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Scale space Radon transform

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Abstract: An extension of Radon transform by using a measure function capturing the user need isproposed. The new transform, called scale space Radon transform, is devoted to the casewhere the embedded shape in the image is not ?liform. A case study is brought on a straightline and an ellipse where the SSRT behaviour in the scale space and in the presence of noiseis deeply analyzed. In order to show the effectiveness of the proposed transform, the exper-iments have been carried out, ?rst, on linear and elliptical structures generated syntheticallysubjected to strong altering conditions such blur and noise and then on structures imagesissued from real-world applications such as road traf?c, satellite imagery and weld X-rayimaging. Comparisons in terms of detection accuracy and computational time with well-known transforms and recent work dedicated to this purpose are conducted, where theproposed transform shows an outstanding performance in detecting the above-mentionedstructures and targeting accurately their spatial locations even in low-quality images.

Keywords : radon transform, line, ellipse, scale space, noise