Comments on: "Robust Line Fitting in a Noisy Image by the Method of Moments"

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Abstract

Qjidaa and Radouane have recently presented a method for robust line fitting and experimentally compared it to other methods, including a method suggested by us. The results attributed by Qjidaa and Radouane to our algorithm are incorrect. We apply our algorithm to the data used by Qjidaa and Radouane and demonstrate its robustness and accuracy.

Index Terms: Line fitting, outliers, Hough transform

In a recent correspondence [1], Qjidaa and Radouane presented a method for robust line fitting. They experimentally compared their algorithm to other methods, including a robust method suggested by us [2]. For clarity we maintain the acronym used in [1] and refer to our algorithm [2] as the KA-algorithm. The results attributed by Qjidaa and Radouane to

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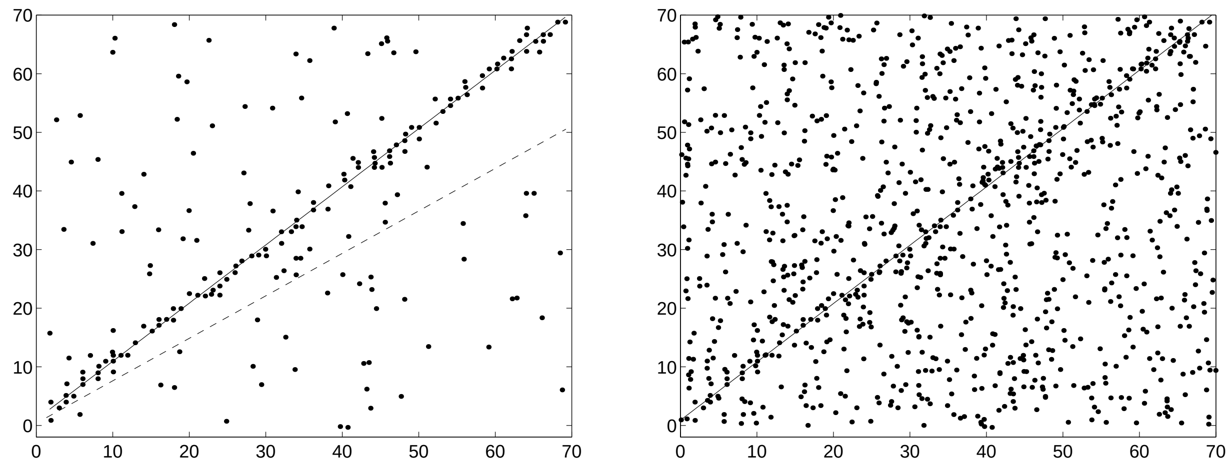

Figure 1: *Left:* Fitting a line to a set of data points taken from Figure 3 of [1]. The solid line was obtained in our laboratory using the KA-algorithm [2]. The dashed line is the result attributed to the KA-algorithm in Figure 6 of [1]. *Right:* The fitting quality obtained with the KA-algorithm remains high even when the number of outliers is increased.

the KA-algorithm are incorrect and are probably due to an error in their implementation of the KA-algorithm. In this correspondence, we apply the KA-algorithm [2] to the data used by Qjidaa and Radouane [1] and demonstrate its excellent performance.

The data points in Figure 1 (left) were obtained by scanning Figure 3 of [1]. In this example the inliers are perturbed and outliers are present. The dashed line was claimed in [1] (line 3 in their Figure 6) to be the output of the KA-algorithm. The good fit presented in Figure 1 (left) by the solid line is the result that we obtained with the KA-algorithm. Variations of two orders of magnitude in the saturation (maximum influence) parameter yielded negligible changes in the output. To further demonstrate the robustness of this result, we added outliers as shown in Fig. 1 (right). The output that we obtained with the KA-algorithm [2] (solid line) remains excellent.

The data points in Figure 2 (left) are taken from Figure 9 of [1]. The dashed line was claimed in [1] (line 3 in their Figure 10) to be the output of the KA-algorithm. The solid line in Figure 2 (left) is the correct result that we obtained with the KA-algorithm. The

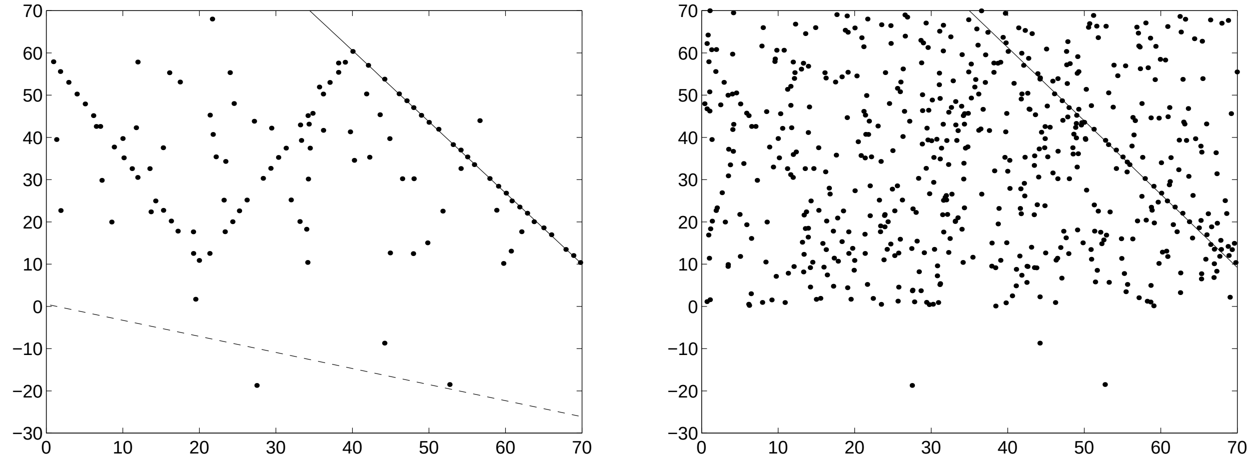

Figure 2: *Left:* Line fitting to data scanned from Figure 9 of [1]. The solid line was obtained with the KA-algorithm [2] in our laboratory. The dashed line is the result attributed to the KA-algorithm in Figure 10 of [1]. *Right:* The fitting obtained with the KA-algorithm is stable even in the presence of additional outliers.

robustness of the KA-algorithm in the presence of additional outliers is demonstrated in Fig. 2 (right).

The performance of the KA-algorithm when applied to the data shown in Figure 16 of [1] is also excellent, contrary to the incorrect result shown as line 1 in Figure 18 of [1]. We omit the images for brevity.

To conclude, we demonstrated that the KA-algorithm is robust and provides excellent line fitting to the data sets shown in [1] and to noisier versions of that data. The statement made in [1] that the KA-algorithm is not robust in the presence of outliers is wrong. The results attributed in [1] to the KA-algorithm are incorrect and are probably due to an error in their implementation of the KA-algorithm. Researchers wishing to repeat the experiments and verify our results are invited to contact us. An extension of the KA-algorithm [2] to the correlated heteroscedastic case can be found in [3].

References

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