

## Abstract

*Wireless Sensor Network is a kind of network infrastructure that have been widely used to connect and monitor the physics environment by using the smart and low-cost node sensor. There have been developed many efficient managements to solve this sensor node's constraint and one of those is by implementing the hierarchical clustering based routing protocol. This kind of routing protocol involves nodes into hop-communication and increases the network-lifetime by distributing the power dissipation load among nodes within a network.*

*In this final project, one of hierarchical clustering based routing protocol algorithm, APTEEN (Adaptive Periodic Threshold-Sensitive Energy Efficient Network Protocol) is simulated using NS-2. Afterwards, the performance of APTEEN is analyzed by comparing the algortihm with another hierarchical clustering, LEACH (Low Energi Adaptive Clustering Hirearchy) and TEEN (Threshold-Sensitive Energy Efficient Network Protocol). This research's aim is to figure out APTEEN's performance in energy efficient mechanism and data quality in wireless sensor network comparing with its feature-ideas, LEACH and TEEN algorithm.*

*The results of research discover that APTEEN is more efficient in energy use if It's compared with LEACH shown by the less energy consumption and longer node lifetime, but not efficient comparing with TEEN. From transmitting-data quality, APTEEN is able to reduce the delay. Cluster Addition can also elevate energy efficient and data-quality in APTEEN, otherwise adding cluster without equalizing the cluster size possibly make particular nodes prematurely die.*

**Keyword:** *WSN, Hierarchical Clustering Based Protocol, APTEEN, LEACH, TEEN, energy efficient.*