**HEALTH MONITORING AND DIAGNOSIS**

**ABSTRACT:**

With the increasing number of Internet of Things (IoT) devices being deployed and used in daily life, the load on computational devices has grown exponentially. This situation is more prevalent in smart cities where such devices are used for autonomous control and monitoring. Smart cities have different kinds of applications that are aided through IoT devices that collect data, send it to computational processing and storage devices, and get back decisions or actuate the actions based on the input data.

There has been a stringent requirement to reduce the end-to-end delay in this process owing to the remote deployment of cloud data centres. This eventually led to the revolution of edge computing, wherein nano–micro-processing devices can be deployed closer to the premises of the smart application and process the data generated with a lower turnaround time. However, due to the limited computational power and storage, controlling the workload diverted to the edge devices has been challenging.

The workload scheduling policies and task allocation schemes often fail to consider the run time health of the edge devices due to a lack of proper monitoring infrastructure. Thus, in this article, we proposed a health monitoring and diagnosis framework for geo-distributed edge clusters processing big data generated by smart city applications. This framework is built over the Map-Reduce approach for distributed processing of big data on edge clusters deployed across the smart city.

Within this framework, SmartMonit (a monitoring agent) is deployed that collects the health statistics of edge devices and predicts the potential failures using an artificial neural network-based self-organising maps approach. The proposed framework is deployed over different clusters to test the efficacy concerning failure detection.

**INTRODUCTION**

Smart cities have adopted many technologies that include distributed Internet of Things (IoT) infrastructures. Large amounts of data are often produced by smart city technologies from mechanical sensors dispersed across diverse city infrastructures. These systems gather data from important urban infrastructure. Smart systems that operate on a city-wide scale are included in the vast streams of data processed by smart city systems.

These include, among other things, water supply networks, waste disposal facilities, power plants, and transportation systems. The data generated by smart city applications is often referred to as big data owing to its volume, velocity, variety, veracity, and other characteristics related to big data. This data is generally sent to the remote cloud for processing and storage purposes.

Most smart city applications are dependent on the actions or decisions that are based on the processed data. Although cloud data centres provide necessary computing, storage, and related resources for handling the smart city big data, it incurs a log round trip delay. This round-trip delay or turnaround time is not suitable for several smart applications that have stringent delay constraints.

For example, mission-critical or safety-critical IoT applications are often intolerant to delay as any significant delay can lead to mission failure, or safety concerns.

**SYSTEM REQUIREMENTS**

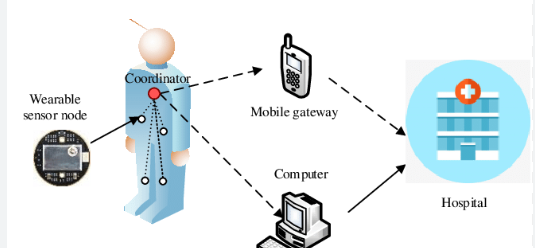
**SOFTWARE REQUIREMENTS:**

* Monitoring infrastructure
* IOT Platform
* Data Preprocessing Tools like KNIME or Alteryx

**HARDWARE REQUIREMENTS :**

* 4 processors.
* 32 GB of RAM.
* 300 GB of hard disk space.

**SYSTEM ARCHITECTURE :**

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