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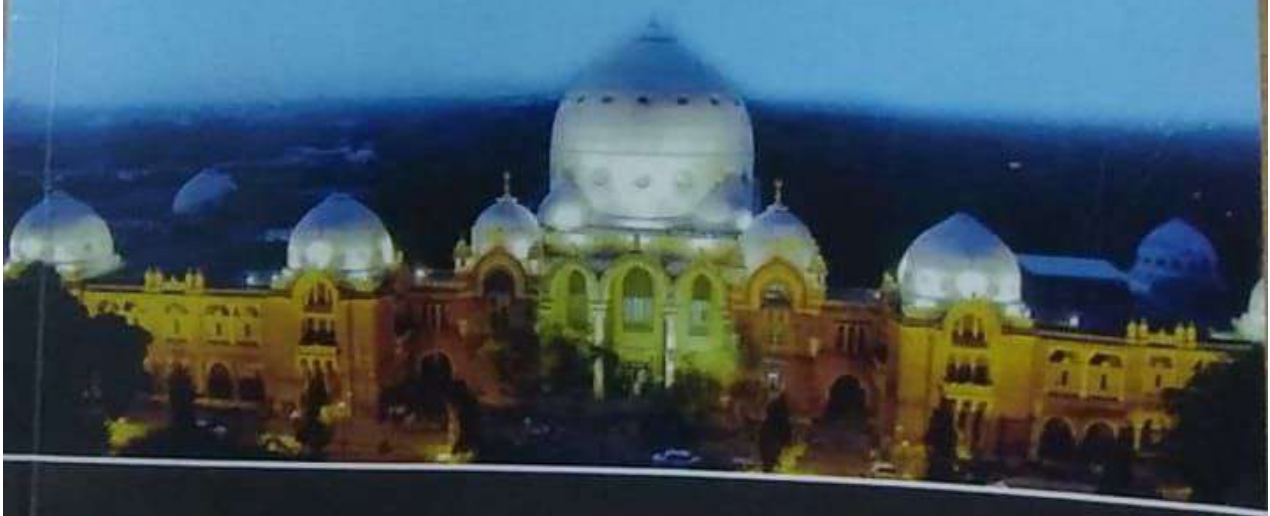
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## A METHOD FOR WSN CLUSTERING USING GAME THEORY APPROACH

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### Abstract

In wireless sensor network clustering plays an important role. The nodes get divided into clusters and then cluster head is elected. The elected CH(cluster head) is onus for the data assimilation. The cluster head plays a vital role in this topology so the selection of cluster heads has to be done with utmost care. Based on the concepts of game theory a model has been derived. Nash equilibrium is employed for that. If a cluster head and the sink node get disconnected then data replication model is adopted. Overall throughput of the network is still guarantee even if a cluster head fails.

**Keywords:** WSN, Clustering, Game Theory, Nash Equilibrium.

### Introduction

In a deployed wireless sensor network, there may be more than two thousand sensors. Those sensor nodes are used to monitor the environmental condition such as air quality, noise pollution, humidity, temperature, etc. The sensed data is then transferred to the base station.

In general, there was an assumption that the sensor nodes are cooperative and share data with each other. But it's not true. The wireless sensor network is not like a traditional network. The wsn is limited to transmitting and receiving power. Some nodes pay attention to saving their energy those nodes will not participate in active communication. Such nodes are called selfish nodes. Even a single selfish node can bring down the throughput of the entire network to 30%.

The clustering of the wsn nodes is done worldwide. The following first process splits the network into clusters and elect a cluster head[CH]. The cluster head is responsible for data aggregation. There are many advantages in using cluster heads they are low energy, routing and scalability of the network. In general, the energy level of the cluster head will be higher than the nodes. This is because of faster communication between the member. By this method, a node with selfishness will get eradicated and it cannot be as a "head".

Game theory is a concept in mathematics which deals with players in a strategy game. Here selfishness of a node is applied with game theory approach. Based on this method the cluster head will get elected.

### Literature Review

In a tree based topology of wireless sensor network, the sensor node might fail due to lack of address configuration [1]. To overcome this limitation the author has proposed an algorithm know as address based routing. This scheme can be implemented over low-power IPv6 sensor network like vehicular network and so on. A super node is implemented which monitors the addressing issues and configure it automatically for multihop network. And also the super node will communicate with the next super node to find the optimal path. By this method the latency of the routing will get reduced. The analysis of the result shows the effective shortening of the routing latency.

In a wireless sensor network, energy-saving optimization has become one of the hottest research areas in routing protocol design. This is because most wireless sensor nodes are equipped with non-rechargeable battery[2]. The author proposed a method for minimizing energy consumption and maximizing the network lifetime in a one-dimensional routing method. By using the optimistic routing theory a multihop decision method is employed to optimize the energy efficiency of a wireless network. the proposed method has significantly increased the performance of the network and also has saved a lot of energy in wsn routing.