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### **Human recognition by active and passive acoustic signatures**

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Recognition of different sensed objects is a problem that often appears in practice. One of the solutions is based on analysis of the signatures of the specific objects. This method was applied for the acoustic detection of walking humans. Human footsteps excite envelopes of broadband acoustic signals in the air due to periodic friction forces between the foot and the ground/floor. The repetition frequency of these envelopes is equal to the footstep rate and usually lies below 3 Hz. High frequencies in these envelopes allow detection and localization of a walker using a narrowband ultrasonic receiver with a high directivity pattern. Consequently, periodic low frequency human motion results in passive ultrasonic detection using this method. This motion has also unique Doppler signatures and is measured using ultrasonic sonar. Common analyses of passive and Doppler signatures allow the extraction of the specific cadence in human motion and recognition of a human while rejecting other moving or stationary objects. [Work supported by Department of the Army, Army Research Office contract W911NF-04-1-0190].