National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: A collaborative decision-based spectrum sensing framework enabling DSA for performance improvement in a UAV-based CRN
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Abstract	: Unmanned aerial vehicle (UAV) communication is very much useful in fifth-generation (5G) and future sixth-generation (6G) networks due to its capability and flexibility in performing various critical operations. In this regard, UAV-based spectrum sensing in cognitive radio networks (CRN) has gained popularity because it can combat fading and shadowing effects in air-to-ground (A2G) channels and receive higher signal strength. In this paper, a UAV-based overlay cognitive radio network model is demonstrated in which the UAV acts as a secondary user and performs periodic spectrum sensing to investigate detection performance in the A2G channel. The sensing duration and transmission duration in this spectrum sensing model are analyzed in radians. A collaborative decision-based energy detection (CDED) approach is proposed to improve sensing performance and allows dynamic spectrum access (DSA) to utilize spectrum holes more efficiently without compromising the quality of service (QoS) of the primary user (PU). Moreover, the sensing performance strongly depends on the decision threshold and sensing radian. Therefore, a new objective function is formulated for decision error probability (DEP) and optimizes the sensing radian to minimize DEP. The optimal value of the sensing radian is obtained iteratively using half searching algorithm. Simulation results indicate that the collaborative decision-based approach provides better sensing performance and improves DEP over the conventional energy detection (CED) approach, especially in severe channel conditions. Hence, the QoS improvement of PU is feasible.