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Virtual Portraits of János Bolyai*

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Abstract

There are not any authentic portraits of one of the greatest Hungarian spirits. We have in view to create János Bolyai's virtual portrait with the help of freewares available on the Internet and using the pictures of his family. We have tried out several softwares and pictures and we sum up our conclusions in the following article.

Categories and Subject Descriptors: I.3.3 [Computer Graphics]: Picture/Image Generation

Key Words and Phrases: Bolyai János, Computer graphics, Morphing

1. Introduction

We would like to summon our great mathematician in a very simple way, namely we try to create his physical portrait with the help of computer. It is widely known that there isn't any authentic portrait of János Bolyai and there is little likelihood of ever coming upon an authentic photo or painting in the back of the archives. Namely there were photos taken of him or paintings made but one of these was destroyed by János himself in a bad mood with the explanation that he never sought earthly glory.

We set ourselves the task of creating a possible portrait of János Bolyai with the help of an objective technique and using the authentic portraits of the Bolyai family.

From these data with the help of computer graphics, namely the Meesoft's SmartMorph freeware, the Winmorph freeware and the Morphman shareware we can create a virtual portrait of János Bolyai.

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2. The generation of the portraits

It is important, that we have his father, Farkas Bolyai's (figure 1), his mother, Zsuzsanna Benkő's authentic portraits.

Also we have his children's authentic portraits, his son's, Dénes his daughter's Amália and his hypothetic son's, Gyula (figure 2). It is a much debated question, whether Gyula was indeed his son. We don't have pictures of his second daughter, Eliza-Klára.

Figure 1: The authentic portraits of Bolyai János parents

Figure 2: Bolyai János children's authentic portraits

Also we have some pictures from the genealogical tree of the Bolyai family (figure 3).

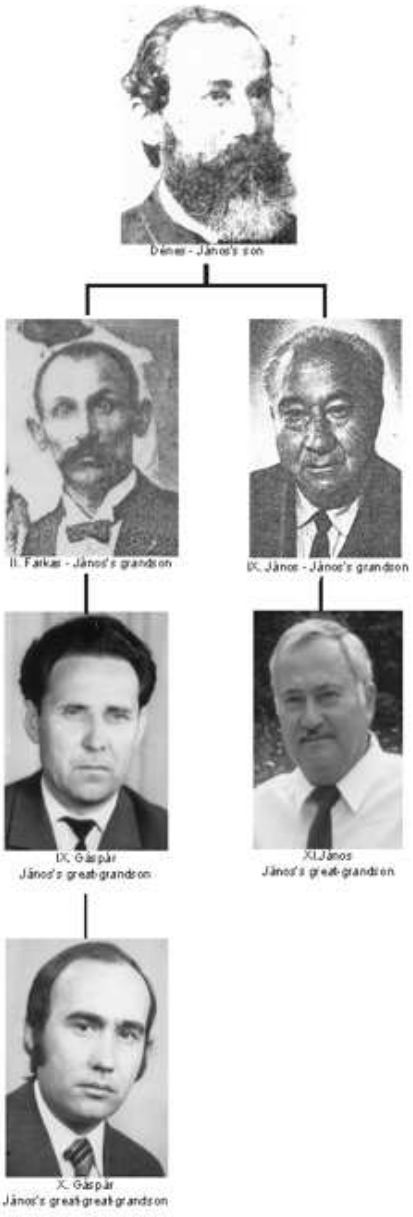

Figure 3: Part of the genealogical tree of the Bolyai family: descendants of Bolyai Dénes, János's son

There are 2 known Bolyai János portraits: the picture painted by Mór Adler

in 1861 and János Bolyai's half-relief on the building of the Culture Palace in Marosvásárhely.

It is to decide which portrait is more correct.

Relying upon Zsuzsanna Benkő's portrait, Mór Adler's painting is quite fitting, perhaps his painting resembles more Zsuzsanna Benkő, than the half-relief resembles Dénes Bolyai (figure 4).

Figure 4: The two Bolyai János portrait compared with his mother's portrait and his son's portrait

We made some animations starting with the transformation of the portrait of János on Mór Adler painting into his mother portrait. (figure 5). In this picture sequence the first and the last picture is the input data - the authentic portraits- and the resulting pictures are those on the middle of the sequence.

Figure 5: The transformation of the portrait of János on Mór Adler's painting into his mother portrait

These animations were made with the above mentioned freewares using a technique called morphing.

Morphing is the process of smoothly transforming one image into another. With this tool we have specified the correspondence between the two starting images

using a set of control points. These points were placed on the critical points and contours of the face like the eyes, the countour of the mouth, nose or face, and so on. These control points are used for mapping pixels in the source image to the target image using triangulation and projecting transformation in these triangles (figure 6).

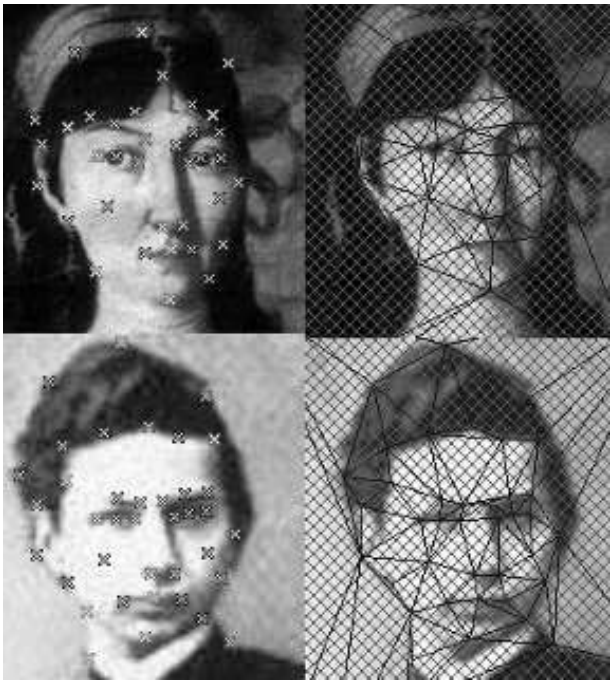

Figure 6: The control points and the triangles determined by these points

As a result we've got an AVI movie file. We've used the frames of this movie to choose the best picture (in our opinion) that represents the new virtual portrait of János Bolyai.

Figure 7: The transformation of the portrait of Gáspár, János's great-grandson into the portrait of János's father, Farkas. The resemblance speaks for itself.

Figure 8: The transformation of the portrait of János's mother into the portrait of János's father

Figure 9: The transformation between Farkas and János's another great-grandson. The resemblance is also very

Figure 10: The transformation between Farkas and Gáspár, János's great-great grandson.

We can see in this last picture sequence (figure 10) that although there is a six generation distance between these two members of the family, the resemblance is astonishing, and who knows, the resulting face may come very near to János's face

3. Conclusions

We made a lot of experiments on the computer and our results are the following:
Such an analysis is very interesting and edifying.

To all probability in the succession of such transformation of faces one of the pictures comes very near to János Bolyai's real portrait, but no one can tell which one is correct.

Moreover, in our opinion, portraits made by the machine are machine faces without soul, they are lifeless faces.

Although we've collected the portraits and information still to be found with great pleasure and enthusiasm in our final conclusion we agree with Barna Szénássy a well-known mathematic historian.

He has namely the opinion that if János destroyed his authentic portrait, we should consider it his last will and shouldn't create a graphical picture of him.

Perhaps János Bolyai was right in saying we shouldn't make graven images of the immortals. Only the mortals have portraits, the immortals have spiritual faces.

References

[1] Róbert Oláh-Gál, Szilárd Máté: Computer generated portraits of János Bolyai, International Conference on Non-Euclidean Geometry in Modern Physics, Bolyai-Gauss-Lobachevsky, Edited by I. Lovas, EP Systema Debrecen, Hungary (2003) 119-126.

[2] Benkő, Samu: Apa és fiú (in Hung.) , Magvető Kiadó Budapest (1978)

[3] Bedőházi, János: A két Bolyai (élet és jellemrajz) (in Hung.), Marosvásárhely (1897)

[4] Dávid, Lajos: A két Bolyai élete és munkássága (in Hung.), Budapest Gondolat Kiadó (1979)

[5] Fráter, Jánosné: A Bolyai gyűjtemény (in Hung.), K22-K30, Budapest (MTA Könyvtára Kéziratárának katalógusa) (1968)

[6] Hints Elek hagyatéka az MTA Kézirattárában, Bolyai Gyűjtemény

[7] Marosvásárhelyi Állami Levéltár (Arhivele Statului, Filiala Tg-Mures-Registrele Contemporane de Evidenta ale Primariei Tg-Mures)

[8] Department of Manuscripts and Rare Books of the Library of the Hungarian Academy Of Sciences (MTA Könyvtára Kéziratár, Bolyai Gyűjtemény, K22-K30).

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