

# Scale space Radon transform

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

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