Time slotted channel hopping scheduling based on the energy consumption of wireless sensor networks

ABSTRACT

- Wireless Sensor Networks (WSNs) are becoming increasingly widespread owing to the introduction of the Internet of Things (IoT) and the networks' comparatively low cost and usability.
- WSNs are usually battery-powered, owing to their low power consumption, which however limits their computational performance. The lifetime of a WSN strongly depends on its communication-related power consumption.
- Time Slotted Channel Hopping (TSCH) solves the problem of power consumption by featuring both time-division and frequency-division multiplexing in the system's Media Access Control (MAC) layer.
- In this paper, Pruning-based Coloring Scheduling (PRCOS) is proposed, which is an algorithm for TSCH scheduling that accounts for the power consumption to extend the system's lifetime.

EXISTING SYSTEM

- FOG computing is designed as a distributed computing platform for supporting the data analytics for Internet of Things (IoT) applications that pushes the data analytics from Cloud server to the far edge of a sensor network.
- As the name suggests, ubiquitous data which is collected from the sensors are processed locally rather than on the central servers.
- Fog computing helps avoid performance bottleneck at the center point and relieves raw data from overwhelming towards the center of the network.
- However, suitable data analysis algorithms such as those of data stream mining that are consist of learning and recognizing patterns from the incoming data streams must be fast and accurate enough for supporting Fog computing.

DISADVANTAGE

- Fog computing helps avoid performance bottleneck at the center point and relieves raw data from overwhelming towards the center of the network.
- However, suitable data analysis algorithms such as those of data stream mining that are consist of learning and recognizing patterns from the incoming data streams must be fast and accurate enough for supporting Fog computing.
- In Fog computing, the edge nodes are mainly responsible in data preprocessing and analyzing patterns fro m the incoming data streams.
- Speed, efficiency and accuracy are required fro m data mining algorithms for data mining big streaming data which may amount to infinity.
- For supporting edge intelligence in Fog computing, to find a proper data mining algorithm(s) is essential.

PROPOSED SYSTEM

- This paper mainly focuses on analyzing about the feasibility of traditional data mining and data stream mining algorithms and compare the m in a Fog computing scenario.
- The data mining experimentation is on a classification problem where air/gas samples are collected fro m sensors and the model that is built by the algorithm(s) in the form of decision tree would decide what type of gas it is.
- Decision tree is a kind of non-black-box machine learning model, which is a flow-chart-like structure for decision making. The tree branches could be extracted into useful predicate-type of decision rules.
- The rules are simple to understand and interpret by both human and machine where they could be coded as logics into embedded devices.
- Moreover, combining correlation-based feature selection algorithm, traditional search methods with ensemble of swarm search methods are to be integrated into the data mining algorithm as pre-processing mechanism.

ADVANTAGE

- The simulation of this experiment is concerning: in case of an IoT environment, emergency service takes over in priority.
- It will take into account of real-time constraint and capability requirements. Through experiment, we for search proper data mining algorithms coupled with an appropriate pre-processing mechanism.

HARDWARE REQUIREMENTS

- Processor – Pentium –III
- Speed – 1.1 Ghz
- RAM – 256 MB(min)
- Hard Disk – 20 GB
- Floppy Drive – 1.44 MB
- Key Board – Standard Windows Keyboard
- Mouse – Two or Three Button Mouse
- Monitor – SVGA

SOFTWARE REQUIREMENTS

- Operating System : Windows 8
- Front End : Java /DOTNET
- Database : Mysql/HEIDISQL

CONCLUSION

- In this paper, a TSCH scheduling algorithm that accounts for energy consumption, called PRCOS, was proposed. The proposed algorithm utilizes “pruning” and “coloring” to shorten the data forwarding time and to suppress the dispersion of energy consumption.
- The proposed method was compared with three existing algorithms. The results of our numerical analysis show that PRCOS achieved a 0.59 shorter communication delay and a 0.47 times smaller duty cycle compared with the other methods.
- Furthermore, when considering the data fusion technique, the proposed method exceeded the other methods from the point of view of delay and energy consumption. Here, we only considered static evaluation; dynamical simulations will be reported elsewhere.

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