Robust and effective medical image filtering, with automatic parameter choice.

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ABSTRACT

The analysis of medical image data currently requires the interpretation of a trained and experienced user. The technological advances in imaging machinery and the understanding of disease onset as well as medical planning, all favour the need for ever more automatic and robust methods for evaluating the health state of a subject. Here, we concentrate on methods for processing medical image data as currently provided by existing imaging technologies. In specific, the effectiveness of automatic image filtering in order to remove noise and improve the sharpness of distinct objects. The filtering approach is based on a partial differential equations approach, namely the Perona-Malik equations. The approach adopted for terminating the iterative filtering procedure is based on image quality descriptors, in specific we observe the rate of change of these to infer the transient effects of the filtering process. The entire pipeline is demonstrated to work effectively on different sets of medical image data, including CTA and CT, both in individual 2-D images in a stack as well as for the complete 3D dataset.

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