SCHOOL OF INFORMATION TECHNOLOGY AND ENGINEERING

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FOOD MONITORING SYSYTEM USING IoT

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A PROJECT REPORT

Submitted in partial fulfilment for the Mini Project – J Component of

Internet of Things (IoT) – SWE4005

Under the guidance of

Prof. KUMARESAN P

ABSTRACT:

In Today's world we are very secure towards our health but when it the comes to food we are very casual!! Food is the main source that can affect one's health. So, in order to monitor the quality of food we eat we have done this project " smart food monitoring system" Here we have done in a low cost andsmall scale where we can use this at home during this COVID situations we don't want to risk our lives by eating stale food without knowing. But our project can be implemented in large scale as well where it'll help a lot of food industries even which have chain industries as it'll be useful in getting to know the qıality of the food products by the managing person from a single place.

LITERATURE SURVEY:

S.NO	TITLE OF THE PAPER	ABSTRACT	METHODOLOGY ADAPTED	RESULTS
1.	IOT BASED SMART FOOD MONITORING SYSTEM 1 Professor Rajesh Kumar Kaushal, 2 Harini. T, 3 Pavithra Lency.D, 4 Sandhya.T, 5 Soniya.P 1 Dept of Electronics and Communication Engineering, Dr. T. Thimmaiah Institute of Technology, Visveswaraya Technological University, Belagavi, Karnataka, India 2,3,4,5Dept of Electronics and Communication Engineering, Dr. T. Thimmaiah Institute of Technology, Visveswaraya Technological University, Belagavi, Karnataka, India	In the era of technology advancement, everything requires monitoring and controlling. This paper proposes an IoT framework for facilitating food monitoring for protection of the food, so that it would not get contaminated due to surrounding conditions during storage and transportation. In present scenario, the work done is in terms of the sensed value that have been recorded and a detailed analysis has been performed but automated controlled alternatives are not present. The proposed solution analyzes temperature, moisture, light as these parameters affect nutritional values of food items such as fruits and vegetables, and makes the analysis results accessible to the user via a mobile application (SMS). A web server is used for storage of data values sensed in real time and also for analysis of results. User is alerted via messages along with locations of the shipment whenever an emergency occurs in this solutions, heterogeneous sensors for various domains are employed for sensing the condition of food. Key words: Food monitoring, IoT, Sensor.	We have wireless sensor unit to monitor the critical environmental parameters like temperature, humidity, light, moisture etc. we have DHT-11 sensor which will senses the humidity and temperature at shopping mall and give it to the Arduino. Arduino will convert this analog vale into digital value compared threshold value. If the parameter above or below the threshold value then actuators will turn on and control the temperature. Alarm will be on to turn on. We have gas sensor which will send message to owner. We have IR sensor unit, which is used to monitor the stock. If the stock is less it will sense and send information to the vendor. We have GSM to communicate with vendor and owner. We have EPS-8266(wi-fi) module which is used to upload all measured data into the cloud. We use Thing speak cloud, which is freely available for students. Which will collect the sent data and plot the graph. We can take daily /weekly/monthly report for data analysis. We have LCD display, which displays the status of each sensor.	The integrated IoT-based online monitoring approach using smart logistics can address the critical needs of reducing food waste, increasing transportation efficiency, and tracking food contamination. The emerging MI-based communications technology appears well suited for local communications in this environment; however, there are several challenges to making the technology work reliably in the highly dense and dynamic environment of real-world logistics operations. Further advances are needed to derive actionable intelligence from the collected data in real-world conditions, such as the presence of faulty modules or patchy cellular communications. Real-world logistics operations also have other complexities that make flexible distribution challenging, such as delivery contracts, party-specific distribution policies, and specific data- privacy needs. We hope this article will spur further research and result in solutions to many of these issues

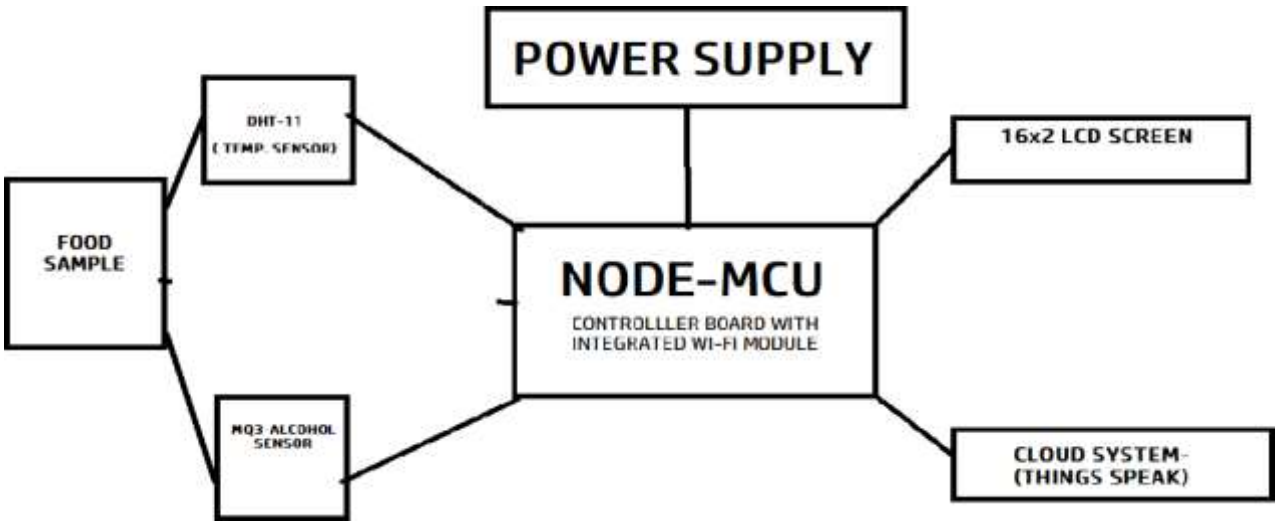
2.	I Track: IoT framework for Smart Food Monitoring System Amrita Srivastava Department of Computer Science IGDTUW Delhi, India Ankita Gulati Department of Computer Science IGDTUW Delhi, India	This paper proposes an IoT framework for facilitating food monitoring for protection of the food, so that it would not get contaminated due to surrounding conditions during storage and transportation. In present scenario, the work done is in terms of the sensed values that have been recorded and a detailed analysis has been performed but automated control alternatives are not present. The proposed solution analyzes temperature, moisture, light as these parameters affect nutritional values of food items and makes the analysis results accessible to the user via a mobile application. A web server is used for storage of data values sensed in real time and also for analysis results. User is alerted via messages along with location of the shipment whenever an emergency occurs. In this solution, heterogeneous sensors for various domains are employed for sensing the condition of food. The data values with plotting of graphs has been done at remote location so that this data can easily be used for further analysis and the user could be notified if a change in parameters values above a threshold is recorded.	A Graphic user interface (GUI) is designed to assist the user. This GUI is basically for the user monitoring at the server end. Using this application, the user can monitor the sensor values and keep a record of variations. These data values and alert messages can be shared with end user (the one monitoring the shipment containing the food items) via Bluetooth or Wi-Fi depending on the proximity of the end user with remote user. Basically, there are three modules by which GUI can be created on Raspberry Pi. The different modules are: 1.Tkinter 2.Wxpython 3.Jpython We are using the Tintern module that supports different GUI to develop on the raspberry pi.	A system has been proposed to analyze the ambient conditions under which the food item is being stored and transported. The proposed solution senses the temperature, moisture, light parameters of surrounding environment as these parameters affect nutritional values of food items as shown in Fig1. The values of these parameters are then compared to standard values serving as threshold values for respective parameters. The data values with plotting of graphs has been done at remote location so that this data can easily be used for further analysis and the user could be notified if a change in parameters values above a threshold is recorded. A web server is used for storage of data values sensed in real time and analysis results. User, i.e. storage inventory manager is alerted via messages along with location of the shipment whenever an emergency occurs. An android mobile application is used to facilitate user interaction due to wide penetration of android devices . The aim is to develop a generic platform that can be interfaced with third party applications to enable easy access to all the stakeholders involved in storage and transportation process.

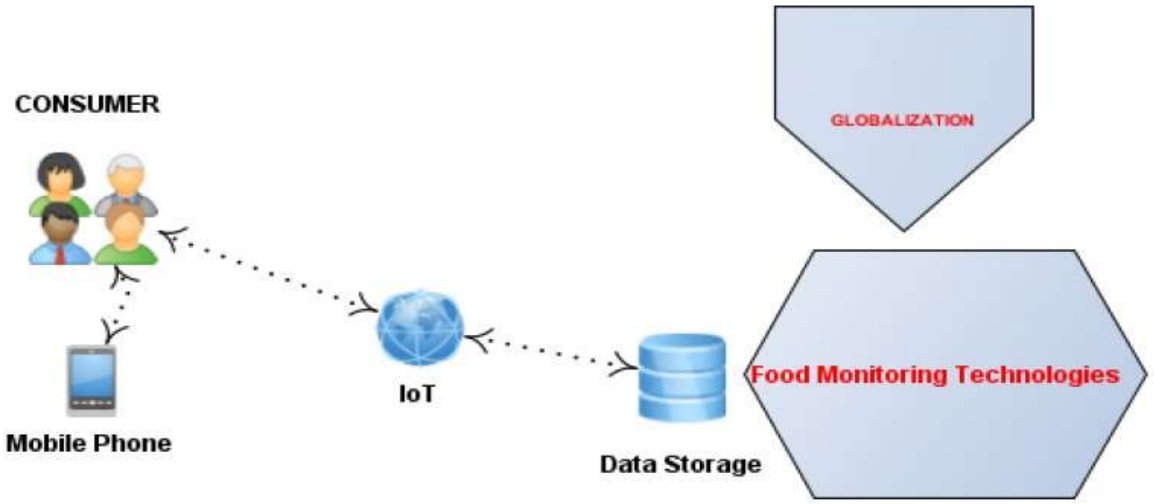
3.	FOOD QUALITY MONITORING SYSTEM BY USING ARDUINO B.Ravi Chander 1 , P.A.Lovina 2 ,G.Shiva Kumari3 1,2&3AssistantProfessor, Dept. of ECE, St.Martin's Engineering college, Dhulapally(v), kompally,Secunderabad500100 Telangana state, India	Food safety and hygiene is a major concern in order to prevent the food wastage. The Quality of the food needs to be monitored and it must be prevented from rotting and decaying by the atmospheric factors like temperature, humidity and dark. Therefore, it is useful to deploy quality monitoring devices at food stores. These quality monitoring devices keep a watch on the environmental factor that cause or pace up decay of the food. Later, the environmental factors can be controlled like by refrigeration, vacuum storage etc. In this paper, a similar food quality monitoring device will be designed that will keep watch of environmental factors like temperature, humidity, alcohol content and exposure to light. The device is built on Arduino UNO which is a popular prototyping board. The Arduino board is interfaced with various sensors like DHT-11 to monitor temperature and humidity, MQ6 to detect alcohol content and LDR to measure exposure to light.	It consists of power supply unit, Arduino microcontroller, Wi-Fi modem, Gas sensor, LDR, DTH11 sensor, LCD. Hardware implementation deals in drawing the schematic on the plane paper according to the application, testing the schematic design over the breadboard using the various ICs to find if the design meets the objective, carrying out the PCB layout of the schematic tested on breadboard, finally preparing the board and testing the designed hardware. The firmware part deals in programming the microcontroller so that it can control the operation of the IC's used in the implementation. In the present work, we have used the OrCAD design software for PCB circuit design, the Arduino software development tool to write and compile the source code, which has been written in the C language. The Atmel AVR® core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in a single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers	Food poisoning has been the source of innumerable diseases, to reduce and avoid illness we use biosensors and electrical sensors to determine the freshness of household food items like diary, fruits, and meat, to expend the device for more items by adding new sensors and by using existing sensors. User can also get output in the form of voice by attaching the speaker

PROBLEM STATEMENT:

Delivering poor quality of foods to the end customers can be a disaster for a food processing company, so in this project we put together a model using IoT to address the problem.

BLOCK DIAGRAM:





HARDWARE COMPONENTS AND THEIR ROLE:

1. NODE-MCU (CONTROLLER WITH INTEGRATED Wi-Fi module)
2. MQ3 SENSOR- TO DETECT THE PRESENCE OF ALCOHOL
3. DHT-11 sensor – To detect the temperature and humidity of thegiven food sample
4. 16x2 LCD – To display the sensor values every 30s

SOFTWARE COMPONENTS USED AND THEIR USES:

1. Arduino-IDE (For compiling and deploying the code)
2. Things speak (Platform to display the values)

WORKING METHODOLOGY:

First power-up the system using a USB adapter, it takes around 10 – 20seconds for the sensors, LCD screen and things speak to boot up Then we introduce the sample (In our case we took banana) to the system.MQ3 sensor takes 10 seconds to sense the value. The limits for the sensor values are as follows:

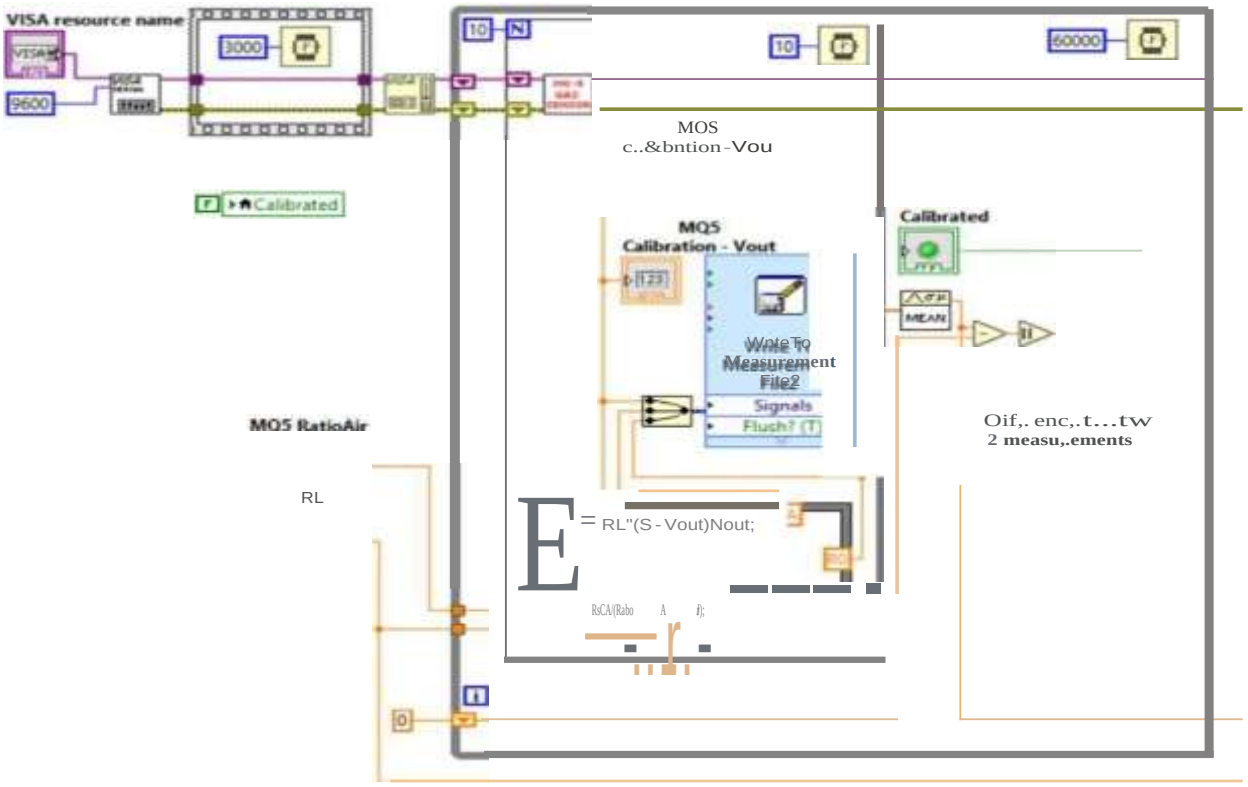
Food is in a good condition if the value is less than 200, in a preservable condition if the value is 200-250 and it becomes stale if the value crosses over 250.

Similarly, the desirable values for temperature and humidity is as follows:For Temperature: 25c to 29c (Room temperature)

- For Humidity: 78-85.

All these data can be viewed in things speak using cloud storage, In the thingsspeak we can view graphical data as well.

The main crux of this design is, it shows the continuous readings in every 30seconds, so it is preferable to be used in big scale industries.



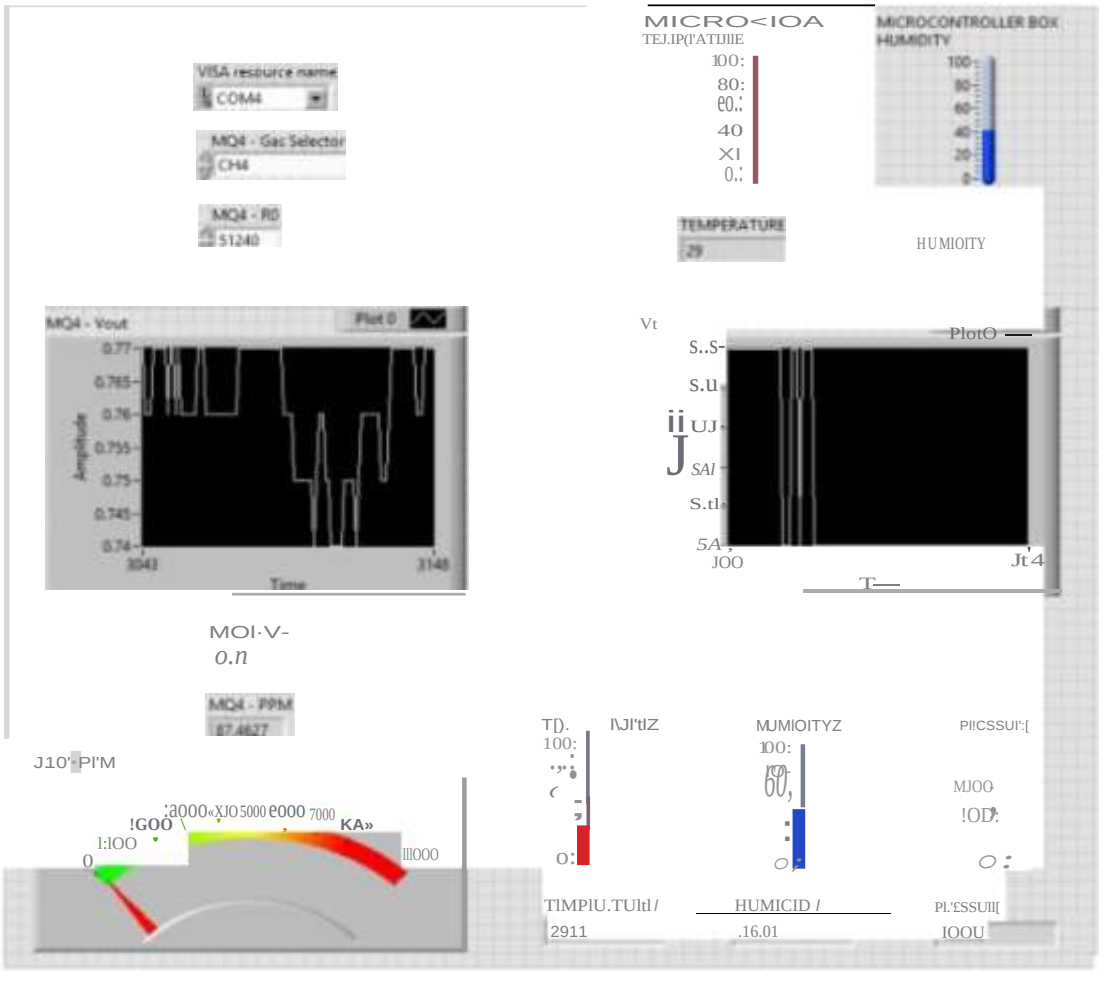


Fig. User interface for the Future scope

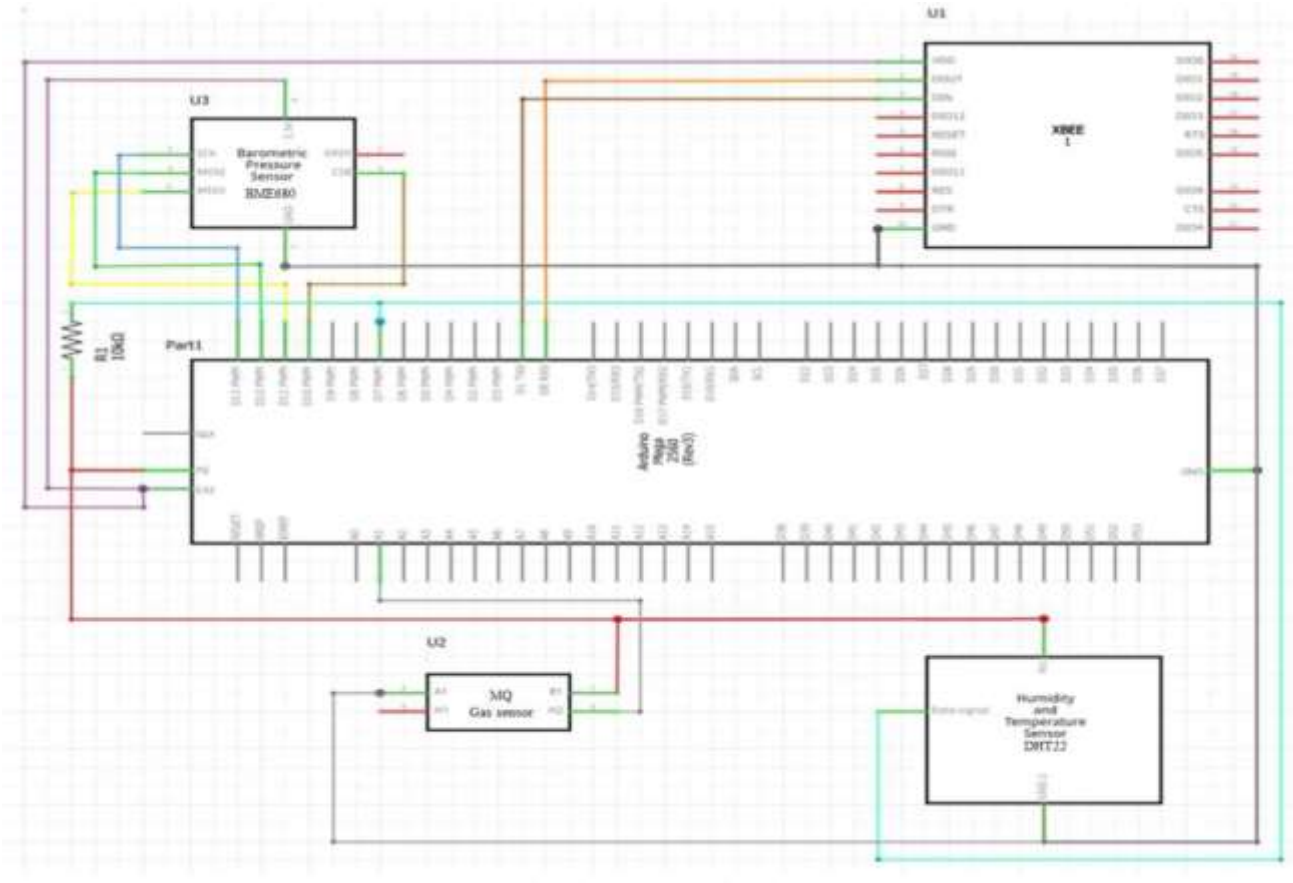


Fig. Circuit diagram for proposed model

PERMISSIBLE LEVEL OF PH

Item	Approximate pH	Lower range	Upper range
Apple	3.65	3.3	4
Avocados	6.43	6.27	6.58
Bananas	4.85	4.5	5.2
Bananas, red	4.67	4.58	4.75
Beans, Kidney	5.7	5.4	6
Cabbage	6	5.2	6.8
Carrots	6.14	5.88	6.4
Carrots, canned	5.2	5.18	5.22
Grapes, Lady Finger	3.55	3.51	3.58
Onion	5.8	4.8	6.8
Potatoes	5.65	5.4	5.9
Tomatoes	4.6	4.3	4.9
Whole milk	6.65	6.4	6.9

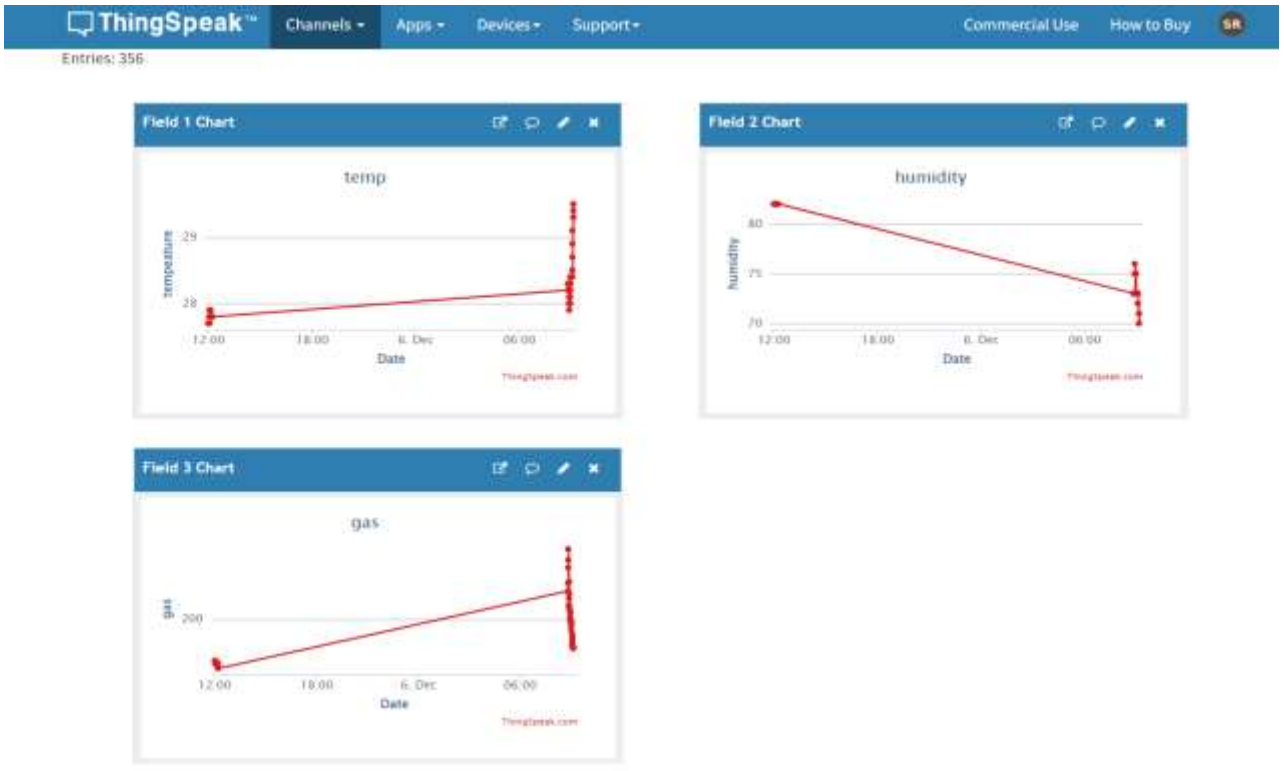
FEATURES COVERED IN IoT POINT OF VIEW:

Security and privacy are adhered here because only the owner and his associates can view the values in ThingSpeak using private API key.

Cloud and network protocol – We used cloud to store the data and **JSON** network protocol is used here for data flows.

Time	Things peak		Serial monitor		Deviation		Time delay (ms)	
	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)	Temperature	Humidity	Temperature	Humidity
10:30 AM	31	62	31	62	0	0	0	0
10:35 AM	30.9	65	30.6	66	0.3	-1	1	1.23
10:40 AM	31.3	63	31	62	0.3	1	0	3
10:55 AM	32	65	30.8	62	1.2	3	0	0
11:20 AM	31	62	32.3	62	-1.3	0	3	0
11:30 AM	31	62	31	62	0	0	1	2
12:00 PM	33	49	35	55	-2	-6	0	0
1:00 PM	33	52	33	55	0	-3	0	2
2:00 PM	33	48	33	50	0	-2	1	0
3:00 PM	31	42	31	43	0	-1	0	0
7:00 PM	30	49	28	50	2	-1	0	0
9:30 PM	30	55	30.2	55	-0.2	0	0	0
10:00 PM	31	39	31	39	0	0	4	2
10:30 PM	30	40	29.4	40	0.6	0	2	2

RESULTS IN THINKSPEAK:



FUTURE SCOPE:

This methodology can be implemented in food processing industry to ensureholistic delivery to the end customer and efficient business running for the food processing companies. With foodborne illnesses on the rise. Industrial IoT technology gives food manufacturers and the food service industry real-time data to identify problems, reduce waste and prevent expensive, brand-damaging outbreaksand recalls. Maintaining a safe temperature range for perishable food from farm to fork remains a technical and logistical challenge, and it's not the only one food producers and handlers contend with. Other areas for potential improvementin food safety are recordkeeping, the scope of monitoring, real-time visibility into systems, human error and cost management. Accurate data, available to managers as the readings are taken, can help with all of these tasks. There is also the potential to prevent food contamination with IoTtechnology. And help in the quality of food by the industries.

CONCLUSION:

The aging population is a phenomenon occurring not only in India, but also on the other countries. Also, according to the World Health Organization, from a medical point of view, age is associated with many diseases for which there are no effective treatments. However, the same study, showing that the aging population is associated with the increase in the prevalence of the diseases and specific related symptoms, indicates that all these could be delayed by the adoption Symmetry of a healthy lifestyle. In this context, our study contributes to increase the quality of life, through the use of intelligent sensor networks to warn the aged individuals when a food expires, or when certain properties of the food packaging are altered. In this article, we presented a portable system for monitoring vacuum packed foods.

The Internet of Things facilitates a numerous benefit to the society and from our project we can provide and prove the strength of IoT using the Thing speak API that is capable to contribute the services for the purpose of building vast number of IoT applications and help to implement them on the public platform. This Design Provide a Moderate and less expensive way of Sensing and Monitoring system in the field of Domestic and as well industrial standards to implement the IoT.

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