Distributive System for Congestion Control in WSN directing through IoT

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Abstract*: *This paper is presented to bring a very important issue in the data transmission realm 'congestion'. Regardless of the type and priority of the data it may happen that a lot of signals generate by the system of sensors arrive at the 'root' destination at the same time. Regardless of the processing power sometimes it has been observed that spectrum gets saturated. This saturation can be compared with large crowd trying to get into stadium through one entry point. To solve this problem various algorithms have been introduced, in this paper we have given emphasis on one algorithms one is signal-type priority reception. The Quality-of-Service (QoS) of the primary applications is of vital issue in order to ensure its efficiency and robustness. WSN's with limited resources, congestion in WSN will further reduce the expected QoS by degrading its services and contributions in monitoring systems. In this state, efficient use of the scarce resources is an important to ensure seamless data transmission. At a sensor node the power consumption can be reduced by reducing the packet retransmission rate which can be caused by congestion. The nodes deployed in the area monitored will be clustered groups with a cluster head. The proposed technique is able to reduce congestion thus improve the overall performance. This algorithm will give a major boost to WSN system employing 'n' number of sensors and be able to boost up efficiency and cut down the time delay and hence enhancing the productivity of the system itself.

Index Terms: WSN, IoT, QoS.

I. INTRODUCTION

There are many number of methodologies introduced in the field of congestion control in the wireless sensor network. Most of them are based on algorithms which takes thousands of sensors into consideration at the very beginning stages, those sensors sometimes act as the repeaters or local processing stations. The amount of data traffic across the network could be paramount. Maintenance of these systems are not very cost effective. There are new types of IoT based products that are being launched every year among them wearable devices are the most popular among them. These devices comes in wearable form factor which makes them highly mobile in nature and battery backup also last for substantial amount of time and provide ample amount of data about various parameters in the proposed paper we have gone through development of smart wearable device which makes use of various sensors and so to avoid congestion at the time of emergency we have created an algorithm to provide first preference to those signals according to their type.

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The prototype we developed has a form factor of wearable. It mainly has two sensors which provide readings of temperature and pulse. At a very initial stage the readings from the temperature and pulse sensor are gathered at base station and then the base station system consisting of a microcontroller send their data to a central processing system**.** The sampling rate for every incoming signal is also distinct so as to make the process of signal identification more sensible and also to make the process of traffic control easier for the system. The sensors in an IoT system, directly send information to the internet. Example, a sensor may be used to monitor the temperature, pulse of a body. The data will be transmitted immediately or periodically to the internet, where a server can process the data to interpret.

In WSN, there is no direct connection to the internet, in WSN the sensors connect to router or central base node. The data is routed from the router or central node. An IoT system is utilized by wireless sensor network by communicating with its router to gather data.

A wireless sensor network is a group of sensors can be further classified as a "competitor" or "rival" to the Internet-of-Things.

IoT exists at a higher level then WSN. WSN is a technology used within an IoT system. A large collection of sensors deployed in a region, commonly referred as a mesh network, which can be utilized to individually gather data and send data through a router to the internet in an IoT system.

The term "wireless sensor network" is not surrounding as "the internet of things." WSN consists of a network which comprises of only wireless sensors. Any device that connects to the internet can be considered an IoT device. An "IoT system" can therefore be interpreted as a group of many IoT devices. The signals received by the systems are then processed further, for analog sensors processing scheme is different and for digital signals we have different scheme of decoding it.

II. ALGORITHM

The following are the steps need to follow for realizing the algorithm to ease up the traffic congestion.

Algorithm is developed for the base station.

- **A.** Start the system by powering up either using DC source or AC source.
- **B.** All the inputs arrive at the controller at the same time.
- **C.** Temperature sensor output is digital in nature and that of pulse is analogue in nature so both create an external interrupt.

D. So the pin connected to the analogue input gets read first by raising a flag.
E. Set a delay to set the sampling rate.
F. Set the conditional statement to check whether there is an input for temperature sensor.
G. If YES then it would get read as the second output
H. If NO it would go back to step D.
I. Loop repeats
J. End

Next stage of the algorithm is for the central sever:

A. Start the central server.
B. Set the port numbers
C. Set the hardware interrupt ports
D. Set the flag up to 1.
E. Set up a condition to check for the data.
F. If data is there check for analog and digital signals.
G. **After checking set up a condition to check for the message from which sensor.**
H. Signals arrived after delay is digital, which is of temperature sensor.
I. **Signals arrived without delay is analogue, which is of pulse sensor.**
J. **After checking the arrived signal check for the nearest response.**
K. All data from multiple sensors are pushed into stack
L. **To retrieve the data latest priority data is popped out followed by rest.**

III. BLOCK DIAGRAM

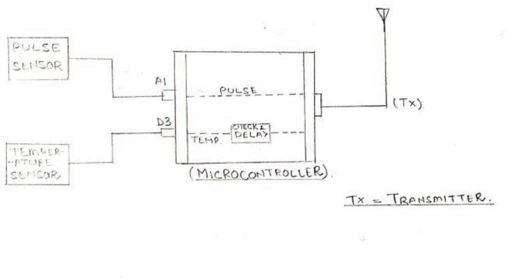

Figure 1. Block diagram

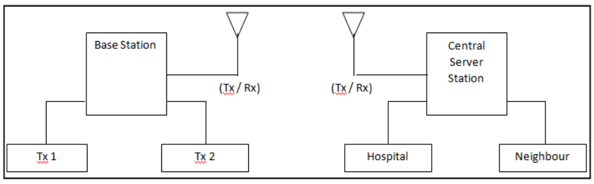

Figure 2. Proposed Architecture

Architecture proposed is with two sensors deployed, Tx 1 – Pulse transmitter, Tx 2 – Temperature transmitter, a base station, a central server station,

The architecture in the Figure above represents typical WSN architecture. There are nodes deployed followed by a base station and a central server station.

The sensors transmit the data the role of base station is to gather the data from the transmitters. An attempt is made to transmit the data in a single hop rather than multi hop to avoid congestion, delay and energy efficiency.

When event is sensed by any node, it will transmit the information to base station the base station will collect all the data and transmit the data with priority wise to the central server station.

An attempt is made as the no. of events occurred and the signals transmitted are received at base station without causing congestion, delay, energy consumption, not effecting the throughput of the network.

The earlier work done has more challenges as compare to the proposed work. The delay in the nodes has a great impact on the performance of the network since it makes the network more complex by leading to congestion in the network due to which the number of packets arrived at the destination or sink node will also be effected.

IV. OUTPUT

Time(HH:MM)	PULSE (BPM)	TEMPERATURE (C)	DELAY* (SEC)
10:00 am	95	35	30
10:30 am	95	36	30
11:00 am	96	35	40
11:00 am	96	35	40

***- delay is between pulse and temperature.**

V.DISCUSSION

In the above described prototype model we have seen our algorithm works fine for two sensors where we have used interrupt-signal type-priority based algorithm. This model should work perfectly where can deploy ‘n’ number of sensors either on the field or any other device.

VI. CONCLUSION

While developing the prototype we have got to know that a powerful processor always play a bigger role in handling role of processing but the most of important aspect is how to prioritize which signal should be processed first, otherwise it would create a dead-lock situation. Hence our proposed and tested algorithm should work for devices which employ sensors whose output need to be processed on priority basis.

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