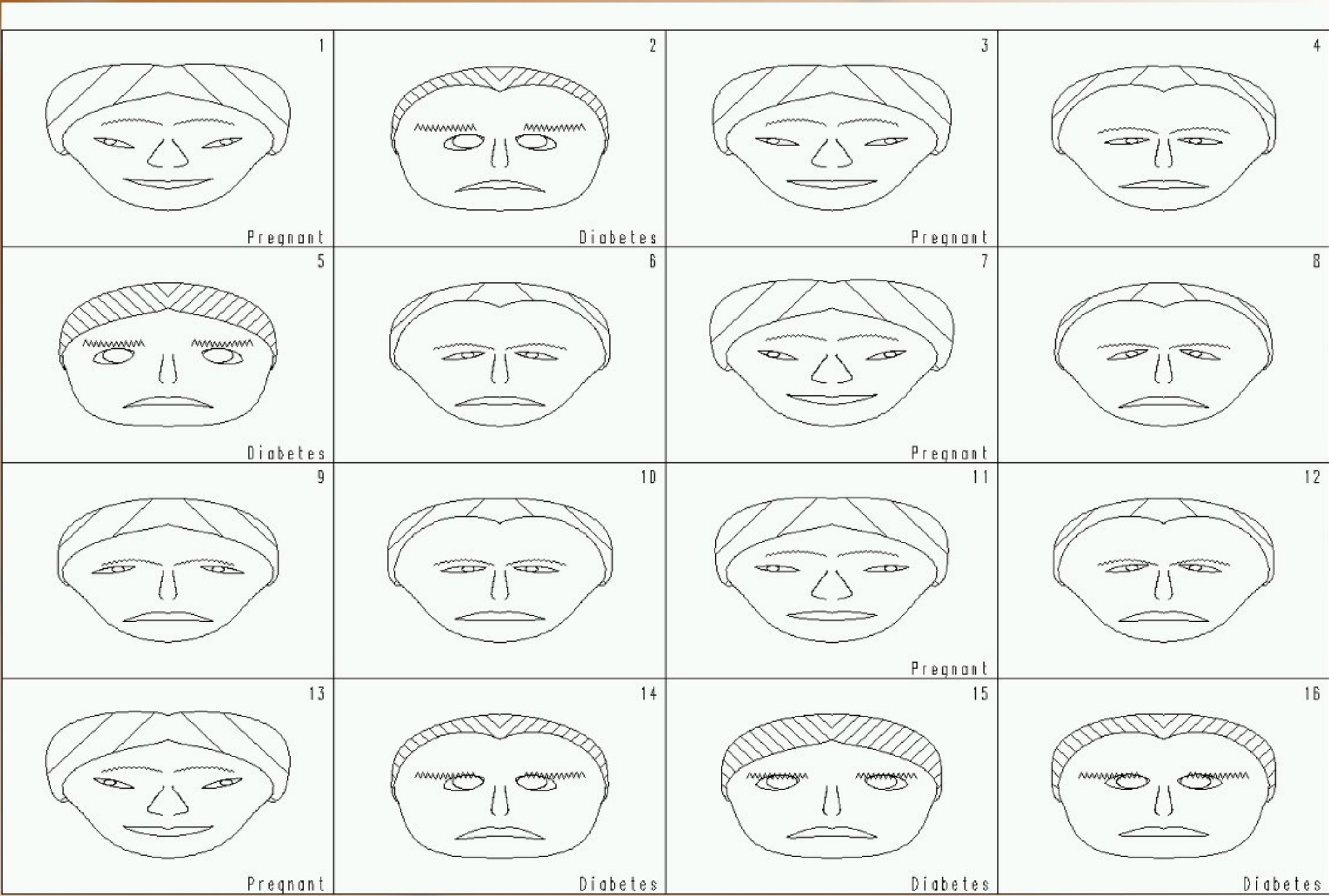
The critique, while acute, does not exclude the potential use for grouping patients with a common set of features. This could be an initial step in pursuing reasons, names, and, possibly, appropriate treatment, for a specific group of patients. The advantage of the method is that prior knowledge of the existence of a specific condition, that would make their graphs look similar, is not required.

REFERENCES

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Friendly, M. (2007). "Faces macro: Faces display of multivariate data", Version 1.5 (19 Apr 2005). <http://www.datavis.ca/sas/mac/faces.html>
Kosara, R., "A Critique of Chernoff Faces", <http://eagereyes.org/VisCrit/ChernoffFaces.html>

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