

ABSTRACT FORM

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3D- Image Processing: Analysis of Ballpoint Lines on Paper

Title of paper

Eva De Leersnyder, Patrick De Smet (NICC / UGent)

Author(s) presenting the paper

Hiep Quang Luong (UGent), Wilfried Philips (UGent), Jan De Kinder (NICC)

Co-Author(s)

eva.deleersnyder@gmail.com

e-mail address of presenting author

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Abstract

This research continues the work of some earlier papers on writing sequence of crossing lines and explores at the same time new possibilities to analyse three dimensional scans of ballpoint lines on paper. The latter is done by following the heights along the lines or by studying cross sections.

The ballpoint lines are extracted semi-automatically using the Steger algorithm, which is an edgedetector for curvilinear lines. The localisation of the lines is feasible in most cases. The higher the pressure on the ballpointpen, the easier it becomes to track the line.

The previous papers on writing sequence had remarked that an oval structure or a total intersection was present at some of the crossing points of two lines. The longest axis of the oval structure was always laying in the direction of the second line. In case of an intersection the first line was totally intersected by the second one. In both cases the writing sequence could be determined properly. In this research however, the determination of the writing sequence does not give good results. Moreover, some doubts arise about the accuracy of the assumptions that were made in the previous papers.

The heights along a line are highly depending on local changes. No conclusions about the longitudinal variation of pressures could be drawn.

The cross sections are very capricious. After taking the mean value of twenty-one consecutive cross sections, the profile becomes smoother. Cross sections of the lines written with a slanted pen, show asymmetry. Some lefthanded lines (pen slanted to the left) and righthanded lines (pen slanted to the right) show the same asymmetry and some the opposite asymmetry, so the link between the kind of asymmetry and the angle of the pen has not yet been fully determined. All measurements as well as the characteristics depend heavily on the paper surface, its local changes, its fibres and the inconsistency of the writer.