A Review Paper on Internet of Things based Remotely Monitoring of Temperature and Humidity

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***Abstract** - As all we know we are living in the era of 4G technology where everyone using internet in their daily life. Now a days internet become our need , so as per our need most of the human beings are using Internet of Things based wearable devices for their different kind of application. In this paper basically we talk about WSN node which is used for the monitoring of temperature & humidity in remote location. As per this paper we study about the different exiting technology which is based on WSN system. According to previous research work we found lots of issues which needs to be solved.*

***Key words**:* WSN, IoT, Small, Remote, Temperature

1. INTRODUCTION

Internet of Things (IoT) is relied upon to change our world by empowering us to screen and control indispensable wonders in our condition using gadgets able to do detecting, handling and remotely transmitting information to Wireless stockpiling like cloud which stores, breaks down and introduces this information in valuable structure. From the cloud this data can be gotten to through different front end UIs, for example, Internet or versatile applications, contingent on reasonableness and prerequisites. Internet lies at the core of this change assuming its job in productive, dependable and quick correspondence of information from gadgets to the cloud and from the cloud to the end clients. In this new worldview, the idea of the run of the mill end framework or host in the Internet is changed and has include gadgets or things henceforth the name Internet of Things. The "things" are equipped for detecting and transmitting information, for example, temperature, weight, stickiness, commotion, contamination, object location, persistent vitals and so on. Ecological checking is a critical IoT application which includes observing the encompassing condition and revealing this information for viable present moment measures, for example, remotely controlling the warming or cooling gadgets and long haul information examinations and measures. With the coming of fast Internet, an ever increasing number of people far and wide are interconnected. Web of Things (IoT) makes this a stride further, and associates people as well as electronic gadgets which can talk among themselves [1]. With falling expenses of Wifi empowered gadgets this pattern will just accumulate more energy. The principle idea driving the Internet of Things(IoT) is to associate different electronic gadgets through a system and after that recover the information from these gadgets (sensors) which can be conveyed in any style, transfer them to any cloud administration where one can break down and process the accumulated data. In the cloud administration one can use these information to caution individuals by different methods, for example, utilizing a ringer or sending them an email or sending them a SMS and so forth. As referenced before, IoT empowers Human-Human cooperation, yet in addition Human-Device communication just as Device-Device collaboration. This specific improvement in the state of new roads of collaborations will affect basically every industry, for example, transportation and co ordinations, vitality, human services and so forth. For instance, on account of vitality, IoT is being connected to make Smart Grids which can recognize and react to changes in nearby and more extensive dimension changes in vitality utilization, which will be a vital piece of any countries vitality approach. Looking past the previously mentioned vitality precedent, there are numerous zones of interests where IoT can have a significant effect, for example, Smart Homes, which include IoT to uplift the level of computerization; Wearable innovations, for example, smartwatches and wellness groups; One of the greatest zones of potential in IoT is associated social insurance. Numerous worldwide hardware behemoths have just put profoundly in the Internet of Things foundation. With players like Intel, Rockwell Automation, Siemens, Cisco and General Electric the market is on the cusp of a blast, with investigators foreseeing there will be 26 Billion associated gadgets, more than 4 for every human on the planet, and the business is anticipated to acquire $19 Trillion, in costs reserve funds and benefits with firms like Samsung and Google standing out. With this new mechanical stage in any case, comes its own arrangement of difficulties and snags, for example, how to manage the huge measures of information which is gathered This undertaking too measures natural parameters.

1.1 WSN

Wireless sensor systems (WSNs) have increased overall consideration lately, so as to defeat the risks and complexities in task caused because of the wired systems interfacing all the equipment components. Wireless sensor systems (WSNs) have enhanced the effectiveness of the frameworks especially with progression in Micro-Electro-Mechanical Systems (MEMS) innovation, which has encouraged the improvement of shrewd sensors [1][2]. Field of checking and Wireless detecting has been changed by Wireless sensor organize. Wireless sensor systems can gather information from various sensors, for example, temperature, stickiness, voltage, current and so forth from Wireless areas and co-operatively go the information through the system to the control station. Thus, Wireless sensor systems can be utilized for observing of intensity information even from Wireless areas [3]. Online consistent observing of these physical amounts from Wireless control stations to co-ordinate the continuous task in the process plants and enterprises [5]. Keeping this circumstance in view, an endeavor has been made in this work to observing information online through Wireless sensor arrange for estimation of temperature and dampness. All the deliberate information are transmitted from site to the control station. The exploratory set up incorporates temperature sensor, moistness sensor and WSN units as equipment. Codes created in-house are kept running in Arduino IDE programming. The quantity of WSN packs might be expanded to build the transmission separate and enhance dependability of the online Wireless checking process. A Wireless sensor arrange (WSN), in some cases called Wireless sensor and performing artist organize (WSAN) of spatially disseminated self-ruling sensors to screen physical or natural conditions, for example, temperature, sound, weight and so forth and helpfully go their information through the system to a primary area. The modem systems are bidirectional, likewise empowering control of sensor action. Wireless sensor hub comprises of detecting, processing, correspondence and power segments.

2. LITERATURE REVIEW

With the approach of rapid Internet, an ever increasing number of people far and wide are interconnected. Internet of Things (IoT) makes this a stride further, and associates people as well as electronic gadgets which can talk among themselves [1]. With falling expenses of Wifi empowered gadgets this pattern will just assemble more energy. The primary idea driving the Internet of Things(IoT) is to associate different electronic gadgets through a system and afterward recover the information from these gadgets (sensors) which can be conveyed in any style, transfer them to any cloud administration where one can dissect and process the assembled data. In the cloud administration one can use these information to alarm individuals by different methods, for example, utilizing a signal or sending them an email or sending them a SMS and so forth. As referenced before, IoT empowers Human-Human association, yet additionally Human-Device communication just as Device-Device connection. This specific improvement in the state of new roads of collaborations will affect basically every industry, for example, transportation and coordinations, vitality, social insurance and so on. For instance, on account of vitality, IoT is being connected to make Smart Grids which can distinguish and react to changes in neighborhood and more extensive dimension changes in vitality utilization, which will be a basic piece of any countries vitality strategy. Looking past the previously mentioned vitality precedent, there are numerous territories of interests where IoT can have an important effect, for example, Smart Homes, which include IoT to elevate the level of computerization; Wearable advances, for example, smartwatches and wellness groups; One of the greatest zones of potential in IoT is associated social insurance. Numerous worldwide gadgets behemoths have just put profoundly in the Internet of Things framework. With players like Intel, Rockwell Automation, Siemens, Cisco and General Electric the market is on the cusp of a blast, with experts foreseeing there will be 26 Billion associated gadgets, more than 4 for every human on the planet, and the business is anticipated to acquire $19 Trillion, in costs funds and benefits with firms like Samsung and Google standing out. With this new innovative stage be that as it may, comes its own arrangement of difficulties and snags, for example, how to manage the tremendous measures of information which is gathered This undertaking also measures ecological parameters, for example, temperature, stickiness, weight, light power and so forth and transfers these qualities to a cloud administration, IBM Bluemix.[2] In the cloud the information are investigated and if the recovered reports are above or underneath a specific edge limit, contingent upon the esteem, an email, a SMS and a twitter post is distributed at the accurate moment[3]. Prior individuals remaining in home and occupied in their family unit tasks or individuals occupied in their workplaces outstanding burden had no clue about the ecological parameters outside their home or office. They have no clue if the temperature outside is very high or very low or typical or in the event that it is raining outside or not or what is the estimation of the dampness in the outside condition. This gadget can come in a significant convenient in these circumstances. It will advise us at whatever point the temperature is excessively low or too high through an email, a SMS and a twitter post. It will likewise consequently inform at whatever point there is a deluge in the encompassing and remind us to convey an umbrella or a parka [4]. It will likewise welcome us with great morning and great night messages as it additionally has a LDR which estimates the light force of the encompassing environment[5]. In [6], temperature, moistness, light force, gas spillage, ocean level and downpour power are estimated and the information are sent remotely to ThingSpeak utilizing Arduino UNO. This work centers extensively around MATLAB perception and examination. Creators in [7] observed and controlled natural conditions like temperature, relative moistness, light force and CO_2 level utilizing sensors and LPC2148 microcontroller. The information was sent to ThingSpeak cloud. In correlation with LPC2148, Arduino UNO utilized in our framework is basic, minimal effort and less perplexing for a basic application. Creators in [8] present an IoT based constant climate observing framework utilizing Raspberry Pi which is mind boggling contrasted with Arduino because of Python language and Raspbian working framework. An Arduino based climate checking framework is created and exhibited in [9]. Creators imported information from different sensors to exceed expectations which is lumbering when contrasted with ThingSpeak. Creators in [10] structured and built up a Wireless sensor arrange framework for natural checking utilizing Raspberry Pi and Arduino. They utilized Xbee module to execute the IEEE 802.15.4 standard for information gathering from various sensor hubs at a base station (Raspberry Pi). Their framework can be reached out to suit huge scale applications, anyway in the present structure, the framework needs cloud network.

WSN environmental monitoring includes both indoor and outside applications. The later can fall in the city arrangement class (e.g., for traffic, lighting or contamination checking) or on the other hand the open nature classification (e.g., synthetic peril, tremor what's more, flooding discovery, spring of gushing lava and territory checking, climate determining, accuracy horticulture). The unwavering quality of any open air organization can be tested by outrageous climatic conditions, however for the open nature the support can be too difficult and exorbitant. These contemplations make the open nature one of the hardest application fields for extensive scale WSN ecological observing, and the IoT applications necessities for low cost, high administration accessibility and low support further increment their structure difficulties. To be savvy, the sensor hubs regularly work on restricted vitality holds. Untimely vitality exhaustion can seriously constrain the system administration [4]-[7] and requirements to be tended to considering the IoT application prerequisites for cost, arrangement, upkeep, and administration accessibility. These turn out to be considerably progressively imperative for observing applications in outrageous climatic conditions, for example, ice sheets, permafrosts or on the other hand volcanoes [2], [11]-[12]. The comprehension of such conditions can impressively profit by nonstop longterm observing, however their conditions accentuate the issues of hub vitality the executives, mechanical and correspondence solidifying, size, weight, and organization methodology. Open nature organizations [13]-[17] and correspondence convention improvements and examinations [7], [18] demonstrate that WSN advancement for dependable activity is tedious what's more, exorbitant. It barely fulfills the IoT applications prerequisites for long haul, minimal effort and solid administration, except if reusable equipment and programming stages [19]-[24] are accessible, including adaptable Internet-empowered servers [25]-[27] to gather what's more, process the field information for IoT applications.

3. RESEARCH GAP

As per the all previous work there is no any researcher who solve the most important and critical factors and that are:

- In Existing system, there is need of Xbee based connectivity.
- There is no Low power System
- Large Size of Microcontroller
- Due to Xbee system cost of the entire system will increase. All previous approaches are not cost friendly
- Large Battery Require to perform the long battery
- Lack of Smart Power utilization

These all are the research gap where we can focus and try to reduce those problems.

4. FUTURE RESEARCH OBJECTVIVE

As we know large area where lots of sectors are involve. If we are talking about the wsn based temperature monitoring system so there is need of followings things which is still not available:

- Mobile alert on real time basses based on the Bulk SMS Service
- Wifi based technology so its very cheap system.
- System will not face the connectivity issue.
- Smart power Management system and increase the battery Life
- Reduce the cost factor
- live temperature and humidity data on portal

So these are the future objectives where researcher can focus.

5. CONCLUSION

In this paper basically we are focusing on the previous existing approach where we found there is lots of research gaps are their which needs to be solved. As we found there is no any proper management of battery. Communication channel is xbee in some of the previous work which is very costly and increase the cost of complete system. Large Battery Require to perform the long battery life. These types of large batteries are not at all good for the environmental also. Similar due to that cost of the device will increase. So there is lots of scope in terms of future work.

REFERANCES

1. M. H. Asghar, A. Negi, and N. Mohammadzadeh, "Principle application and vision in internet of things (iot)," in International Conference on Computing, Communication Automation, May 2015, pp. 427–431.
2. A. Gheith, R. Rajamony, P. Bohrer, K. Agarwal, M. Kistler, B. L. W. Eagle, C. A. Hambridge, J. B. Carter, and T. Kaplinger, "Ibm bluemix mobile cloud services," IBM Journal of Research and Development, vol. 60, no. 2-3, pp. 7:1–7:12, March 2016.
3. S. Gangopadhyay and M. K. Mondal, "A wireless framework for environmental monitoring and instant response alert," in 2016 International Conference on Microelectronics, Computing and Communications (MicroCom), Jan 2016, pp. 1–6.
4. H. Saini, A. Thakur, S. Ahuja, N. Sabharwal, and N. Kumar, "Arduino based automatic wireless weather station with Wireless graphical application and alerts," in 2016 3rd International Conference on Signal Processing and Integrated Networks (SPIN), Feb 2016, pp. 605–609.
5. A. Lage and J. C. Correa, "Weather station with cellular communication network," in 2015 XVI Workshop on Information Processing and Control (RPIC), Oct 2015, pp. 1–5.
6. S. Pasha, "ThingSpeak based sensing and monitoring system", International Journal of New Technology and Research, Vol. 2, No. 6, pp. 19-23, 2016
7. K. S. S. Ram, A. N. P. S. Gupta, "IoT based data logger system for weather monitoring using wireless sensor networks", International Journal of Engineering Trends and Technology, Vol. 32, No. 2, pp. 71-75, 2016
8. S. D. Shewale, S. N. Gaikwad, "An IoT based real-time weather monitoring system using Raspberry Pi", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering", Vol. 6, No. 6, pp. 4242-4249, 2017
9. R. Ayyappadas, A. K. Kavitha, S. M. Praveena, R. M. S. Parvathi, "Design and implementation of weather monitoring system using wireless communication", Vol. 5, No. 5, pp. 1-7, 2017
10. S. Ferdoush, X. Li, "Wireless sensor network system design using Raspberry Pi and Arduino for environmental monitoring application", Procedia Computer Science, Vol. 34, pp. 103-110, 2014
11. R. Szewczyk, J. Polastre, A. Mainwaring, and D. Culler, "Lessons from a sensor network expedition," Wireless Sensor Networks, pp. 307–322, 2004.
12. G. Tolle, J. Polastre, R. Szewczyk, D. Culler, N. Turner, K. Tu, S. Burgess, T. Dawson, P. Buonadonna, D. Gay, and W. Hong, "A macroscope in the redwoods," in Proceedings of the 3rd international conference on Embedded networked sensor systems, ser. SenSys '05. New York, NY, USA: ACM, 2005, pp. 51–63.
13. L. Bencini, F. Chiti, G. Collodi, D. Di Palma, R. Fantacci, A. Manes, and G. Manes, "Agricultural Monitoring Based on Wireless Sensor Network Technology: Real Long Life Deployments for Physiology and Pathogens Control," in Sensor Technologies and Applications, Jun. 2009, pp. 372– 377. 2http://www.minteos.com/
14. S. Verma, N. Chug, and D. Gadre, "Wireless Sensor Network for Crop Field Monitoring," in Recent Trends in Information, Telecommunication and Computing, Mar. 2010, pp. 207–211.
15. Y. Liu, Y. He, M. Li, J. Wang, K. Liu, L. Mo, W. Dong, Z. Yang, M. Xi, J. Zhao, and X.-Y. Li, "Does wireless sensor network scale? A measurement study on GreenOrbs," in INFOCOM, 2011 Proceedings IEEE, Apr. 2011, pp. 873–881.
16. M. Kuorilehto, M. Kohvakka, J. Suhonen, P. Hmlinen, M. Hnnikinen, and T. D. Hmlinen, Ultra-Low Energy Wireless Sensor Networks in Practice. John Wiley & Sons, Ltd, 2007.
17. C. Hartung, R. Han, C. Seielstad, and S. Holbrook, "FireWxNet: a multi-tiered portable wireless system for monitoring weather conditions in wildland fire environments," in Proceedings of the 4th international conference on Mobile systems, applications and services, ser. MobiSys '06. New York, NY, USA: ACM, 2006, pp. 28–41.
18. G. Barrenetxea, F. Ingelrest, G. Schaefer, M. Vetterli, O. Couach, and M. Parlange, "SensorScope: Out-of-the-Box Environmental Monitoring," in Information Processing in Sensor Networks, Apr. 2008, pp. 332–343.
19. N. Kotam¨aki, S. Thessler, J. Koskiaho, A. Hannukkala, H. Huitu, T. Huttula, J. Havento, and M. J¨arvenp¨a¨a, "Wireless in-situ sensor network for agriculture and water monitoring on a river basin scale in southern Finland: Evaluation from a data user's perspective," Sensors, vol. 9, no. 4, pp. 2862–2883, 2009.
20. S. Burgess, M. Kranz, N. Turner, R. Cardell-Oliver, and T. Dawson, "Harnessing wireless sensor technologies to advance forest ecology and agricultural research," Agricultural and Forest Meteorology, vol. 150, no. 1, pp. 30–37, 2010.
21. S. Tennina, M. Bouroche, P. Braga, R. Gomes, M. Alves, F. Mirza, V. Ciriello, G. Carrozza, P. Oliveira, and V. Cahill, "EMMON: A WSN System Architecture for Large Scale and Dense Real-Time Embedded Monitoring," in Embedded and Ubiquitous Computing, Oct. 2011, pp. 150–157. [
22. T. Watteyne, X. Vilajosana, B. Kerkez, F. Chraim, K. Weekly, Q. Wang, S. Glaser, and K. Pister, "OpenWSN: a standards-based low-power wireless development environment," Transactions on Emerging Telecommunications Technologies, vol. 23, no. 5, pp. 480–493, 2012.

23. K. Aberer, M. Hauswirth, and A. Salehi, "Global Sensor Networks," Ecole Polytechnique F´ed´erale de Lausanne (EPFL), CH-1015 Lausanne, Switzerland, Technical report LSIR-2006-001, 2006.
24. M. Corra, L. Zuech, C. Torghele, P. Pivato, D. Macii, and D. Petri, "WSNAP: a Flexible Platform for Wireless Sensor Networks data collection and management," in Environmental, Energy, and Structural Monitoring Systems, Sep. 2009, pp. 1–7.
25. C. Jardak, K. Rerkrai, A. Kovacevic, and J. Riihijarvi, "Design of largescale agricultural wireless sensor networks: email from the vineyard," International Journal of Sensor Networks, vol. 8, no. 2, pp. 77–88, 2010.
26. Gia, Tuan Nguyen, et al. "Energy efficient wearable sensor node for IoT-based fall detection systems." *Microprocessors and Microsystems* 56 (2018): 34-46.
27. Gia, Tuan Nguyen, et al. "Iot-based fall detection system with energy efficient sensor nodes." Nordic Circuits and Systems Conference (NORCAS), 2016 IEEE. IEEE, 2016
28. Karimi, Kaivan, and Gary Atkinson. "What the Internet of Things (IoT) needs to become a reality." White Paper, FreeScale and ARM (2013).
29. Stankovic, John. "Research directions for the internet of things." Internet of Things Journal, IEEE 1.1 (2014): 3-9.
30. Gubbi, Jayavardhana, et al. "Internet of Things (IoT): A vision, architectural elements, and future directions." Future Generation Computer Systems 29.7 (2013): 1645-1660. Pu Liu, Zheng hong Peng (2013) Smart Cities in China,Computer. IEEE computer Society Digital Library. IEEE Computer Society 47: 72-81.
31. Carlos Cunha R, Emanuel Peres, Raul Morais, Ana Oliveira A, Samuel Matos G, et al (2010) The use of mobile devices with multi-tag technologies for an overall contextualized vineyard management. Computers and Electronics in Agriculture 73: 154-164. Aqeel-ur-rehman, Zubair Shaikh(2009) Applications of Modern High Performance Networks: Smart Agriculture. Bentham Science publishers.
32. D.A. Sterling, J.A. O'Connor, J. Bonadies, Geriatric falls: injury severity is high and disproportionate to mechanism, J. Trauma Acute Care Surg. 50 (1) (2001) 116–119.
33. J.A. Stevens, et al., The costs of fatal and non-fatal falls among older adults, Injury Prev. 12 (5) (2006) 290–295.