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## 模拟人群信任和决策机制的协作频谱感知方法

### Cooperative spectrum sensing scheme based on crowd trust and decision-making mechanism

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英文关键词: [cognitive radio](#) [consensus](#) [cooperative spectrum sensing](#) [SSDF attack](#) [trust value](#) [imbalance of sensing ability](#)

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作者

单位

[王小毛](#), [黄传河](#), [吕怡龙](#), [王 斌](#), [范茜莹](#), [周 浩](#)

[武汉大学 计算机学院](#), 湖北 武汉 430072

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中文摘要:

通过模拟人群内部的信任和决策机制,针对多用户的频谱协作感知一致性问题,提出了一种分布式算法。该算法首先通过网络的历次协作过程预测出各感知用户的动态可信值,据此产生用户的相对可信值,并结合决策机制使得用户之间进行数据交互,随着数据的可信、迭代交互,所有用户状态将趋于一致,最后通过判定算法得出最终结果。算法充分考虑了实际环境中各用户频带感知能力的不平衡性,而且各次级用户只需要进行少量局部数据交换即可实现协作感知,与传统的OR-rule、1-out-of-N rule以及普通迭代法有较大区别。对3种数据篡改攻击进行了分析,并在预测算法的基础上提出了相应的安全策略。理论分析与仿真结果表明,新算法在准确性和安全性上均优于传统合作频谱感知算法,能显著提高频谱感知准确率,同时兼具较强的防攻击能力。

英文摘要:

A distributed consensus-based scheme by simulating the crowd trust and decision-making mechanism was proposed. This scheme firstly predicts the dynamic trust value among sensing users by the previous cooperative process, and then generates the user's relative trust value, and makes the data interaction among the users by using the combination of relative trust value and decision-making mechanism. All users' state can reach a consensus as the credible and iterative data interaction. All users get the final results by the determinant algorithm. This new spectrum sensing scheme utilizes the imbalance of each users' sensing ability in the real environment. Each secondary user can maintain cooperation with others only through the local information exchange with the neighbors. It is quite different from traditional spectrum sensing scheme, such as OR-rule, 1-out-of-N rule and ordinary iterative method. Three SSDF attacks were analysed, on the basis of the corresponding anti-attack policy was proposed. Theoretical analysis and simulation results show that the new scheme is better than the existing cooperative spectrum sensing algorithm in accuracy and security. New scheme not only can improve the accuracy of spectrum sensing but also has the strong anti-attack capability.

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地址:北京市丰台区成寿寺路11号邮电出版大厦8层 电话:010-81055478, 81055479  
81055480, 81055482 电子邮件: xuebao@ptpress.com.cn

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