EXTRACTION OF TARGET FEATURES USING INFRARED INTENSITY SIGNALS (WedPmOR4)

Author(s) :

Tayfun Aytac (Bilkent University, Turkey)
Billur Barshan (Bilkent University, Turkey)

Abstract :

We propose the use of angular intensity signals obtained with low−cost infrared sensors and present an algorithm to simultaneously extract the geometry and surface properties of commonly encountered features or targets in indoor environments. The method is verified experimentally with planes, 90deg corners, and 90deg edges covered with aluminum, white cloth, and Styrofoam packaging material. An average correct classification rate of 80% of both geometry and surface over all target types is achieved and targets are localized within absolute range and azimuth errors of 1.5 cm and 1.1deg, respectively. Taken separately, the geometry and surface type of targets can be correctly classified with rates of 99% and 81%, respectively, which shows that the geometrical properties of the targets are more distinctive than their surface properties, and surface determination is the limiting factor. The method demonstrated shows that simple IR sensors, whencoupled with appropriate signal processing, can be used to extract substantially more information than such devices are commonly employed for.

Menu