
Defence Seminar

Seminar Title	: Efficient Vertical Handover Strategies in Heterogeneous Networks using Heuristic Approaches
Speaker	: Pratyashi Satapathy (Rollno : 518cs1010)
Supervisor	: Judhistir Mahapatro
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Abstract	: A heterogeneous network incorporates cellular networks, Wi-Fi, WLAN, etc., to deliver an adaptable and globalized wireless network infrastructure. In such networks, a vertical handover process plays an important role in providing seamless and uninterrupted connectivity, the required quality of service, and wide coverage for all mobile nodes. Several vertical handover decision (VHD) algorithms are found in the literatures that consider a variety of network parameters to take the handover decision. VHD algorithms have become more challenging to implement due to the complex nature of heterogeneous communication networks and the diversification of system functionalities. This research presents an efficient multicriteria-based vertical handover decision-making algorithm that focuses on the design and implementation of a system that is capable of performing optimal VHDs, considering many essential decision criteria that are chosen very attentively. An energy-efficient network scanning scheme for IEEE 802.21 protocol is proposed that considers two functional units, i.e., Energy Consumption Unit (ECU) and Handover Decision-making Unit (HDU) to minimize or avoid the network scanning process as well as meet user requirements. An adaptive channel allocation mechanism is proposed for vertical handover in a heterogeneous network. This study introduces a new hybrid channel allocation mechanism that facilitates the effective use of both fixed and dynamic channels in a highly complex and dynamic environment. It provides minimal overhead as the scheme requires a lower number of exchanges of channel request messages during the channel borrowing process. In conventional handover approaches, the decision attributes are inadequate to adapt to vertical handover environmental circumstances caused by changing network availabilities. Hence, an adaptive context-aware vertical handover decision scheme for heterogeneous networks is proposed, which takes intelligent and efficient handover decisions by considering contextual information including user/mobile node details along with network conditions, application details, etc. An intelligent handover method is developed that jointly uses a hybrid MCDM approach for handover decision-making and a Q-learning strategy to determine the optimal handover triggering point. Instead of using static handover triggering values, the proposed algorithm optimizes those values by adopting the fluctuations of the environment through the Q-learning approach. Finally, the optimal value of triggering points is learned from the environments based on various user velocities. Extensive network simulations are conducted to study the performance of the proposed strategies. The simulation results show that the proposed strategies perform better as compared to the existing research works.