

## ABSTRACT

Recently, WSN (*Wireless sensor Network*) technology application has expanded in almost all aspects of life. This is because of their ability and ease of implementation of the technologies to solve problems. Although its implementation is very flexible and practical, there are several aspects that need to be investigated, there are several things need to be investigated in the technology development of wireless sensor network, such as lifetime constraints, unreliable and communication and need for self-configuration.

It is different from the traditional ad-hoc network which have limited network size of implementation, the wireless sensor network technology can be applied in a much various ways. Routing protocol is one of the method that ensure the high scalability of wireless sensor network. sHEED (Simplified Hybrid., Energy-efficient, Distributed Clustering) is one of the routing protocol used in wireless sensor network. Multi-level clustering is one method that can increase the efficiency of communication between nodes in the wireless sensor network that influence its lifetime and scalability of network that has been established. This thesis put forward enhanced sHEED by reducing its *inter-cluster communication cost* by introduce super CH concept which was tested with the parameter performance that is Network lifetime (first and last node death), energy ratio, PLR (*Packet loss Ratio*) and Convergence Delay

**Keywords:** *Network Lifetime, Scalability, Multi-level Clustering , Distributed Clustering*