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Topic Name: Handover Decisions Support System for Wireless Communication Network Using Fuzzy Logic and Machine Learning Classifiers

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Finding

In this generation, different access technologies need to be interconnected; thus, vertical handovers are necessary for seamless mobility. At the same time, there are a number of redundant handovers due to user movement or user preferences. In this thesis work, we have done the work in two parts. Firstly, we have designed a handover decision support system by using the fuzzy inference system and analyzed the results of different machine learning tools to find out their classification accuracy and the training time they take to train the system. Here, we have considered the Heterogeneous Wireless Networks for the proposed work. The results are analyzed using the MATLAB software and the results thus obtained are compared to find out the best machine learning technique for taking the handover decisions. Here, the parameters considered are: received signal strength, Bandwidth, network coverage, user preference, velocity of the mobile node and power consumption of the battery. The results obtained showed that the C4.5 machine learning technique has worked better than the other considered machine learning tools to obtain the results.

To overcome, the unnecessary handovers in Wireless Heterogeneous Network for the continuous network connection to the mobile terminal, the optimization of handovers especially vertical handovers when a number of wireless communication networks are present is necessary. To optimize the handover, a number of handover parameters are needed to be considered and they are needed to be optimized for getting the seamless connectivity in the heterogeneous networks. We have optimized the battery life of the mobile, call drop probability, number of successful handoffs, number of redundant handoffs. To do the optimization, we have used both the mathematical and Swarm based optimization techniques and the results obtained are compared to the existing Handoff Algorithms. In this work, we have used convex optimization techniques, Particle Swarm Optimization techniques and in the last, mobile robustness optimization technique is used to correct the Handoff failures. The optimization is done using the NS3 software in the VMware virtual toolbox.