National Institute of Technology Rourkela

Departmental Seminar

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| Seminar Title | : Joint Optimization of Sensing Time and Transmission Power Allocation for Secrecy Rate Maximization in UAV-CR Networks |
| Speaker | : Sudipta Mallick |
| Supervisor | : Prof. Susmita Das |
| Venue | : Seminar Room (EE-205) |
| Date and Time | : 01 Sep 2025 (5:30 PM) |
| Abstract | : The unmanned aerial vehicle-assisted cognitive radio network has gained wide attention as a significant cutting-edge technology in the fifth-generation (5G) and upcoming sixth-generation (6G) era due to dynamic deployment flexibility, improved spectrum utilization efficiency, and many more. However, in cognitive radio networks (CRN), the secondary transmitter (ST) opportunistically uses the vacant spectrum bands to send their confidential information to the secondary receiver (SR) in the presence of an eavesdropper, which may result in severe security threats. UAV-assisted CRN can provide better physical layer security while utilizing the unused spectrum by transmitting artificial noise (AN) to confuse eavesdroppers (Eve). This study investigates the physical layer security in a UAV-assisted CRN network where the UAV acts as a secondary transmitter (ST) and a jammer according to the primary user (PU) status identified in the channel. A collaborative decision-based spectrum sensing (CDSS) approach is proposed to improve the sensing accuracy, which improves the secrecy rate while maintaining the PU's quality of service (QoS). Moreover, an objective function is formulated for the UAV's secrecy rate, jointly optimizing the sensing time and the UAV's transmission power allocation to SR and Eve to maximize the secrecy rate further. The optimal value of sensing time is obtained using a searching method at the outer loop, and a difference of concave (DC) programming is used to obtain optimal transmission power at the inner loop. The simulation results suggest that the proposed approach has achieved an improved secrecy rate over existing benchmark approaches. |