**D. ADC**

The analog-to-digital conversion involves quantization of the input, so it necessarily introduces a small amount of error. Instead of doing a single conversion, an ADC often performs the conversions ("samples" the input) periodically. The result is a sequence of digital values that have been converted from a continues-time and continuous-amplitude analog signal to a discrete-time and discrete-amplitude digital signal. Typically the digital output will be a two's complement binary number that is proportional to the input, but there are other possibilities. An encoder, for example, might output a Gray code.

**E. ZigBee wireless module**

ZigBee is a specification for a suite of high-level communication protocols used to create personal area networks built from small, low-power consumption limits transmission distances, ZigBee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. Zigbee is typically used in low data rate applications that require long battery life and secure

networking (ZigBee networks are secured by 128 bit symmetric encryption keys.) Zigbee has a defined rate of 250kbit/s, best suited for intermittent data transmissions from a sensor or input device. Applications include wireless light switches, electrical meters with in home displays, traffic management systems, and other consumer and industrial equipment that require short-range low-rate wireless data transfer. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or WiFi.

## 4. Results and Discussions

**A.ADC**

An analog-to-digital converter (ADC, A/D. or A to D) is a device that converts a continuous physical quantity (usually voltage) to a digital number that represents that quantity's amplitude. The input to the ADC is a voltage. ADC is designed for voltages from 1 to 10v, from -5 to +5v, etc., but they almost always take a voltage input. In any event, the input is an analog voltage signal for most cases. The output of the A/D converter is a binary signal, and the binary signal encoders the analog input voltage. So, the output is some sort of digital number.

- The input can range from 0 to 100 v.
- When the input voltage goes above 50v, the output is a binary one (1).
- When the input voltage is below 50v, the output is a binary zero (0).

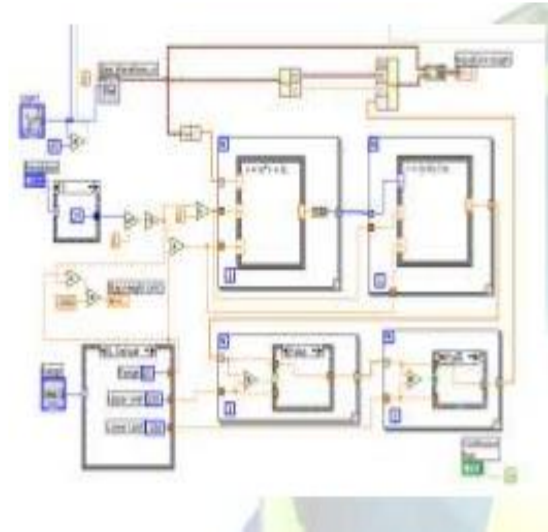

**Figure 2:** Implementation of ADC

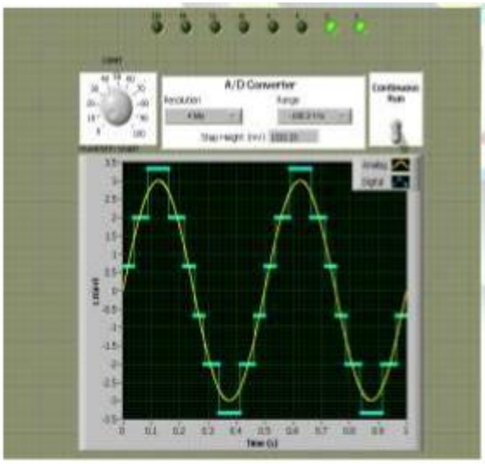

**Figure 3:** Front panel of ADC

**B. Binary Conversion**

Given analog value is converted to equivalent binary numbers. Analog value is divide by 2 and compare the remainder with constant value 1. The output of this value is given to the led indicator. In this project we have converted for 8 bits.

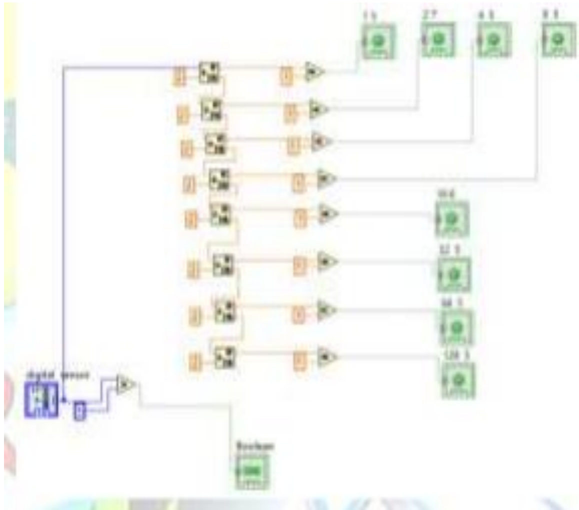

**Figure 4:** Logic diagram for binary conversion

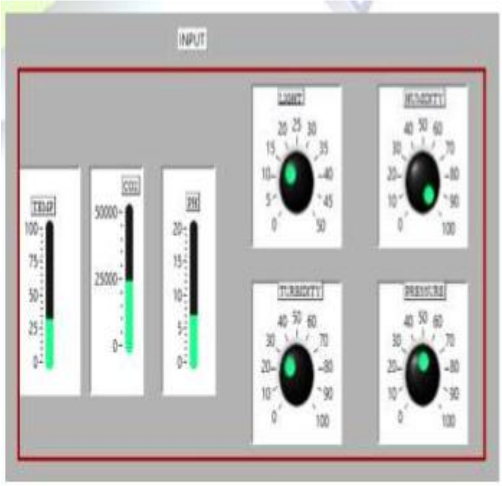

**Figure 5:** input

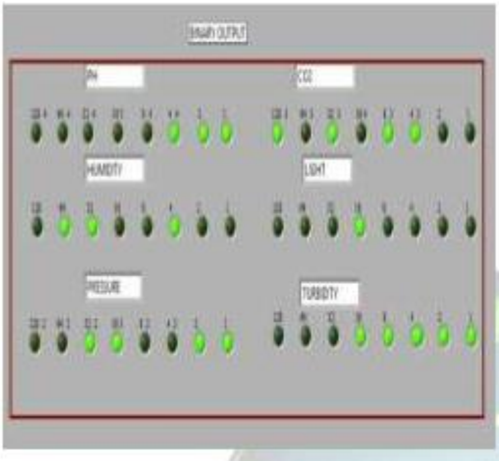

**Figure 6:** Equivalent binary output

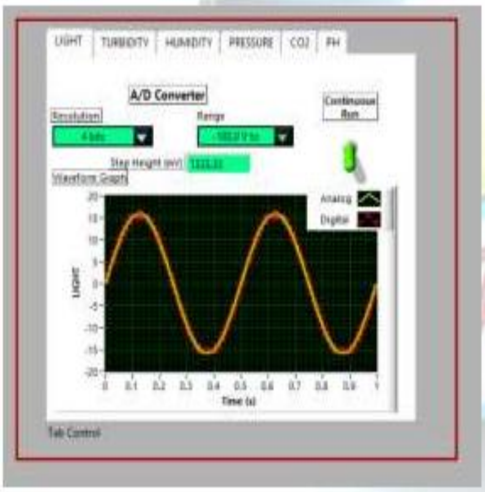

**Figure 7:** Output waveform

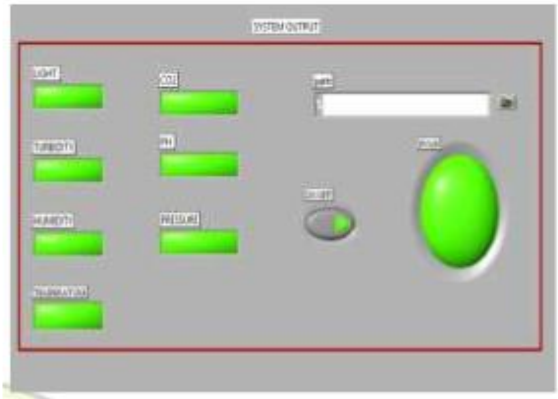

**Figure 8:** Output of the system when all sensors meet threshold

## 5. Conclusion and Future Work

This describes a reconfigurable smart sensor interface for industrial WSN in IOT environment. The system can collect sensor data intelligently. It was designed in LabVIEW. Various analog and digital sensors are implemented in LabVIEW. Various sensors like digital temperature sensor, turbidity sensor, ph sensor, CO2sensor, light sensor, humidity are implemented in LabVIEW and graphs are plotted for each sensor. Digital value of each sensor is obtained. Each sensor has certain threshold limit. If any one of the sensor does not satisfy threshold limit an alarm sound is played indicating which sensor is not satisfying the limit. Web publishing tool is used to control inputs over web page. But hosting is done within the internal server. We have to use arduino board completely implementing these sensor values over internet.

## References

[1] S. Li, L. Xu, X. Wang, and J. Wang, “Integration of hybrid wireless networks in cloud services oriented enterprise information systems,” Enterp. Inf. Syst., vol. 6, no. 2, pp. 165–187, 2012.

[2] Q. Li, Z. Wang, W. Li, J. Li, C. Wang, and R. Du, “Applications integration in a hybrid cloud computing environment: Modelling and platform,”Enterp. Inf. Syst., vol. 7, no. 3, pp. 237–271, 2013.

[3] L. Wang, L. D. Xu, Z. Bi, and Y. Xu, “Data cleaning for RFID and WSN integration,” IEEE Trans. Ind. Informat., vol. 10, no. 1, pp. 408–418, Feb. 2014.

[4] Y. Fan, Y. Yin, L. Xu, Y. Zeng, and F. Wu, “IoT based smart rehabilitation system,” IEEE Trans. Ind. Informat., vol. 10, no. 2, pp. 1568–1577, 2014.

[5] W. He, G. Yan, and L. Xu, “Developing vehicular data cloud services in the IoT environment,” IEEE Trans. Ind. Informat., vol. 10, no. 2,pp. 1587–1595, 2014.

[6] M. T. Lazarescu, “Design of a WSN platform for long-term environmental monitoring for IoT applications,” IEEE J. Emerg. Sel. Topics Circuits Syst., vol. 3, no. 1, pp. 45–54, Mar. 2013.

[7] L. Xu, “Introduction: Systems science in industrial sectors,” Syst. Res. Behav. Sci., vol. 30, no. 3, pp. 211–213, 2013.

[8] Z. Pang et al., “Ecosystem analysis in the design of open platformbasedin-home healthcare terminals

towards the internet-of-things," in Proc. IEEE 15th Int. Conf. Adv. Commun. Technol. (ICACT), 2013,pp. 529–534.

[9] L. Benini, "Designing next-generation smart sensor hubs for the Internetof-Things," in Proc. 5th IEEE Int. Workshop Adv. Sensors Interfaces (IWASI), 2013, p. 113.

[10] Y. Chen and V. Dinavahi, "Multi-FPGA digital hardware design for detailed large-scale real-time electromagnetic transient simulation of power systems," IET Gener. Transmiss. Distrib., vol. 7, no. 5,pp. 451–463, 2013.