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Smart WSN node device for remotely monitoring of temperature and humidityin Rular Area

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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 basically we proposed a system which is based on WSN and this system is able to capture the live temperature & humidity in remote location. Device is working on small 220 mah battery with long battery life. This system architecture is based onESP8266-01.

Keywords: WSN, IoT, Small, Remote, Temprature

I. INTRODUCTION

Internet of Things (IoT) is depended upon to change our reality by engaging us to screen and control key ponders in our condition utilizing devices ready to do identifying, dealing with and remotely transmitting data to Wireless amassing like cloud which stores, separates and presents this data in significant structure. From the cloud this information can be gotten to through various front end UIs, for instance, Internetor adaptableapplications,dependentuponsensibility and requirements. Web lies at the center of this change expecting its activity in profitable, reliable and snappy correspondence of data from contraptions to the cloud and from the cloud to the end customers. In this new perspective, the possibility of the regular end structure or host in the Internetischangedandhasincorporatecontraptionsorthings from now on the name Internet of Things. The "things" are prepared for distinguishing and transmitting data, for instance, temperature, weight, stickiness, bustle, tainting, object area, tenacious vitals, etc. Natural checking is a basic IoT application which incorporates watching the including condition and uncovering this data for reasonable present minute measures, for instance, remotely controlling the warming or cooling devices and whole deal data examinations and measures. With the happening to quick Internet, a regularly expanding number of individuals far and wide are interconnected. Web of Things (IoT) makes this a walk further, and partners individuals just as electronic devices which can talk among themselves [1]. With falling costs of Wifi enabled contraptions this example will simply amass more vitality. The guideline thought driving the Internet of Things(IoT) is to relate diverse electronic devices through a framework and after that recuperate the data from these devices (sensors) which can be passed on in any style, move them to any cloud organization where one canseparate and process the aggregated information. In the cloud organization one can utilize these data to alert people by various strategies, for instance, using a ringer or sending them an email or sending them a SMS, etc. As referenced previously, IoT enables Human-Human participation, yet what's more Human-Device correspondence similarly as Device-Device joint effort. This particular improvement in the condition of new streets of joint efforts will influence fundamentally every industry, for instance, transportation and collaborations, imperativeness, humanadministrations,

etc. For example, by virtue of essentialness, IoT is being associated with make Smart Grids which can perceive and respond to changes in close-by and increasingly broad measurement changes in imperativeness use, which will be an indispensable bit of any nations essentialness approach. Looking past the recently referenced essentialness point of reference, there are various zones of interests where IoT can have a critical impact, for instance, Smart Homes, which incorporate IoT to elevate the dimension of computerization; Wearable developments, for instance, smartwatches and wellbeing gatherings; One of the best zones of potential in IoT is related social protection. Various overall equipment behemoths have quite recently placed significantly in the Internet of Things establishment. With players like Intel, Rockwell Automation, Siemens, Cisco and General Electric the market is on the cusp of an impact, with specialists predicting there will be 26 Billion related contraptions, more than 4 for each human on the planet, and the business is foreseen to get $19 Trillion, in costs save assets and advantages with firms like Samsung and Google emerging. With this new mechanical stage regardless, comes its very own game plan of troubles and tangles, for instance, how to deal with the colossal proportions of data which is accumulated This endeavor also measures characteristic parameters.

WSN: Wireless sensor frameworks (WSNs) have expanded by and large thought recently, to crush the dangers and complexities in assignment caused in view of the wired frameworks interfacing all the hardware parts. Remote sensor frameworks (WSNs) have upgraded the adequacy of the structures particularly with movement in Micro-Electro-Mechanical Systems (MEMS) advancement, which has supported the improvement of canny sensors [1][2]. Field of checking and Wireless distinguishing has been changed by Wireless sensor arrange. Remote sensor frameworks can accumulate data from different sensors, for instance, temperature, stickiness, voltage, current, etc from Wireless zones and co-operatively go the data through the framework to the control station. Along these lines, Wireless sensor frameworks can be used for seeing of force data even from Wireless territories [3]. Online reliable seeing of these physical sums from Wireless controlstations to co-ordinate the persistent undertaking in the process plants and ventures [5]. Keeping this situation in view, an undertaking has been made in this work to watching data online through Wireless sensoror chestrate estimation of temperature and clamminess. All the intentional data are transmittedfromsitetothecontrol station. The exploratory set up joins temperature sensor, sogginess sensor and WSN units as gear. Codes made in-house are continued running in Arduino IDE programming. The amount of WSN packs may be extended to construct the transmission independent and upgrade steadfastness of the online Wireless checking process. A Wireless sensor mastermind (WSN), sometimes called Wireless sensor and performing craftsman sort out (WSAN) of spatially scattered self-decision sensors to screen physical or characteristic conditions, for instance, temperature, sound, weight, etc and accommodatingly go their data through the framework to an essential region. The modem frameworks are bidirectional, in like manner engaging control of sensor activity. Remote sensor center point contains recognizing, preparing, correspondence and powerfragments

II. LITERATUREREVIEW

Looking past the recently referenced imperativeness point of reference, the rearevarious regions of interests where IoTcan have a significant impact, for instance, Smart Homes, which incorporate IoT to lift the dimension of computerization; Wearable advances, for instance, smartwatches and wellbeing gatherings; One of the best zones of potential in IoT is related social protection. Various overall contraptions behemoths have quite recently placed significantly in the Internet of Things system. With players like Intel, Rockwell Automation, Siemens, Cisco and General Electric the market is on the cusp of an impact, with specialists predicting there will be 26 Billion related contraptions, more than 4 for each human on the planet, and the business is foreseen toprocure

$19 Trillion, in costs assets and advantages with firms like Samsung and Google emerging. With this new inventive stage nevertheless, comes its own course of action of challenges and tangles, for instance, how to deal with the enormous proportions of data which is assembled This endeavor likewise measures natural parameters, for instance, temperature, stickiness, weight, light power, etc and moves these characteristics to a cloud organization, IBMBluemix.[2]In the cloud the data are researched and if the recouped reports are above or underneath a particular edge limit, dependent upon the regard, an email, a SMS and a twitter post is conveyed at the precise moment[3]. Earlier people staying in home and involved in their nuclear family undertakings or people involved in their working environments remarkable weight had no idea about the biological parameters outside their home or office. They do not understand whether the temperature outside is high or low or ordinary or if it is raining outside or not or what is the estimation of the clamminess in the outside condition. This contraption can arrive in a noteworthy helpful in these conditions. It will exhortusat whatever point the temperature is too much low or too high through an email, a SMS and a twitter post. It will moreover thus advise at whatever point there is a downpour in the incorporating and remind us to pass on an umbrella or a parka [4]. It will in like manner welcome us with incredible morning and extraordinary night messages as it also has a LDR which gauges the light power of the including environment[5]. In [6], temperature, wetness, lightpower, gasspillage, sealevel and deluge power are assessed and the data are sent remotely to ThingSpeak using Arduino UNO. This work revolves widely around MATLAB discernment and examination. Makers in [7] watched and controlled regular conditions like temperature, relative clamminess, light power and CO2 level using sensors and LPC2148 microcontroller. The data was sent to ThingSpeak cloud. In relationship with LPC2148, Arduino UNO used in our structure is essential, insignificant exertion and less baffling for a fundamental application. Makersin[8] present an IoT based steady atmosphere watching structure using Raspberry Pi which is incredible stood out from Arduino in view of Python language and Raspbian working system. An Arduino based atmosphere checking structure is made and displayed in [9]. Makers imported data from various sensors to surpass desires which is blundering when appeared differently in relation to ThingSpeak. Makersin

[10] organized and developed a Wireless sensor mastermind system for regular checking using Raspberry Piand Arduino. They used Xbee module to execute the IEEE 802.15.4 standard for data gathering

from different sensor centers at a base station (Raspberry Pi). Their system can be connected with suit immense scale applications, in any case in the present structure, the system needs cloud organize.

WSN natural observing incorporates both indoor and outside applications. The later can fall in the city course of action class (e.g., for traffic, lighting or tainting checking) or then again the open nature grouping (e.g., manufactured hazard, tremor what's more, flooding revelation, spring of spouting magma and region checking, atmosphere deciding,exactness agriculture).Theenduringnatureofanyoutdoorsassociation can be tried by over the top climatic conditions, anyway for the open nature the help can be excessively troublesome and extreme. These thoughts make the open nature one of the hardest application fields for broad scale WSN environmental watching, and the IoT applications necessities for ease, high organization availability and low help further augmentationtheirstructuretroubles.Tobecanny,thesensor center points normally take a shot at limited essentialness holds. Troublesome imperativeness fatigue can genuinely compel the framework organization [4]-[7] and necessitiesto betendedtoconsideringtheIoTapplicationrequirementsfor cost, gameplan, upkeep,and organization availability.These end up being impressively continuously basic for watching applications in over the top climatic conditions, for instance, ice sheets, permafrosts or then again volcanoes [2],[11]-[12]. The cognizance of such conditions can astonishingly benefit by constant longterm watching, anyway their conditions complement the issues of center point essentialness the officials, mechanical and correspondence cementing, size, weight, and association procedure. Open nature associations [13]-[17] and correspondence show upgrades and examinations[7],[18]exhibitthatWSNheadwayforreliable action is dull what's increasingly, extravagant. It scarcely satisfies the IoT applications requirements for whole deal, negligible exertion and strong organization, with the exception of if reusable gear and programming stages [19]-[24] are available, including versatile Internet-engaged servers[25]-[27]toaccumulatewhat'smore,processthefield data for IoT applications. **As per the all previous work there is no any researcher who solve the most important and critical factors and thatare:**

- In Existing system, there is need of Xbee based connectivity.
- There is no Low powerSystemLarge Size ofMicrocontroller
- Due to Xbee system cost of the entire system will increase. All previous approaches are not cost friendly
- Large Battery Require to perform the longbattery
- Lack of Smart Powerutilization

These all are the research gap where we can focus and try to reduce those problems. As we know IoT is large area where lots of sectors are involve. If we are talking about the wsn based temperature monitoring system. Here we are focus on the followings:

- Mobile alert on real time basses based on the Bulk SMS Service
- Wifi based technology so its very cheapsystem.
- System will not face the connectivityissue.
- Smart power Management system and increase the batteryLife
- Reduce the costfactor
- live temperature and humidity data onportal

So the seare the future objectives where researcher can focus.

III. PROPSOED METHADOLOGY

In this work we will design a system Smart WSN node device for remotely monitoring of temperature and humidity in rular area, here we are using the concept of internet of things. Here for communication point of view we are using Wi-Fi module Esp8266 which is working on HTTP protocol. Our proposed design will work on sleep and wake up concept here we use ESP8266-01 as a MCU also due to that there is no need of extra MCUcost.

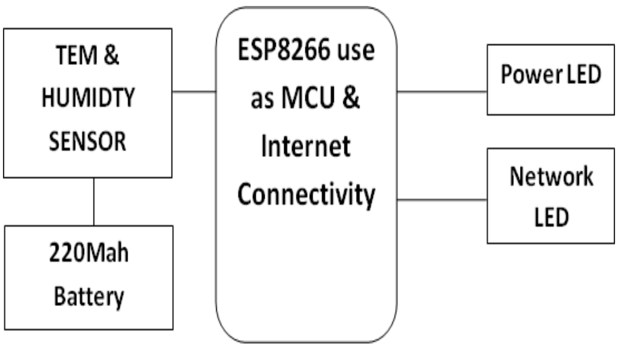

Fig. 3.1 Proposed Design

- **HardwareComponents:**
- **Wi-Fi module(ESP8266)**
- **Temperature & HumiditySensor**
- **RedLED**
- **SoftwareRequirements:**
- **ArduinoIDE**
- **ThinkSpeak**
- **Bulk SMSService**

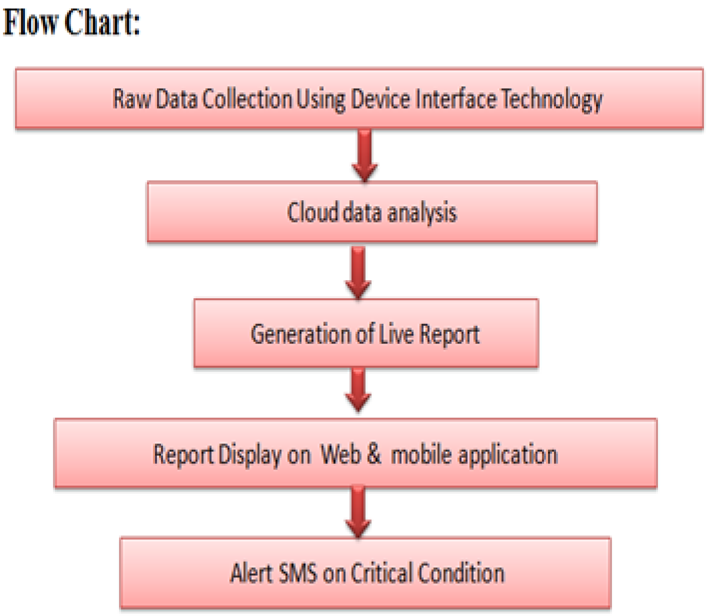

Fig. 3.2 Flow

Schematic & PCB fabrication: Here we are using Eagle EDA for schematic & PCB designing. So at initial stage we design the schematic sketch and create the same design on breadboard and check the functionality once system functionality is upto the mark so after that we convert that schematic in to the PCB layout

IV. RESULT & ANALYSIS

In this work basically we are focusing on to design a device which is able to make justice with all parameters and provide a balance result. Here our main parameters are followings:

1. COST
2. BATTERY BACKUP
3. FORMFACTOR

According to our proposed approach we are using 220 mah battery and we are able to run the device upto the 1000hr. Here we are using the concept of ultra low power management system. In this approach we are able to manage the device form factor in small size with proper long lasting battery backup and best part we are able to achieve low cost design. Here is cost breakup of our proposed system:

Table 4.1

Component	Price (INR)
3V (220 mah battery)	80
ESP8266-01	110
DHT11	90
TOTAL	280

Table 4.2 Proposed approaches Capacity &Features analysis:

Parameters	Proposed
Current/Sec on Deep Sleep	40ua
Current/Sec on Sending data	70ma
Operating Voltage	3V
Device Size	30X40X15mm
Power on Deep Sleep	120uW
Power on Sending Data	210mW
Battery Working Hour	3648
SMS	Yes
Internet	Yes
WSN	Yes
Alert	Yes

According to our proposed approach we are able to make justice with all parameters. Now in terms of cloud server we areusingthinkspeaktosendandstoreprefalltimewithdate, similar we are using bulk **SMS** service for sending pre fall notification to resisternumber.

V. CONCLUSION

In this paper basically we proposed a new approach which is better than as compare to previous approach. In previous approach there is lots of research gaps are their which needs tobesolved. 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 devicewillincrease.Accordingtoourproposedapproachwe are able to run system up to 3648 hr. by using of deep sleep logic.

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