

IoT Based Machine Learning Approach for Industrial Environment Using Cloud Computing

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ABSTRACT

Internet of Things (IoT) is a technology that makes use of control systems such as computer to control the physical devices, industries, vehicles, buildings over the internet. Here we propose efficient industry automation machines over the internet. The IoT is comprised of smart machines interaction with other machines, objects, environments and infrastructure. In the industries huge amount of data are generated. The data is being processed into useful actions . These actions can be command and control things to make our lives much easier and safer. We are using different sensors to collect the data from the industries. The data is analysed through sensors. The data is stored on the cloud database. That data is being checked by normal and abnormal conditions through the machine learning approach. If any abnormal condition occurs then, the notification will send to the android application. Then the higher authority like supervisor or manager can control and know about the abnormal and any critical situation.

Keywords— IoT, Sensors, Smart industries, SVM, IOT and Cloud.

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I. INTRODUCTION

Project Idea:

IoT and Cloud Computing are hot topics. Now a days, a lot of data is stored on cloud from various IoT devices and sensors attached to it. But a smart system has to be developed which will recognize which data is normal and which is abnormal before sending it to the cloud. To solve this problem, IoT based smart Industrial environment recognition system as out project.

Motivation of the Project:

Now a days, there are lots of inventions occurred in the different environments. For the industrial purpose there is much wider use of industrial approaches. In case, the light remains on in the industry or door may be open and the manager or supervisor is unaware about these all incidences then the things can be controlled by industrial handling approach.

II. LITERATURE SURVEY

2.1 A comprehensive study of security of Internet-of-Things

This technique was proposed in 2017 by A. M. Nia and N. K. Jha where Internet of Things (IoT), also referred as the Internet of Objects, is envisioned as a transformative approach for providing numerous services. Smart devices are the essential part of IoT. This technique widely used in size, energy, capacity, and computation power. However, the integration of these smart things into the standard Internet introduces several security challenges because the majority of Internet technologies and communication protocols were not designed to support IoT. Moreover, commercialization of IoT has led to public security concerns, including personal privacy issues, threat of cyber-attacks, and organized crime. The guideline is for those who want to investigate IoT security and contribute to its improvement. This survey attempts to provide a comprehensive list of vulnerabilities and counter measures against them on the edge side layer of IoT, which consists of three levels (i) edge nodes, (ii) communication, and (iii) edge computing. To achieve this goal, we briefly describe three widely known IoT reference models and security in the context of IoT. Firstly, there are many possible

applications of IoT and potential motivations of the attackers who target this new paradigm. Secondly, different attacks and threats are seen here. Thirdly, we describe possible counter measures against these attacks. Finally, two emerging security challenges are not yet explained in detail in previous literature.

2.2 A survey of Internet-of-Things: Future vision, architecture, challenges and services

In 2014 Dhananjay Singh, Gaurav Tripathi and Antonio J. Jara published this paper which explains IoT is the convergence of Internet with RFID, Sensor and smart objects. IoT can be defined as things belonging to the Internet to supply and access all of real world information. Billions of devices are expected to be associated into the system and that shall require huge distribution of networks as well as the process of transforming raw data into meaningful inferences. IoT is the most promising technology in real world, but still lacking a novel mechanism, which can be perceived through the lenses of Internet, things and semantic vision. Paper represents a novel architecture model for IoT with the help of Semantic Fusion Model (SFM). The architecture introduces the use of smart semantic framework to encapsulate the processed information from sensor networks. To make the system an intelligent the smart embedded system is having semantic logic and semantic value based information. Paper represents a brief information on applications based on Internet, services, visual aspect and challenges for Internet of things using RFID, 6lowpan and sensor networks.

2.3 Smart Home Energy Management System using IEEE 802.15.4 and ZigBee

In 2010 Dae-Man Han and Jae-Hyun Lim published the work which mainly explains Wireless personal area network and wireless sensor networks are rapidly gaining popularity, and the IEEE 802.15 Wireless Personal Area Working Group has defined possibly similar to standards so as to fulfill the requirements of different applications. The pervasive home network has gained widespread attention due to its complete integration into everyday life. The proposed innovative system transparently unifies various home appliances, smart sensors and energy technologies. Two types of ZigBee networks are required by the smart energy market. The domain application of control introduced in this initial version are sensing device control, pricing and demand response and load control applications. The proposed home energy control systems design provides intelligent services for users and its implementation is demonstrated using a real testbed.

2.4 IoT Based Monitoring and Control of Appliances for Smart Home

In 2016 Praveen Kumar and Umesh Chandra Pati published a work which mainly studies :The recent technology in home automation provides security, safety and comfortable life at home. That's the reason why competitive environment and fast world, home automation technology is required for every person. As per the given home automation system, it provides smart monitoring and control

of the home appliances as well as door permission system for interaction between the visitor and home or office owner. To implement the control and monitoring status (ON/OFF of the appliances) there are multiple ways such as internet, electrical switch, and Graphical User Interface (GUI). The system composed with the few features like low-cost design, user-friendly interface, and easy installation in home or multi-purpose building. According to this system, the consumer can reduce the wastage of electrical power by regular monitoring of home appliances or the proper ON/OFF scheduling of the devices.

III. PROPOSED SYSTEM

Problem Statement

In previous years, there is no use of IoT for the industrial automation. So there is too much work load on supervisor to handle all over data. Because of this there is too much load on the management like supervisor, manager or any other supporting staff. The supervisor can handle or detect anytime any of the normal or abnormal conditions through the android phone. The system which we are developing is totally based on IoT. Without IoT data we cannot do anything. The main problem occurred only when the work of sensors is not proper. By this system failure may occurred.

Goals and objectives

- To fetch sensor data using Arduino.
- To send sensor data to server using ESP8266.
- Generate Training dataset with two classes normal and abnormal
- Perform Machine Learning using SVM
- Send Abnormal Environment alert to concerned authority using cloud.
- Send Command to IoT after Abnormal Environment.
- Perform Command on IoT

Statement of scope

- IOT: The system can be used to collect sensor data and pass it to the server using Arduino and ESP8266.
- Machine Learning: The System can be used to analyze sensor data in two classes abnormal and normal using SVM and training dataset that is generated manually by us.
- Cloud Computing: The System can be used to send alert to concerned authority and keep log of the abnormal environment readings.

IV. SYSTEM ARCHITECTURE

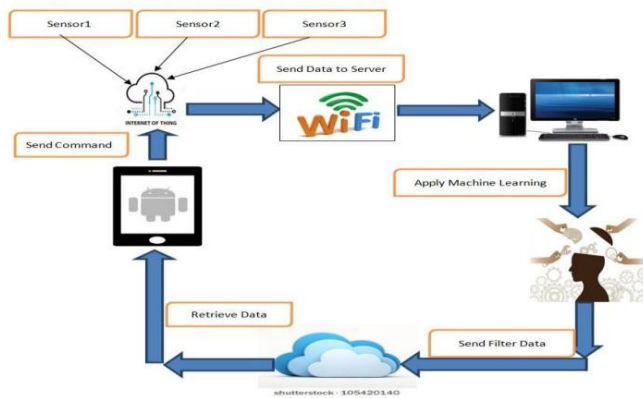


Fig. System Architecture

V. CONCLUSION

Using this methodology, we are developing a novel approach to provide Smart Industrial Environment Detection system. The basic idea of the project is integrating IoT, Machine Learning and cloud computing together to achieve a user independent industry handling system. We have assembled mobile computing, cloud computing and desktop together to build a whole new system which is secured and reliable. It is more intelligent in recognizing harmful environments in a day to today industry structure.

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