High-quality Motion Deblurring from a Single Image

The paper deals with one of the most common problems in digital photography – motion blur. It presents a new way of deblurring single images using a very specific probabilistic model and reducing the problem to an energy minimization problem.

The paper provides a small introductory section, so a reader does not have to know very specific details of the topic. However, some additional words about deconvolution will probably be highly appreciated by a reader. A brief review of older work on the topic is also included, and the main problems with existing approaches are pointed out, therefore the need of additional research seems to be understandable. Nevertheless, the section can be easily improved by adding more visual examples of related work.

The next section contains a thorough analysis of ringing artifacts appearing in deconvoluted images. Moreover, it shows weaknesses of present approaches by explaining why spatial randomness should be respected while modelling image noise. The problem seems to be clarified and illustrated very precisely.

The next several sections describe a new probabilistic model. They provide exhaustive information about the model itself and useful comparisons with older research, so a reader does not have to think about the advantages of the new approach. Although, more equations should be moved outside paragraphs in order to make the text well-readable.

The paper includes some accurate details of optimization, providing helpful mathematical descriptions. This section seems to be the most complicated one and is very difficult to understand. It would be great to present and explain maximum a posteriori and energy minimization problems as the whole section relies on the two. Some additional details at the beginning would make the section easier to read and understand.

The next section contains numerous examples of results in comparison with other methods. Visual examples confirm the usefulness of the research and its advantages. However, the paper mentions that some results are ‘surprisingly’ good – it can be understand in a wrong way, one can think good results were not expected.

To sum up, the paper itself could be organised better, some textual operations would improve its readability and understanding. Nonetheless, the content is very interesting and thought-provoking, it provides many new ideas and confirms they are undoubtedly useful. The program provided with the paper is also convincing and the presented results seem to be very promising. One thing would be great – a sample source code – as the described method seems to be quite complex and difficult to implement.