The Smart Innovation in Industrial Data Acquisition System Using IOT

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***Abstract*—**Presently a day Internet of Things is all of a sudden expanding innovation. IOT is the system of physical question or things inserted with programming sensors, gadgets and system availability. IOT is utilized to gather data and trade information. In this paper, we are building up a framework which will naturally screen the mechanical applications. IOT has given a capable method to fabricate modern framework by utilizing remote gadgets, and sensors. IOT idea is to screen and control the business. In stage I the hard product was outlined effectively utilizing IOT. The contribution from sensor and information yield can be shown in the LCD (16*2).microcontroller (PIC16F887) which is utilized to gather information from sensors and showed in LCD. The showed information can be seen by server utilizing IOT. The exhibitions are confirmed tentatively utilizing IOT. In Phase II the information from the server can be screen through PC .The modern information can be seen through URL.

Keywords - *Internet of Things, industrial applications, microcontroller, health care parameters, personal computer.*

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I. INTRODUCTION

In earlier year, Industry was observed physically, however this paper acquaints Artificial Intelligent with screen and control the Industry independently without human intercession. Presently a days by utilizing RFID perusers, individuals can distinguish, track, and screen any items appended with RFID labels consequently. Another innovation is the remote sensor systems (WSNs), which principally utilize interconnected clever sensors to detect and checking. Its applications incorporate ecological observing, mechanical checking, activity observing. Both RFID and WSN are utilized to create IoT(internet of things). RFID innovation, which enables microchips to transmit the recognizable proof data to a peruser through remote correspondence.

II. LITERATRURE SURVEY

[1] Gas turbines become a work horse throughout the world for various industrial applications. Their reliability, operating efficiency and cost can be optimized with predictive maintenance. Proper calibration of the turbine's control system is critical to its safe operation, reliability, and minimization of operational costs. A faulty control system can quickly destroy expensive components of the gas turbine during just one improper startup cycle. In the early 1980's, as the personal computer (Pc) became available, PC based data acquisition systems migrated out of the laboratory and in to industry. The cost of installing a data acquisition system on a gas turbine control system was high. It was uneconomical to place such a system on a gas turbine that was used only occasionally, such as an electric utility's peaked unit. A data acquisition system that could be moved from unit to unit could be economical method of envying a control system's calibration and monitoring a gas turbine's performance.Such a portable data acquisition and analysis system was developed in 1985 by the author and another individual employed at Golden Valley Electric Association, a rural electric cooperative in interior Alaska. Its development was begun as a hobby, something which was fun as well as useful.[2]It eliminates costly and time consuming cable lying for new and retrofitting of existing project. This wireless conduit is an interference free link between remote devices and control room, it is ideal for a noisy industrial environment. The subject of this paper deals with monitoring, controlling, and acquiring data continuously from an industrial process using this wireless conduit. The authors plan to demonstrate the interfacing of an industrial process, transducers, and final control elements to a remotely located Computer controlled data acquisition system. The monitoring and controlling of remote process via a reliable link without sacrificing the data integrity and loss of ability to analyze the acquired data will .be discussed. We are proposing to show how this wireless conduit is a two-way monitoring and controlling solutions for a variety of industrial application in heavy interference environment where other radios fail to perform. [3Data Acquisition Systems have an important role in the market today as many leading companies like National Instruments have specialized in the making of such devices. This paper deals with building a low cost system with components easily obtained in the market. It's more like a walk through tutorial of how to construct an advanced system with these components[4In order to monitor industrial parameters such as the temperature, pressure, and humidity more intuitively, a Multi-channel data acquisition system is

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designed. In the system, AT89S52 is used to control the LCD that displays different parameters with different colors. The system is composed of these components: MCU, data acquisition device, analog signal amplifier, A/D converter, and intelligent color LCD. The data acquisition module can collect temperature (AD590), pressure (MPX10DP) and humidity (HM1500). MCU communicates with LCD via serial interface. C language issued to compile and develop the software.[5] In this paper, a portable IoT (Internet of Things)device developed based on a single-board-computer Raspberry Pi and the extend-sensor board is presented and the positional information system is presented with the data log system based on the portable IoT device and RT-Middleware. First, the potable IoT device developed based on a single board computer and various sensors for data acquisition is explained. Then, Hand loop based database system for the obtained data is presented with RT-Middleware. Next, RTCs for the data log system are explained and the positional information system for visualizing the obtained GPS data on the Google map is proposed based on the data log system and RT-Middleware, where the GPS data is filtered based on its validity. Finally, some concluding remarks are pointed out.

III. PROPOSED SYSTEM

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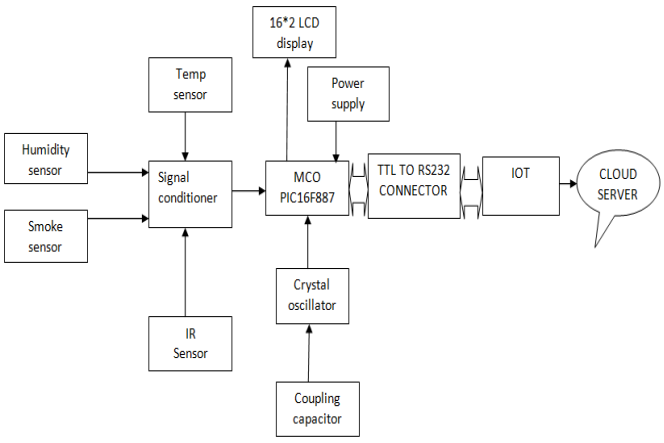

Fig 1: Transmitter Side

Power Supply

The ac voltage, typically 220V RMS, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

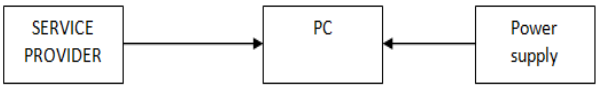

Fig 2: Receiver Side

Bridge Rectifier

At the point when four diodes are associated as appeared in figure, the circuit is called as scaffold rectifier. The contribution to the circuit is connected to the askew inverse corners of the system, and the yield is taken from the staying two corners. Give us a chance to expect that the transformer is working appropriately and there is a positive potential, at point An and a negative potential at point B. The positive potential at point A will forward inclination D3 and turn around predisposition D4. The negative potential at point B will forward inclination D1 and turn around D2. Right now D3 and D1 are forward one-sided and will enable current stream to go through them; D4 and D2 are turn around one-sided and will piece current stream. The way for current stream is from point B through D1, up through RL, through D3, through the auxiliary of the transformer back to point B. this way is demonstrated by the strong bolts. Waveforms (1) and (2) can be seen crosswise over D1 and D3.One-half cycle later the extremity over the optional of the transformer invert, forward biasing D2 and D4 and turn around biasing D1 and D3. Current stream will now be from point A through D4, up through RL, through D2, through the auxiliary of T1, and back to point A. This way is shown by the broken bolts. The present move through RL is dependably a similar way. In moving through RL this current builds up a voltage relating to that indicated waveform (5). Since current moves through the heap (RL) amid both half cycles of the connected voltage, this scaffold rectifier is a full-wave rectifier.

Sometimes there is no need to send the entire range of voltages from a sensor to the analog-to-digital converter (ADC). Instead, many times a sensor is used simply as a switch. Figure 40 contains a circuit called a comparator which takes an analog sensor voltage and compares it to a threshold voltage, If the sensor's voltage is greater than the threshold, the output of the circuit is maximum (typically 5V). If the sensor's output is less than the threshold, the output of the circuit is minimum (usually 0V). The threshold voltage is set by adjusting the potentiometer labeled . The output of the sensor can also be reduced by using the resistor divider network as shown if desired. Notice that the circuit has a positive feedback resistor which assures that the output of the comparator will swing quickly and completely from maximum output to minimum output (also called ``rail to rail").

Humidity Sensor

Stickiness is the nearness of water in air. The measure of water vapor in air can influence human solace and also numerous assembling forms in ventures. The nearness of water vapor

likewise impacts different physical, compound, and natural procedures. Mugginess estimation in ventures is basic since it might influence the business cost of the item and the wellbeing and security of the work force. Henceforth, moistness detecting is critical, particularly in the control frameworks for mechanical procedures and human solace. Controlling or observing mugginess is of vital significance in numerous mechanical and household applications. In semiconductor industry, dampness or dampness levels should be appropriately controlled and observed amid wafer handling. In restorative applications, dampness control is required for respiratory equipment's, sterilizers, hatcheries, pharmaceutical preparing, and organic items. Moistness control is likewise essential in compound gas purging, dryers, stoves, film drying up, paper and material generation, and nourishment handling. In farming, estimation of mugginess is essential for ranch insurance (dew avoidance), soil dampness observing, and so forth. For local applications, mugginess control is required for living condition in structures, cooking control for microwaves, and so on. In every single such application and numerous others, dampness sensors are utilized to give a sign of the dampness levels in the environment.Signal Conditioning Circuits

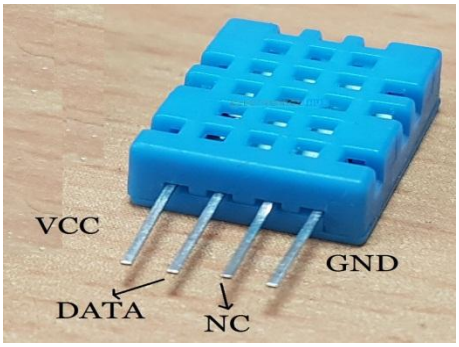

Fig 3: DHT11 Humidity Sensor

Temperature Sensor

The LM35 arrangement are exactness incorporated circuit temperature sensors, whose yield voltage is straightly corresponding to the Celsius (Centigrade) temperature. The LM35 in this manner has preference over straight temperature sensors adjusted in ° Kelvin, as the client isn't required to subtract a vast steady voltage from its yield to get helpful Centigrade scaling. The LM35 does not require any outside adjustment or trimming to give run of the mill exactnesses of ±¼°C at room temperature and ±¾°C over a full - 55 to +150°C temperature extend. Minimal effort is guaranteed by trimming and alignment at the wafer level. The LM35's low yield impedance, direct yield, and exact innate alignment make interfacing to readout or control hardware particularly simple. It can be utilized with single power supplies, or with in addition to and less supplies. As it draws just 60 µA from its supply, it has low self-warming, under 0.1°C in still air. The LM35 is evaluated to work over a - 55° to +150°C temperature go. An advanced thermometer can be effectively made by utilizing LM35 temperature sensor and can be interfaced any microcontrollers. The LM 35 IC creates a 10mV variety to its yield voltage for each degree Celsius change in temperature. The Output of the temperature sensor is simple in nature so we require a simple to computerized converter for changing over the simple contribution to its proportionate parallel yield. The ADC 0804 is the simple to advanced converter IC utilized as a part of the undertaking. 0804 is a solitary channel converter which changes over the simple contribution up to a scope of 5V to an identical 8-bit twofold yield.

Flame Sensor

A flame detector is a sensor designed to detect and respond to the presence of aflame or fire. Responses to a detected flame depend on the installation, but can include sounding an alarm, deactivating a fuel line (such as a propane or a natural gas line), and activating a fire suppression system.

Temperature Sensor

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full -55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a -55° to +150°C temperature range. A digital thermometer can be easily created by using LM35 temperature sensor and can be interfaced any microcontrollers. The LM 35 IC generates a 10mV variation to its output voltage for every degree Celsius change in temperature. The Output of the temperature sensor is analog in nature so we need an analog to digital converter for converting the analog input to its equivalent binary output. The ADC 0804 is the analog to digital converter IC used in the project. 0804 is a single channel converter which converts the analog input up to a range of 5V to an equivalent 8-bit binary output.

MAX 232

The MAX232 IC is utilized to change over the TTL/CMOS rationale levels to RS232 rationale levels amid serial correspondence of microcontrollers with PC. The controller works at TTL rationale level (0-5V) though the serial correspondence in PC deals with RS232 principles (- 25 V to + 25V). This makes it hard to build up an immediate connection between them to speak with each other. The halfway connection is given through MAX232. It is a double driver/collector that incorporates a capacitive voltage

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generator to supply RS232 voltage levels from a solitary 5V supply. Every recipient changes over RS232 contributions to 5V TTL/CMOS levels. These beneficiaries (R1 and R2) can acknowledge ±30V inputs. The drivers (T1 and T2), likewise called transmitters, change over the TTL/CMOS input level into RS232 level. The transmitters take contribution from controller's serial transmission stick and send the yield to RS232's collector. The recipients, then again, take contribution from transmission stick of RS232 serial port and give serial yield to microcontroller's beneficiary stick. MAX232 needs four outside capacitors whose esteem ranges from 1µF to 22µF.

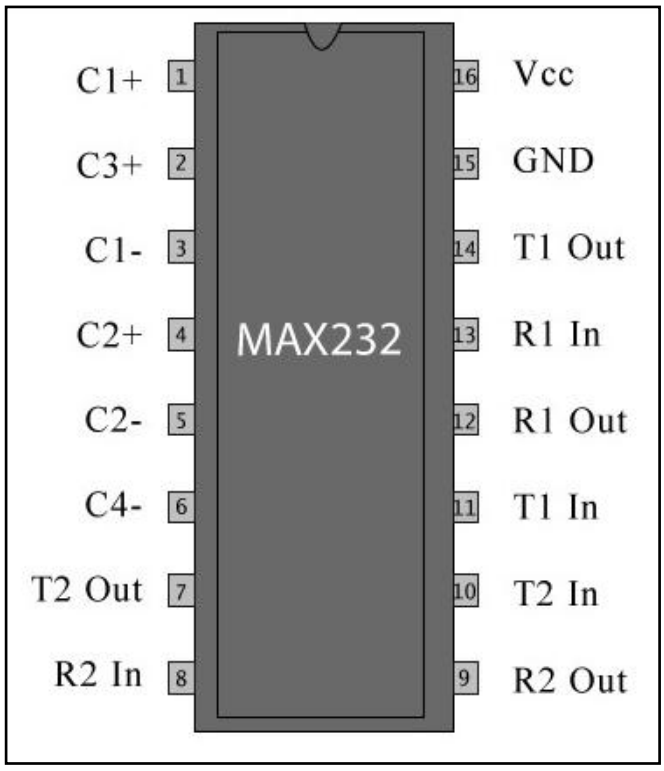

Fig 4 Pin Diagram – MAX 232

GSM Module

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. A GSM modem can be an external device or a PC Card / PCMCIA Card. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. As mentioned in earlier sections of this SMS tutorial, computers use AT commands to control modems. Both GSM modems and dial-up modems support a common set of standard AT commands. You can use a GSM modem just like a dial-up modem's provides recommendations, not requirements. The GSM specifications define the functions and interface requirements in detail but do not address the hardware. The reason for this is to limit the designers as little as possible but still to make it possible for the operators to buy equipment from different suppliers. The GSM network is divided into three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS). The basic GSM network elements are shown in below figure Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. As mentioned in earlier sections of this SMS tutorial, computers use AT commands to control modems. Both GSM modems and dial-up modems support a common set of standard AT commands.

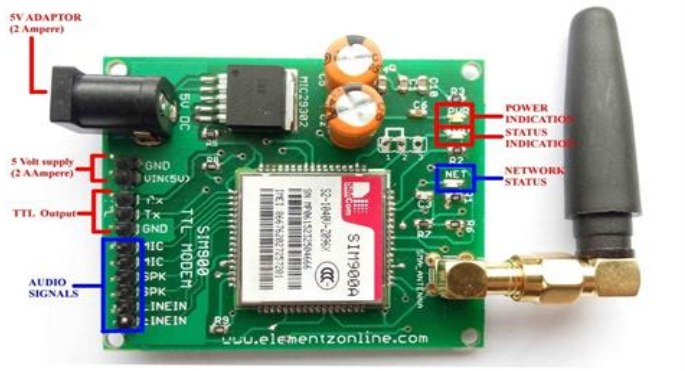

Fig 5 SM9100 Module

IV. DESIGN METHODOLOGY

In the proposed framework we introduce a wellbeing observing framework that uses the sensors for gathering information from patients, wisely predicts patient's wellbeing status and gives criticism to specialists through their cell phones having android application. The patients will take part in the medicinal services process by their cell phones and in this way can get to their wellbeing data from anyplace whenever. Patient's information (temperature, heart rate, ECG, position) will be much of the time estimated and sent to server as appeared in the figure. Time of sending (say each 1 min) can be set. Checking individual learns persistent particular limit. Say the general body temperature of a patient is 24°C while one individual feels hot if his body temperature is 32°C. By utilizing an averaging system over a generally prolonged stretch of time, Observer can take in these edges for patients. By utilizing the framework the human services experts can screen, analyze, and guidance their patients constantly. The wellbeing parameters information are put away and distributed on the web. Henceforth, the medicinal services proficient can screen their patients from a remote area whenever. Our framework is basic and patient's information can be effortlessly gotten to.

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In this design, the PIC microcontroller is used as a gateway communicate to the various sensors such as temperature sensor, heartbeat sensor, ECG sensor, sensor for keeping a track of drip level (blood or saline).The microcontroller picks up the sensor data and sends it to the network through a Wi-Fi and hence provides real time monitoring of the health care parameters for doctors.

V. RESULTS AND DISCUSSIONS

At the initial stage it displays as shown in the Fig1 where it displays the name of the project.

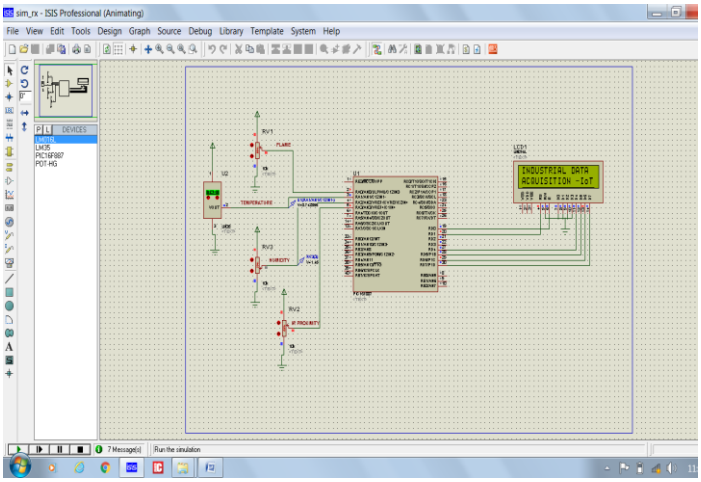

Figure 6: output of Stage 1 simulation

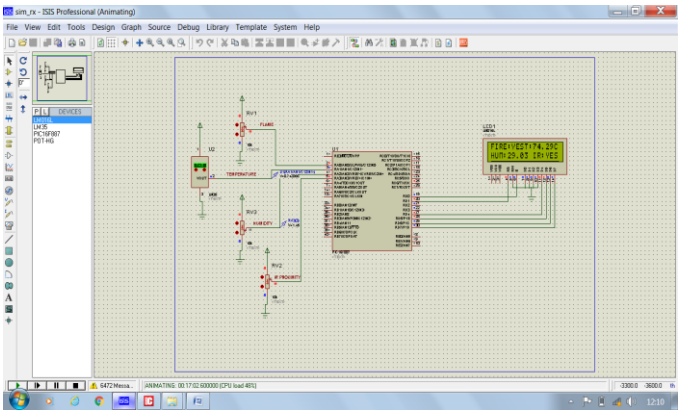

Figure 7: output of Stage 2 simulation

Figure 8: output of visualized graphically through URL

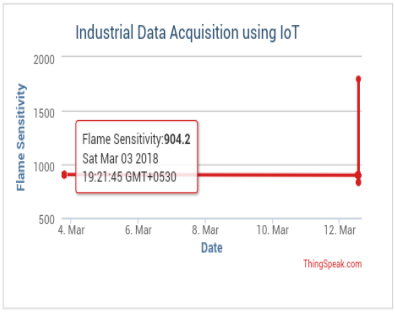

Figure 9: Project proposed model output

VI. CONCLUSION

Earlier we can only monitor the situations with the help of cameras. In industries to reduce manual overhead we have implemented Internet of Things (IoT) in Industry to monitor as well as to inform the responsible person to take appropriate measures, but this will partially fulfill our requirement. As sometimes it will be late in this process and it will harm to property as well as life. For this purpose we are developing a system for Novel Industrial Data Acquisition System Using IOT with the help of Artificial Intelligence to make system automated which will take intelligent decisions.

The Future work of this project is very essential in order to make the design system more advanced. In the designed system the enhancement would be connecting more sensors to internet which measures various other industrial parameters and would be beneficial for industry monitoring i.e. connecting all the objects to internet for quick access. The data is stored in cloud server through internet. The data from the server can be monitor through personal computer or URL.

VII. ACKNOWLEDGMENT

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