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Author

Nanzer JA. Popova E. Rogers RL.

Title

Performance analysis of a Bayesian classifier for the detection of human presence using total power and correlation radiometry

Source

IET SIGNAL PROCESSING, vol.5, no.7, OCT 2011, 669-679.

Abstract

This study presents a performance analysis of a new method of detecting and classifying non-moving humans from a moving platform in real time using millimetre-wave radiometry. The implementation of the detection method is a naive Bayes classifier which operates on signals produced by two K(a)-band total power receivers, one W-band total power receiver and one K(a)-band correlation receiver. Processing of the radiometric signals involves median filtering and passive range estimation prior to the signals being classified by the Bayesian algorithm. Experimental results are shown and a performance evaluation of the classifier is given using the F(1)-measure and the receiver operating characteristic. A maximum F(1)-measure of 0.68 is achieved, and the area under the receiver operating curve is 0.94 and 0.98 for passive and active ranging, respectively. The maximum true positive rate was 0.85 (passive) and 0.92 (active) both corresponding to F(1) = 0.48. The processing time required for classification is shown to be less than 50% of the experimental time, permitting real-time operation.