

## 基于信号差分特性的被动入侵检测方法

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摘要：

被动入侵检测系统在空巢老人监护、边境监测、安防等众多领域有着广泛的应用，传统的基于信号变化特征的入侵检测方法容易受到复杂环境变化的影响而使检测效果不容乐观。为了解决该问题，本文提出了一种可靠的被动入侵差分检测方法。用链路信号的均值和方差组成的特征矩阵在相邻两个时刻的相似度来表征信号的差分变化并以此作为特征信号实现目标的入侵检测。该方法解决了由于参考信号随环境参数变化带来的检测误差增大的问题，抵消了测试环境变化引起的噪声。利用自主设计的传感器节点进行了相关的实验验证，结果表明，本文的方法成功的克服了噪声和信号时变性的影响，具有较高的检测率与较低的误检率。

关键词：无线传感器网络；入侵检测；差分；链路信号强度

## Passive Invasion Detection Scheme Based on Differential Signals

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**Abstract:**

Passive invasion detection system is widely applied in many fields such as guardianship of empty nesters, border monitoring, security, et al. Traditional invasion detection method based on the signal variation is easy influenced by the complex environment and the detection error increases dramatically with the change of the environment. To overcome this problem, this paper proposes a novel robust invasion detection algorithm based on the differential signals. It utilizes the similarity of characteristic matrix which is composed of mean and variance of signal between the subsequent two moments to indicate the change of signal and achieves invasion detection robustly and successfully. The method solves the problem of the increasing of the detection error caused by the time-variation of referential signal and offsets the noise caused by the variation of test environment. The experiments with the specialized designed sensor nodes show that the algorithm overcomes the influence of noise and signal degeneration with a higher detection rate and lower error detection rate.

**Keywords:** invasion detection; differencing; link signal strength; wireless sensor network

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