

Chapter 2

Fundamentals of Wireless Sensor Networks: Wireless Sensor Networks Techniques

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ABSTRACT

As the current computing era is working behind digital data, it is indeed important to concentrate on climatic change, which has become dynamic. Even a few non-automation processes have been converted into automation by using IIoT and industry 4.0 revolution technologies such as data analytics, the Internet of Things, cybersecurity, and machine learning. Sensor networks (SN) play a pivotal role in

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the collection and transformation of data through electronic devices as sensors. The sensors that work in this stream are ultrasonic sensors that help measure the distance between two vehicles. This proposal concentrates on different sensors used in environmental monitoring, data collection, and data transformation from devices to clouds and cyberattacks that poison wireless sensor networks: tampering attacks, replication attacks, blackhole attacks, wormhole attacks, Sybil attacks, and link layer attacks. Sensors which retrograde in environmental monitoring are listed as Temperature sensor, humidity sensors, airflow sensors, pressure sensors, vibration sensors, and water measuring sensor

Wireless sensor networks are becoming the most recent trend in the computing field to provide solutions for the collection of data from sensors various sensor parameters are routing problem, node deployment, network lifetime, throughput, routing overhead, energy consumption, latency, network coverage, transmission range and sensor capabilities (Rout S., 2022) (Rout S.K., 2017) all those are the basic parameter for WSN (wireless sensor networks), routing overhead concern about number of nodes which was trying to communicate with another node even heavy traffic was been imparked at this situation various WSN algorithm are not able to provide solution because of previous and current algorithm parameters and potentiality of routing protocols are also not much supported (Rout S., 2022) (Rout S.K., 2017).

Since because of single-layer network protocols most of the time mathematical models and network complexity are getting increased and also the performance of WSN is also been degraded (Rout S.K., 2017). Nowadays testbed is being considered as the desirable parameter for WSN since it reduces the time complexity of network routing and it increases the iterative improvements of WSN networks on the other side it also detects the fault tolerance of networks and security measurements are also measured by using testbed technology. The two different types of WSN are WBAN- (wireless body area networks), and UWSN – (underwater wireless sensor networks)

The most familiar operations of WSN (wireless sensor networks) are self-configurable, infra-structureless networks, base stations, a sink node, and the interface between user and networks WSN can also be classified into multiple structures are terrestrial WSN, MWSN, static WSN, static base station and MWSN (mobile WSN), self and non-self-reconfigurable networks, heterogenous WSN, terrestrial WSN works based on node deployment for unstructured networks and randomly distributed networks and it also helps to do communication with low power energy among nodes, UWSN – (underwater wireless sensor networks) it is bit quit little expansive than terrestrial networks of WSN the exact operation of UWSN is to bring out communication among the WSN nodes of the sink and bottom nodes of the base station to sensor nodes it also requires the devices like autonomous and underwater devices both are used to collect the data from sensors.

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