International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 11 Issue: 10
DOI: https://doi.org/10.17762/ijritcc.v11i10.8414
***Article Received:** 25 July 2023 **Revised:** 14 September 2023 **Accepted:** 28 September 2023*

Power Reduction Sleep Scheduling Technique for Cloud Integrated Green Social Sensor Network

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Abstract—The wireless sensor network is the maximum appropriate technology nowadays with such awesome applications and areas including Infrastructure tracking, environment tracking, health care tracking, etc. Cloud Computing has fantastic data collecting skills and effective data processing ability. Social Network is a group of People or organizations of human beings with similar intentions. Social Sensor Cloud is one type of expertise-sharing mechanism wherein similar types of human beings can connect. Energy Consumption is nowadays the largest challenge as far as the concern with green environment. Because the battery life of the sensor is so limited, the Social Sensor Cloud must be energy efficient. As a result, this article will concentrate on Energy-Efficient Techniques for the Social Sensor Cloud. According to our findings, findings, the majority of energy-saving measures will cope with not unusual place Parameters including Network Lifetime, Network Work rate, Throughput, Energy, Bandwidth, etc. We will Summarize current Technology and we Will Provide Our Architecture for Energy Reduction in Social Sensor Cloud.

Keywords- Wireless Sensor Network, Cloud Computing, Social Network, Energy Efficient Technique, Research, Virtual Sensor, Physical Sensor, Fog Computing.

I. INTRODUCTION

Sensors are used in many applications to collect data, and these sensors are connected together to form a wireless sensor network (WSN). The sensor interacts with one another via a transceiver and a wireless communication medium in order to carry out a given task [5]. Since the sensors are battery-operated and have a finite lifespan, creating an energy-efficient network model is a necessary step in addressing the research problem. This will maximise network longevity. Cloud computing solutions offer end-user services like platform, infrastructure, and software support. Cloud of sensors This WSN and cloud computing integration model enables the user to access the sensor and take advantage of the capability of the acquired data from various sensors will be saved, shared, and processed on the cloud.

An interface for user registration, sensor deletion, and monitoring and controlling virtual sensors is provided by sensor-cloud architecture. The sensor cloud offers consumers on-demand sensing by utilizing virtualization technology for wireless sensor nodes and providing sensing as a service [6]. The sensor is owned by owners who rent their property to users, and each WSN has a different owner. The owner of each physical sensor registers it with the sensor-cloud infrastructure. To create a sensor-cloud system, physical sensors are managed by computing infrastructure. Using WSN nodes linked to a cloud architecture, the data is sent to the cloud where it is stored, processed, and evaluated before being sent to various clients. A review of various It looks at current issues with existing technological solutions as well as potential future areas of study for sensor-cloud infrastructure. The sensor cloud must be energy-efficient because sensor batteries have a finite lifespan and data centers consume a lot of energy to run computers and store data [2].

With many existing applications such as Smart healthcare, smart homes, smart monitoring, smart manufacturing, smart irrigation, and smart farms are all examples of smart technologies. After the invention of the computer and the Internet, the Internet of Things (IoT) is growing in different domains (e.g., civilian, industrial, agricultural) as the world's third wave of the information industry development [1]. IoT refers to the collection of "things" that are connected to the

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internet, have sensors, and can be programmed. In the Internet of Things, each "thing" (from everyday objects to man-made antiquities, from complicated frameworks to everyday machinery) is linked and communicates with one another, allowing them to "talk" to one another (i.e., gather and exchange data).

The social sensor cloud (SSC), which links social networks, sensor networks, and the cloud as an IoT paradigm, is gaining a lot of attention from both academic and industry circles. On the one hand, the SSC proposal is motivated by the IoT concept, which is to connect all "things." The emergence of SSC, on the other hand, is prompted by merging social networks, sensor networks, and the cloud to investigate the possible advantages. The foundation for a social sensor cloud is shown in Figure 1 [14].

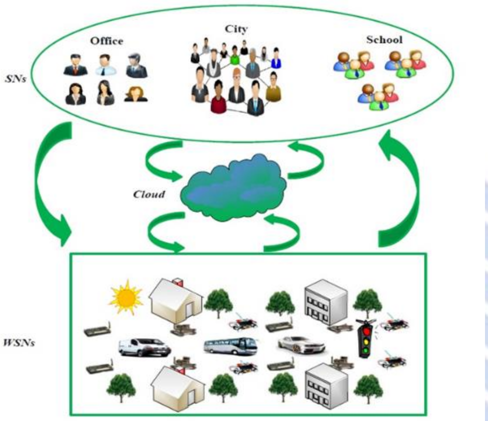

Figure 1. SOCIAL SENSOR CLOUD

The flowchart for the newly presented framework is shown in Figure 2. In the newly suggested framework, interactions between sensor networks, the cloud, and social networks are specifically illustrated as follows [14].

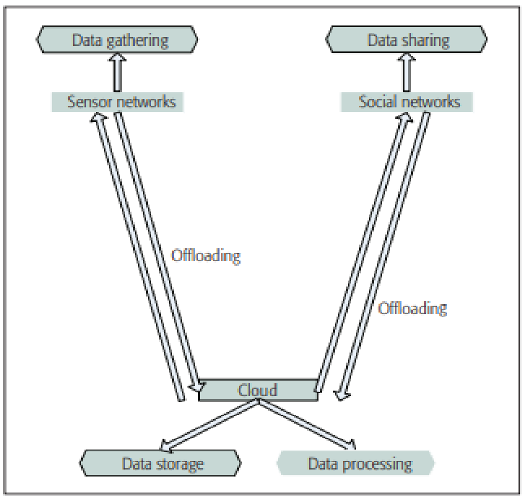

Figure 2. FLOWCHART ABOUT THE FRAMEWORK FOR SSC

II. CLASSIFICATION OF ENERGY-EFFICIENT TECHNIQUES

Scheduling approaches, key tool, Techniques for data transfer, enhanced system design, data processing, and job scheduling were all identified as energy-efficient sensor cloud approaches in our assessment [13]. The categorization Figure 3 shows an example of an Energy - saving Sensor Cloud Technique.

A. Techniques for Scheduling.

In order to save energy, the E2DAWCS (energy-efficient and delay-aware computing system) controls network connectivity and sleep schedule within a permitted delay. Data aggregation, sensor planning with physical sensors, and lower-power listening techniques were used to cut down on the number of detected packets transmitted for transmission. The outcome is a further reduction in energy consumption. Code-divided multiple access (TDMA) based scheduling has been used to reduce energy while giving a quick response time and high throughput for jobs with fine granularity. In mobile resource constraint devices, the idea of communication scheduling optimization and clock frequency adjustment has been used to cut down on energy use. A task execution framework that chooses the built-in sensors with the lowest energy use and stops redundant job execution has been described. The clustered multichannel scheduler system increases throughput while using less energy by combining data from multiple sections at once and sending it all to the sink. furthermore, the delivery ratio To reduce overall energy usage, a real-time item allocation heuristic technique was developed. The QoS-aware service selection problem is employed in IoT-based cloud systems. To cut expenses and energy usage, a scheduling technique based on adaptive duty cycle has been developed for the sensor cloud [13].

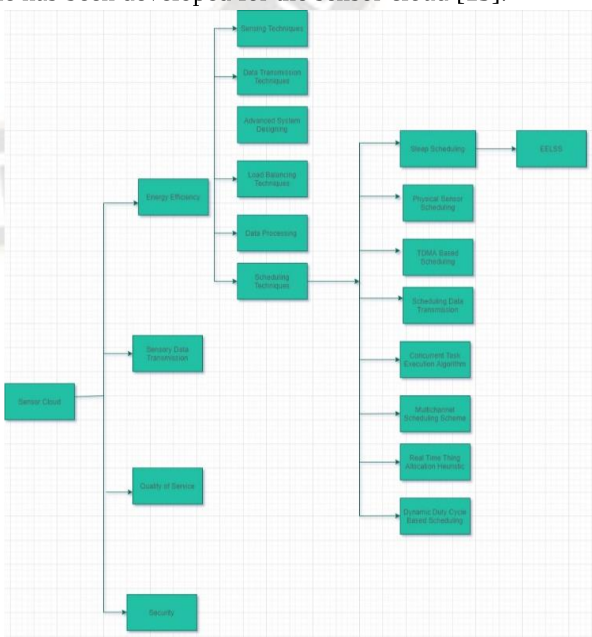

Figure 3. Classification of Technique for Energy Efficient

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B. Techniques of Sensing

To decrease energy consumption and improve scalability, query processing and cloud sensing approach optimization were used. Selective sensing, based on the location, surroundings, and activity, reduces the need for energy, storage, and data processing. The energy-efficient CO-GPS system logs millisecond raw data from the GPS signal for processing and uses sensing devices to ensure the duty cycle of the GPS receiver instrument. Energy savings result from the usage of reliable middleware for collaborative sensing and data aggregation. By increasing energy efficiency, enabling several programmes to load on various platforms in a flexible and secure way, and supporting the enticement process, sensing as a carrier mechanism aids the inducement mechanism [13].

C. Techniques for Data Transfer

An optimum judgement rule approach is used to reduce each node's transmission energy use by selecting the best bridge node. It is energy-efficient because to a programmable Model of the frequency of data collection and transmission can be changed using the sensor information system. Technology also reduces CO2 emissions. a framework for wirelessly powered computing that is solely based on cellular computing, subject to cut-off dates and deadlines. Energy harvesting is a technique for increasing offloading's ability to save energy while minimizing local computing's energy consumption. Push pull communication across the three layers of the system architecture is performed using the sensor-cloud integrated platform to transport information in an energy-efficient manner. With reduced bandwidth usage, a lot of user data can be gathered with this technique. The Send compression method, which is especially suitable for massive quantities of numerical data, is used to eliminate duplicate data brought on by high transmission energy usage [13].

D. The pinnacle of system design.

A cloud orchestration approach's objective is to coordinate services only through cloud computing, leading to significant energy savings. This technique enables dynamic workflow between service components. A facts prediction model is used in a sensor-cloud architecture to reduce energy consumption. A self-managed sensor-cloud technology is used to deal with critical applications and automate energy management, event management, fact aggregation, and connection management. This plan also allows for an immediate response in an emergency. A publishing or subscribing middleware in a cloud architecture controls the sensors. Additionally, unnecessary sensors were removed, and energy consumption was decreased. A framework suggests striking a compromise between information quality and energy efficiency. It achieves equilibrium between high-quality information reception and energy use [29]. A distributed computing system called the green energy mobile cloud (GEM Cloud) makes use of a network of mobile devices to enable complicated, simultaneous processes while consuming up to 98 percent less energy. In essence, the WSN design is cloud-based, with a virtual sink gathering sensed data and several sink points processing it. to reduce the CPU clock frequency, data size, hop count, and energy consumption [13].

E. The information is being processed.

All of your queries can be managed and optimized in the cloud. Techniques are used to lower the highest uncertainty, lower the cost of sensing, and intelligently transmit the query-evaluated result in order to conserve energy. With the intention of eliminating network outages, lowering data loss, and extending network lifetime, a paradigm for merging WSN and cloud is provided. With the use of the internet and this technology, sensor data may be retrieved at any time and from any location. There is a suggested data storing algorithm. the energy-efficient retrieval of massive amounts of data from wireless sensor networks with a non-uniform node distribution. The route-matching algorithm technique was used with altitude data utilizing low-cost and energy-efficient air pressure sensors instead of a GPS device to detect altitude [13].

F. Techniques for Load Balancing

By utilizing the idea of collaboration, in which activities are divided and fulfilled by sensors in the most effective way possible, a novel node selection method minimizes energy consumption. As a result, it is difficult to find computer resources that are fully exploited. Using cloud-assisted monitoring of complex events, the service access point solution for QoS support within an energy-efficient limitation is selected. This approach is reliable, quick to react, and energy-efficient. The load-balancing system makes use of virtual machine technology to allocate processing tasks to the appropriate server, improving performance and lowering energy usage. The wireless sensor routes the packets using a load-balancing strategy that makes sure that the energy consumption of each node is equal [13].

III. ANALYSIS

We've covered a lot of factors in this part that are used in six different approaches. Bandwidth, data size, computational energy, total energy, conversation energy, accuracy, dependability, throughput, deadline, availability, and network connectivity are all factors to consider. Longevity, packet delivery, data throughput, CPU clock frequency, querying, packet loss, hop count, turnaround time, total time, storage demands, scalability, and cost were all factors we considered.

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Our classification shows that general energy, general time, cost, data rate, communication energy, data size, hop count, and CPU clock frequency and throughput make up the majority of research for effective scheduling methods. In none of the research studies on this approach are their accuracy or query processing parameters. The terms scalability, storage needs, reaction time, and availability are all underutilized. Most research papers [13] disregard network lifetime and QoS issues. The energy and remaining parameters for an energy-efficient scheduling method are shown in Figure 4.

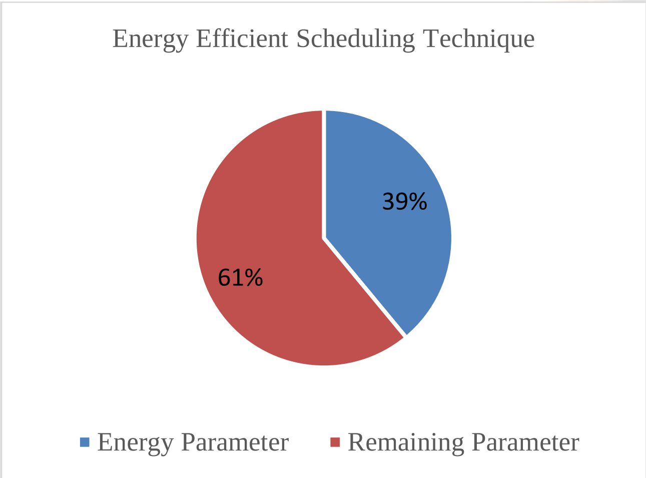

Figure 4. Energy Efficient Scheduing Technique Parameters

Energy sensing systems have utilized the metrics total energy, total range, accuracy, and scalability. Throughput, community longevity, packet transit ratio, number of hops, or reaction time metrics are not used in any of the research papers for those techniques. Most research studies using such approaches [13] do not cover QoS considerations. Figure 5 displays the energy and remaining parameter for an energy-efficient sensing technique.

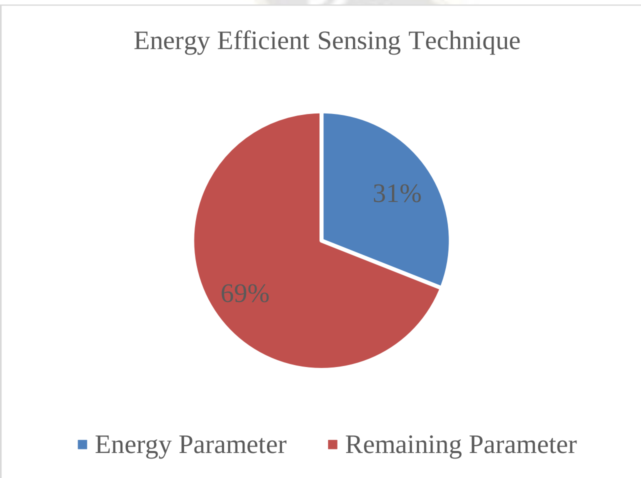

Figure 5. Energy Efficient Sensing Technique Parameters

Computation energy, total time, accuracy, and scalability are the parameters that have been used in the majority of articles for energy-efficient Data Transmission Technique. The majority of study published in such techniques do not examine quality of service factors [13]. The energy and remaining parameter for an energy efficient Data Transmission technology are shown in Fig. 6.

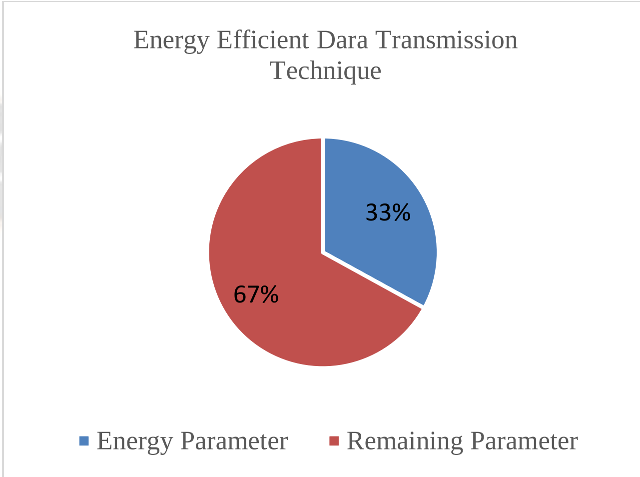

Figure 6. Energy Efficient Data Transmission Technique Parameters

The most common characteristics for energy-efficient advanced system designing methodologies are energy, throughput, and network lifetime. The properties of packet transit ratio, hop count, or reaction time are not used in any of the research articles for those methods [13]. Figure 7 shows the energy and remaining variables for a sophisticated, energy-efficient system design process.

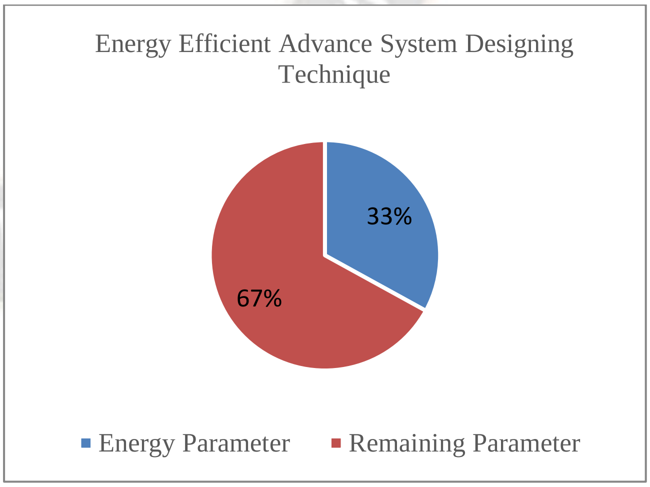

Figure 7. Energy Efficient Advance System Designing Technique Parameters

The bulk of current studies use data size, network lifespan, packet loss, computational energy, total energy, total time, data size, total time, total energy and storage demands as metrics for energy-efficient data processing. None of those research publications for those strategies use bandwidth, throughput,

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latency, or availability factors. The majority of study studies [13] do not examine QoS factors. The energy and remaining parameter for an energy efficient Data Processing approach are shown in Fig. 8.

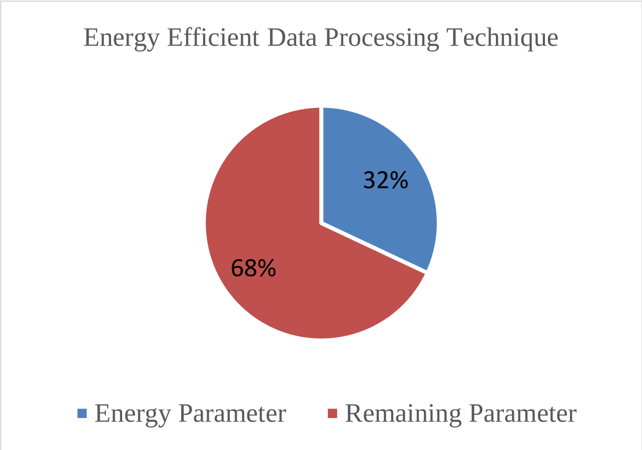

Figure 8. Energy Efficient Data Processing Technique Parameters

Most current articles on energy-efficient load balancing systems employ measurements like total energy, total time, and communication energy. Precision, CPU clock frequency, query processing, packet loss, hop count, or scalability characteristics are not used in any research papers for such techniques. Most research studies [13] ignore QoS considerations. Figure 9 displays the energy and remaining parameter for an energy-efficient load balancing strategy.

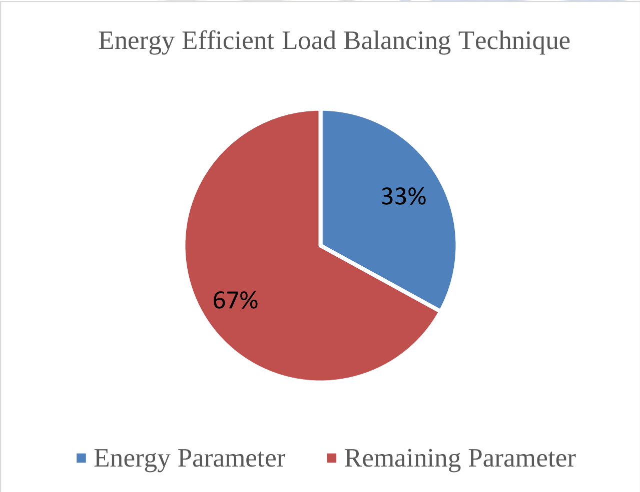

Figure 9. Energy Efficient Load Balancing Technique Parameters

IV. DISCUSSION

We have considered the parameter like Frequency band, data actual size, supercomputing energy, overall energy, communique energy, accurateness, dependability, throughput, deadline, availability, network lifetime, packet transport ratio, info rate, CPU clock frequency, querying, packet loss, variety of hops, reaction speed, total time, memory space, expandability, and value.

In Energy Efficient Scheduling Technique, Scalability, Availability and Accuracy Parameter might be ignored [13].

In Energy Efficient Sensing Technique [13], throughput, network lifespan, packet transit ratio, hop variety, and reaction time characteristics are often neglected.

Multitasking, scalability, mobility, QoS, Computational for Energy Efficient Data Transmission Technique [13], The features of energy, throughput, query processing, and scalability are frequently overlooked.

The Energy Efficient Advance System Designing Technique [13] does not take into account scalability, QoS, statistics mining, data filtering, deadlines, network lifetime, packet delivery ratio, hop variety, response time, or scalability characteristics.

Energy Efficient Data Processing Technique [13] mainly avoids bandwidth, throughput, deadlines, and availability criteria.

For the Energy Efficient Load Balancing Technique [13], Scaling, QoS, multihop transmissions, accurateness, CPU clock frequency, querying, packet loss, hop range, and other scalability issues are frequently overlooked.

We used Energy Parameter in place of combination of three individual parameter named computational energy, communication power and overall power [13].

From fig. 4 to fig. 9, its clearly mention that the weightage of energy parameter is generally 30% to 40% out of the 20 Parameters. The average is 25% to 28% energy parameter compared with another parameter [13].

V. PROPOSED PRSS FRAMEWORK

Fig. 10 Indicate Cloud integrated Social Sensor Network framework with Following Functionality.

We will discuss From Bottom to Top.

There are large Number of Sensors deploy in Field whether it is City, Forest, Village etc.….

Along with Sensors, we will install Energy Harvesting Mechanism according to the Field whether it is City, Forest, Village etc. and provide External energy in form of Thermal Power, Solar Power, Wind Energy etc.

Now, Sensor senses the environmental phenomenon like humidity, motion, temperature, objects according to the sensor type.

Now they send all kind of data to cloud environment via sensor gateway.

Cloud has extraordinary storage and Processing capacity, so all the data which is sense by sensors are processed and stored in cloud environment.

Cloud environment also need large amount of energy to continue functionality of cloud. So, we want to provide energy harvesting mechanism to provide external energy.

With this mechanism, we can make our environment green.

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Now, we will provide this processed data to socially connected people who make group of similar kind of people. So, we can reduce load of cloud.

We will also implement fog environment in future step so we can reduce load of cloud and achieve Cloud Offloading.

Based on the amount of resource consumption and service usages created by a variety of users in Social Networks, the deployment of resources could be optimized and the waste of resources could be reduced in Social Sensor-Cloud.

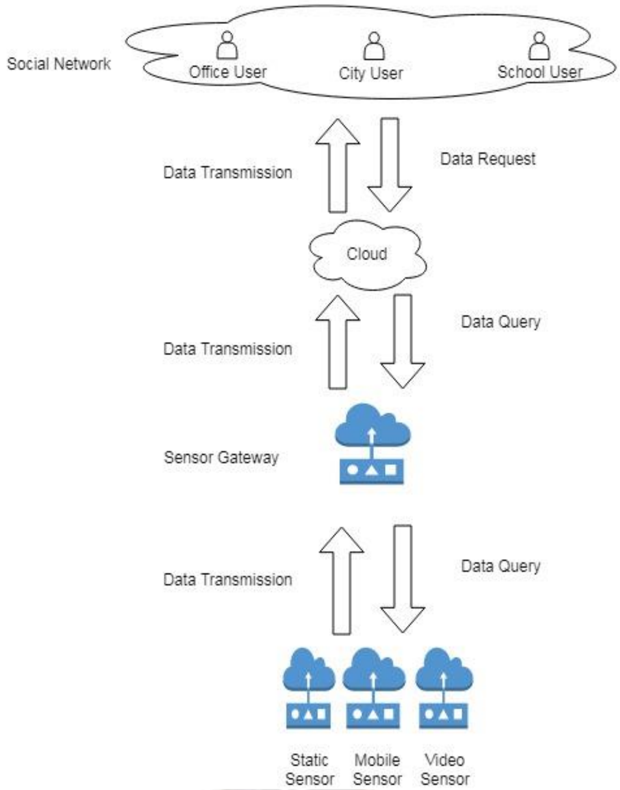

Figure 10. Proposed Cloud Integrated Social Sensor Network Framework

VI. PROPOSED PRSS ALGORITHM

The following section indicate the proposed algorithm for cloud integrated social sensor network which is based on power saving mechanism.

Step 1: Start

Step 2: Live location lu of mobile user u's will be taken by Cloud c.

Step 3: Cloud c delivered a flag A to base station s if lu € L. If condition not satisfied than transmit the flag Z.

(L=area of sensor nodes)

Step 4: Individual sensor n_x will receive a flag A which is broadcast by base station s.

Step 5: If specific sensor n_x receives flag A, it awakes, else go to sleep.

Step 6: If specific sensor node n_x receives flag A, base station s will send flag A to all nearby Sensor nodes n_i.

Step 7: Run Step 7 at each node that is nearby (n_i) in Step 6.

Step 8: Stay awake if a neighboring node (n_i) receives flag A. Otherwise, get some rest.

Step 9: End

VII. CONCLUSION

We have divided energy-efficient techniques into six categories. About 32 parameters were used for the categorization method. In all six categories, we generally concentrated on the Energy Parameter. We also took into account Quality of Service-related characteristics, such as reliability, throughput, accuracy, etc., in addition to the Energy Parameter. We will categories all energy-efficient social sensor cloud techniques in upcoming study. In every way, social sensor clouds are the way of the future. We will combine with technology like social networks, sensor networks, and cloud computing to provide an energy-efficient algorithm for social sensor clouds. Results of the proposed method will be compared to those of the current.

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