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Industrial Automation using Sensing based Applications for Internet of Things

Geetesh Chaudhari[1], Sudarshan Jadhav[2], Sandeep Batule[3,] Sandeep Helkar[4]

Student, Computer Engineering, AISSMS COE, Pune, India[1,2,3,4]

Abstract: The internet of things is a network of physical object that contain embedded technology essence communicate with extrinsic environment. The industrial internet of thing is part of internet of thing that focuses on devices and object used in business setting. It helps to connect everything around you to internet including wearable devices, metering devices and environmental sensor. These devices will connect to internet to share different types of data. We have proposed Industrial Automation using cloud computing and sensing based applications for Internet of Things. In these paper we use sensing device to check different behaviour like fire, humidity, temperature of room.

Keywords: industrial automation, sensing based applications, internet of things, etc.

I. INTRODUCTION

There are many things we hear about industrial internet of things as it is new emerging technology. We use sensors to continuously monitor industry appliances which is highly impossible to manage by human. We are going to develop auto-monitoring system to generate alert and notification through email and SMS on any digital(Computer and smartphone) device. In these paper we also automise notification and alter system through buzzer.

Cloud computing is used to run software application and data storage on online. Three basic building block of cloud computing computing namely Software as a service(SAAS), Platforms a service(PAAS), Infrastructure as a service(IAAS). Cloud are classified in four different type Public, Private, Hybrid, Community cloud.[2] We are going to used private cloud type as private cloud provide an ideal way of security. In are project we are just going to use service of cloud to store sensor data, so we use SAAS cloud model as there is no need to create any cloud environment. [1]SaaS is typically accessed by any users as it is common delivery model for many business applications.

II .LITERATURE SURVEY

The concept of the internet of things was introduced by the members of the radio frequency identification development community in 1999.[2] This concept is very popular because of growth of mobile devices, embedded and real time communication, cloud computing and data analytics. The internet of things is a network of physical objects are embedded with electronics, software and sensors having the ability to collect data from the world around us and share data across the internet.

The term internet of things refers to the general idea of things, especially everyday objects that are readable, locatable, recognizable, addressable and controllable through the internet, irrespective of the communication means such as wired or wireless LAN, WAN or any mean.

The things or objects of real world can be
1. People
2. Location (object)
3. Time of information (object)
4. Condition

These things can easy get integrated in virtual world enabling anytime, anywhere connectivity. Now the system architecture also includs different types of elements which shown in following.

1. **Sensors**
The sensors are the devices that are useful for gathering the information at the point of activity. This information is actually captured by appliances, wearable devices, some specific device mounted controls, and so on[6]. Thus these are the elements of IOT that sense any type of information depending upon purpose of the application.

2. **Communication**
The information sensed by various sensors need to be transmitted to a cloud based service for subsequent processing. This require either Wi-Fi, WAN, LAN or some internet communication network. Along with this communication networks the support for other capabilities such as Bluetooth, short range communication method or GPS for locating the positions is often required for the effective communication[4]. The communication network is typically based on the M2M technique. The M2M stands for machine to machine communication system in which at one end sensors are attached to sense any desired information and at other end the devices that deliver the information to the actual user are attached.

3. **Cloud based capture and consolidation**
Gathered data is transmitted to a cloud based service. At this cloud, the useful information is provided for the end user. Some information processing is also done at this level.

4. **Delivery of Information**
This actually last step of delivery. This is point at which end user, commercial user or industrial user comes in picture. The goal of delivery of information is to provide information in as simple and transparent manner as

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possible[5]. The delivery of information typically needs the execution of well-designed and optimized user interface across multiple platforms. The delivered information should run on various operating systems such as iOS, Android, Windows and Linux and so on.

III.PROPOSED ARCHITECTURE

Iiot is an acronym for Industrial internet of things. The industrial internet of thing is a network that is used for monitoring industrial appliances.IIOT incorporates machine learning and big data technology, harnessing the sensors data. This technology allow us to monitor business appliances:

- For the first time users have to register to enter into the system.
- Afterwards, when system starts user needs to log in to the system using username and password. After verifying credentials entered by user system allows user to enter into the system.
- Here we store all user information in database which is cloud server.
- Cloud server consist following :
  - Admin(Alert):- To Control the all over system and pass message in cloud server.
  - Technician:- When any type of problems occurs in cloud server technician can solve it.
  - Remote Monitoring:- Work automatically using sensors.
  - Decision Maker:- It take decision of sending alert via SMS/Mail.

Connections:-There are two type of connections used in system architecture.

1. Wi-Fi connection :- Android applications and Cloud server are connected to each other using Wi-Fi/ internet connections.
2. Bluetooth :- Android applications are connected to hardware by using Bluetooth connections.

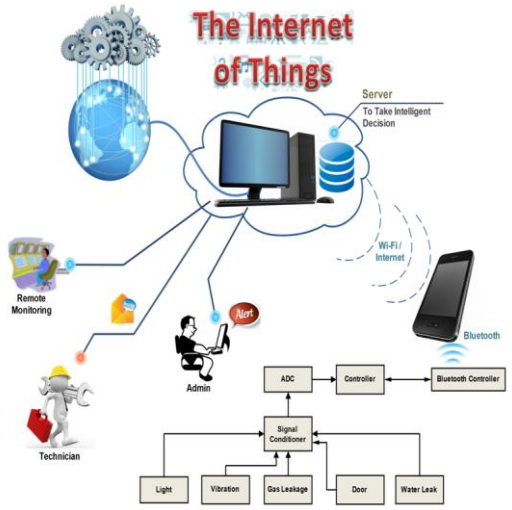

Fig: proposed system architecture

Hardware Architecture: -

Hardware consist of:-

- Microcontroller.
- Sensor Array
  1. Light ,Gas.
  2. Vibrations.
  3. Door.
  4. Water Leak.
- ADC(Analog to digital converter)

IV.MATHEMATICAL MODEL

Let S be main set theory,
Then

S={user, sensors, devices, threshold, uname, password, mob_no, email_id, adc_value, nodes, alert_details, f)

Where,
User-->user1, user2,.....i{finite set of system users}

Uname1-->uname1, uname2.....i{finite set of usernames of the user in the system}

Password --> password1, password2,.....i {Finite set of users password in the system}

Sensors --> s1, s2.....i{finite set of sensors connected to the hardware node}

Devices-->device1, device2.....i{finite set of devices connected to the hardware node}

Threshold-->threshold1, threshold2,.....i {finite set of threshold values set against each sensor}

Nodes-->node1, node2.....i{finite set of nodes connected to the system}

Mob-no-->mob_no1, mob_no2.....i {finite set of numbers to send sms at time of alerts}

Email_id-->email_id1, email_id2.....i {finite set of email_id to send mail at time of alerts}

Adc_value-->adc_value1, adc_value2,.....i {finite set of system adc values}

F:authenticate_user(), interface_hardware(), acquire_sensor_values(), apply_threshold(), control device(), generate alert(), send_sms(), send_email()

Yes/no-authenticate_user()-The function will authenticate the system user.

Interface_h/w()-It will establish connection between android device and hardware.

Acquire_sensor_values()-It will read the adc value of sensor.

Apply_threshold()-It will detect whether the adc value crosses the threshold.

Control_device()-It will control the h/w device.

Generate_alert()-It will generate alert.

Send_sms (alert_details,mob_no)

Send_email(alert_details,email_id)

V.FEASIBILITY

Technical feasibility

This project is specially designed for authorized users can

use the network and start secure communication online through internet from in the periphery of the existing network. The project is technically feasible. The system consists client server architecture and coded in java which are easily available. This system has no technical risk. All the resources that are required for the system can be easily available.

Economical Feasibility

Economical feasibility is the evolution of the development cost weighted derived from the developed system the resources that are required for the system can be available easily. The system developed is basically developed for study purpose so economic feasibility is not a major issue

Cost-Benefit Analysis

This includes an evolution of the development cost weighted against the ultimate income derived from the developed system.

Various expenditures needed in this project are as follows:-

1. Actual equipment purchase or lease costs. This includes the cost of computer System, Android Mobile phone.
2. Cost of operating system installation.
3. Cost of application software.
4. Cost of data collection.

This system economically feasible, as this does not require network related readymade software and also does not require any external interface.

VI.APPLICATIONS

There are billions of devices connected by the internet and sensors. Following is a sample list of things that are based on the Internet of Things.

1. Monitoring and controlling of railway tracks, ship tracking systems.
2. Monitoring system for the air or water quality.
3. Earthquake or tsunami early warning systems.
4. Heating and air conditioning systems.
5. Entertainment and home security devices.
6. Smart traffic control or vehicle control system.
7. Electronic toll collection system.

VII.CONCLUSION

We are developing an industrial application using internet of things technology. We aim to provide an application for monitoring industrial appliance. We aim to serve as an efficient backbone for achieving a network of sensors and actuators which can help for improving the performances of the day to day gadgets/activities for industry use.

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BIOGRAPHIES

Geetesh Chaudhari is a student at AISSMS COE, Pune. He is pursuing Bachelors Degree in Computer Engineering in Savitribai Phule Pune University, Pune, Maharashtra, India.

Sudarshan Jadhav is a student at AISSMS COE, Pune. He is pursuing Bachelors Degree in Computer Engineering in Savitribai Phule Pune University, Pune, Maharashtra, India.

Sandeep Batule is a student at AISSMS COE, Pune. He is pursuing Bachelors Degree in Computer Engineering in Savitribai Phule Pune University,pune, Maharashtra, India.

Sandeep Helkar is a student at AISSMS COE, Pune. He is pursuing Bachelors Degree in Computer Engineering in Savitribai Phule Pune University, Pune, Maharashtra, India.