Integration of AI with IOT in Hybrid Cloud for Security

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Abstract

This research has considered role of AI with IOT to provide security to industry on hybrid cloud environment. Proposed system will secure industries from the loss caused by fire. Here we are going to consider fire signals captured that should be transferred to the event database after detection in the IOT system using artificial intelligence. The system would be smart enough to trigger a fire alarm after detection of a fire event. Moreover it would transmit signals to the fire brigade too. Proposed System will smart enough that user can remotely access the entire appliance to make our industry more efficient. Proposed system will also sense the presence or absence of the human being. In this we are going to consider presence or absence as an event. Proposed system will be secure enough for any suspicious vehicle in the industries. This system will capture vehicle Registration number or Vehicle information and then this registered data will further match in the existing database in the IOT system.

Keywords: Hybrid cloud, IoT, AI, Industrial automation.

1. Introduction

1.1 Internet of Things (IOT)

The **Internet of Things** (**IOT**) becomes a structure of visible properties and items. Hardware, software, automobile, premesis and lots of other material make this structure. All of these things are implanted in the company of computerized hardware, computer programs, sensing elements, network connectivity. Due to this, these materials are able to accumate and transfer data. It becomes possible to sense and manage objects at a certain distance under the existing system structure. It povides opportunity in favor of direct combination of external world in the company of computer based systems. It increases performance, consistency & cost effective adavantages. When internet of things is build up in the company of sensing elements, control devices it becomes an example of broad category of computerized geological machine. It contains technical equipment which makes automatic control of home appliances, smart grids, intelligent building, smart transportation and intelligent cities possible. With the help of computing system enclosed by a particular object it is possible to identify each object in a unique way. But for this purpose it is essential that these systems are engaged in the company of Internet infrastructure. Up to year twenty twenty it is expected that internet of things will consist of nearly fifty thousand million objects.

1.2 Artificial Intelligence

Artificial intelligence is the intelligence that has been put in the machines to tackle the general challenges. In machine learning, a machine observes the data, direct experience, and instruction. It has been done to create the patterns in data. After observation, the machine can formulate better decisions for future operation. This better decision is made on the base provided examples to the machine. The basic objective of AI is to make enable to the computers to learn automatically. It is possible without human intervention. One of the most important form in which the technology of artificial intelligence used is machine learning. It makes the probability of automatically learning efficiency possible to any. It improves the system from experience. The explicitly programming is not required by Machine learning. It is a process in which a device learns of observations.

1.3 Applications of AI

Use of artificial intelligence already becomes common in fields which are described below:

- Gaming: - The games made on the basis of this technology are already available in market. It means, technique of artificial intelligence is already used in Games. Some example on games in which this technology is used are chess, poker etc.
- Natural Language Processing: - AI based devices are also used to interact with computer. Such devices are applicable to understand the natural language. Such understand the language spoken by user.
- Systems of Expert: -Several devices system understandsthe different devices. Such systems are very advance and well coded. These systemsdescribe and provide the advice to user.
- Vision Systems: -Such systems are able to understand and take the visual input on computer.
- Speech Recognition: -Such AI base devices are also used to detect and categorizethe different voice.
- Handwriting Recognition: -Text written on paper, screens are read by the AI base systems. As well as such applications are able to recognize the shapes related to the letters. As well the editable text has been converted.

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- Smart Robots: - Robotic devices are electro mechanical device. These devices performs task that are allotted by a human. These devices are designed in order to perform different type of tasks. These robots are multipurpose manipulator. Different sensors are used in robot devices which perform automatically and on command.

1.4 Contribution of Artificial Intelligence in Internet of Things Application

In application connected with internet of things, technology connected with artificial intelligence gives significant contribution because implementation has been performed by the AI based systems. Internet of things has been known as a keen network of physical devices. It has been used in buildings, vehicles etc. Such devices are connected to electronics, software, sensors via network [1]. This connectivity allows such objects to receive and get the information. IOT based Security systems are developed for keeping money safe. The cost of storage has been large due to limited storage capacity of storage devices. Moreover, the recording of video data gets lost after 15 days. In this research objective is to provide more Security to the physical wallet with reduced storage cost.

The proposed model would tackle the above mentioned problems. This would provide security at remote location without need of human attention using image processing. This research would establishment of cloud environment to host application. Implementation of image capturing module works from two different dimensions to too boost the security. The size of captured frame sample would be reduced in order to save the storage space. Secondly any suspicious activity would be traced more quickly using edge detection mechanism during frame comparison in order to make system fast. After detection of suspicious activity signal would be forward to trigger the alarm so that urgent action could be made in reduce the changes of loss. This research is supposed to host web based application in cloud environment. The image compression technique is reducing size of image in order to save the storage space. Uses of Edge detection [2] mechanism allow fetching only comparable information make system fast.

2. Literature Review

Several models of related systems have been reviewed here. In 2020, S. M. Thaung et al.[1] on the basis of system which control health related issues remotely proposed an assessment of experimental Data. In 2020, L. Leong and S. Wiere[2] recognized pattern on the basis of wrist movements and safety issues related to intellectual IoT device which are weared on wrist and put them in written form. They showed that wearable IoT equipment can get on the unpretentious developments during composing. In 2020, So Hasegawa et al[3] discussed those methods of channel selection which are derived on the basis of machine learning. These methods

International Journal of Engineering Sciences Paradigms and Researches (IJESPR)
Volume 52, Issue 04 and Publication Date: 19th June, 2023
An Indexed, Referred and Peer Reviewed Journal
ISSN: 2319-6564
www.ijesonline.com

are put in to operation on that hardware of internet of things which are used for sensing purpose in coexisting internet of things Networks. It is estimated that in future, no of internet of things devices grow in a dramatic manner. Due to presence of large internet of things devices, large amount of traffic generates. In 2016, S. Charmonman [4]surveyed on IoT in Thailand. This article will talk about six arrangements of instances of IoT exercises in Thailand. In 2016,M. Babar et al.[5] discussed a secured Demand Side Management Engine for Smart Societies using Industrial internet of things and Big Data Analytics. In 2019, Saiful Islam, et al made a system on the basis of internet of things for controlling the rush of people public gathering like hajj . For this, they use Wemos D1 in the company of Machine Learning methods. In some situations lagre numbers of people's are gathered in a very small place. In 2019, Kirti Sharma, et al in the company of internet of things takes a literature survey in to account which was done over Machine Learning Fusion. James Brown and UtzRoedig made available to the general public a research work which was done in order to find out the effect of temperature on the transmission of internet of things. In 2014 a research was published tilted "Smart Security Solutions based on Internet of Things (IOT)" by Chirag M. Shah, Vamil. Sangoi and Raj M. Visharia. In 2015 Vinay sagar et_al described a wireless system in which home appliances are controlled automatically by menas of Internet. With the growth of computerise engineering, life becomes very simple and easy from different perspective. At present, in place of manual system, computerized systems are getting more attractions. In 2018, Pramathi J Navarathna, et al described role of artificial intelligence in the assessment of smart city and put it in to written form. It is expected, Artificial intelligence provides a significant help in the sustainable expansion of upcoming smart cities. A lot of contribution is provided by those fields of artificial intelligence which are already grown. In 2018, Yasuo KATO made a discussion on the usage of Artificial Intelligence (AI) in support of Cosmetics. From the last few years technology of artificial intelligence gets a lot of attraction. Technology of Artificial Intelligence is formed, when the engineering related to computer program and appliances are used in integration form. Deep learning represnts software

technology whereas GPU represents hardware technology. In 2018, Daniel Howard et al carried out an evaluation on responsible Artificial Intelligence the promise of Genetic Programming Multi-run Subtree Encapsulation. The solutions which are provided on the basis of deep learning and other Artificial Neural Network are hardly clear, Due to this white-box solutions becomes necessary. In this paper the manner in which Multirun Subtree Encapsulation offers identical white box solutions in order to support responsible Artificial Intelligence.
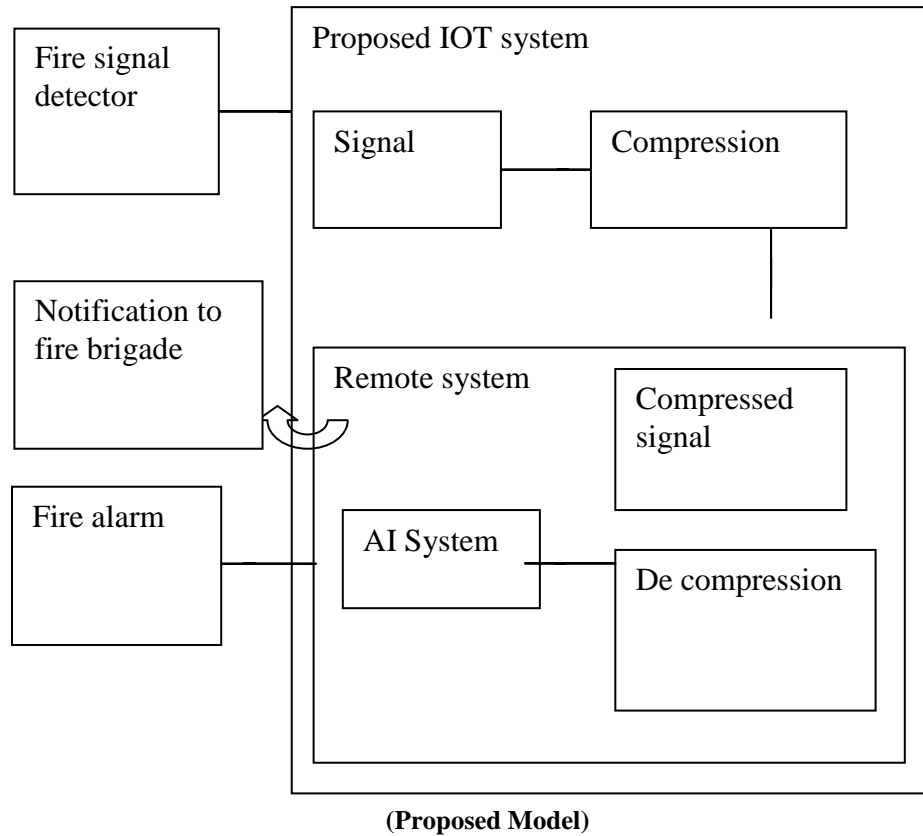
3. Proposed Work

The proposed work would be faster and space saving as compared to traditional mechanisms. Moreover there would be no need for manual observation. The system automatically notifies in case of fire event. Whenever an event of fire occurs it transmitted a warning sign in the direction of internet of things port which is operating on the server and linked with isolated records. The records related to event are upgraded and a detecting device is combined to the record. A clock signal examines the upgradation of records on hourly basis and gives a response in the direction of detecting device. As the actuator gets an update message it sends a signal to connected devices to inform them of fire event.

4. The proposed work consists of following steps

1. In this research camera captures smog signal when there is any fire event.
2. After capturing the signal it is compressed to eliminate the unnecessary data.
3. Proposed model after detecting and compressing smog signal would consider it fire event.
4. In case of such fire event, signal would be transferred to the internet ogf things port which is operating on the server and linked with isolated records.
5. The records related to event is upgraded and a detecting device is combined to the record
6. This actuator would be connected to the fire alarm

7. As the actuator gets an updating message it sends a signal to connected alarm and trigger it and sent notification to fire brigade too.

(Proposed Model)

5. Resutl and Discussion

The size of signal has been compression proposed work. The size of data gets reduced. This results in reduction in storage requirement. The cost of data storage is reduced after compression.

Table 1: Size Comparison Chart

Signal	Without compression (In kb)	After compression (in kb)
1	4	2.6667
2	8	5.3333
3	12	8.0000
4	16	10.6667
5	20	13.3333

International Journal of Engineering Sciences Paradigms and Researches (IJESPR)
Volume 52, Issue 04 and Publication Date: 19th June, 2023
An Indexed, Referred and Peer Reviewed Journal
ISSN: 2319-6564
www.ijesonline.com

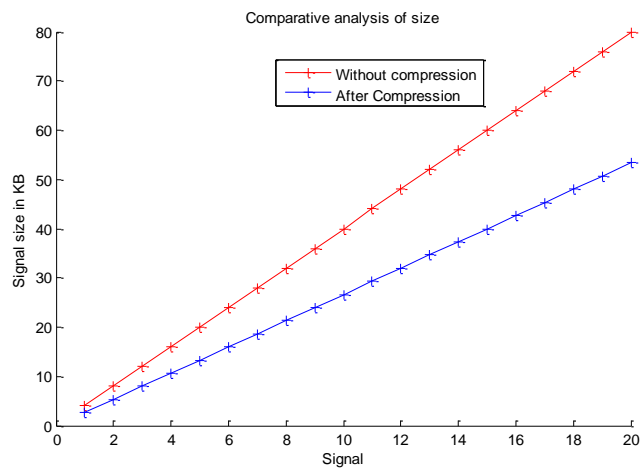|		
6	24	16.0000
7	28	18.6667
8	32	21.3333
9	36	24.0000
10	40	26.6667
11	44	29.3333
12	48	32.0000
13	52	34.6667
14	56	37.3333
15	60	40.0000
16	64	42.6667
17	68	45.3333
18	72	48.0000
19	76	50.6667
20	80	53.3333

Figure 1: Comparitive Analysis of Signal Size

Comparative analysis of time taken during data transmission

The time of signal transmission has been reduced in proposed work because size of signal is reduced. This results in fast transmission. The following table is representing the comparative analysis of time taken during

data transmission before and after compression of data. The simulation has been performed considering that signal of 10kb is transmitted in 1 second.

Table 2 Transmission Time Compression Chart

Signal	Without compression (Time taken in second)	After compression (Time taken in second)
1	1	1
2	1	1
3	2	1
4	2	2
5	3	2
6	3	2
7	3	2
8	4	3
9	4	3
10	5	3
11	5	3
12	5	4
13	6	4
14	6	4
15	7	5
16	7	5
17	7	5
18	8	5
19	8	6
20	9	6

Following chart is plotted to represent the time taken in second in case of compressed and uncompressed signal.
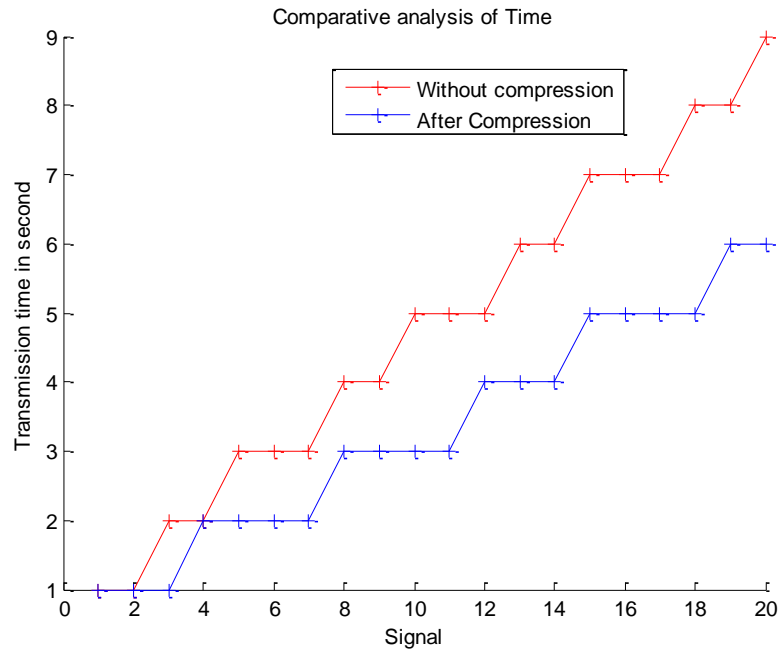
Figure 2 Comparison of Time Taken During Signal Transmission

Comparison analysis of time taken for alert

The time taken for alert is also reduced in proposed work. This results in immediate action for protection. The following table is representing the comparative analysis of time taken for alert before and after compression of data. The simulation has been performed considering that alert signal for 10kb takes 1.5 second.

Table 0.3 Alert Time Comparison Chart

Signal	Traditional	Proposed
1	1.5	1.5
2	1.5	1.5
3	3	1.5
4	3	3
5	4.5	3
6	4.5	3
7	4.5	3
8	6	4.5
9	6	4.5
10	7.5	4.5
11	7.5	4.5
12	7.5	6
13	9	6
14	9	6

15	10.5	7.5
16	10.5	7.5
17	10.5	7.5
18	12	7.5
19	12	9
20	13.5	9

Following chart is plotted to represent the alert time taken in second in case of compressed and uncompressed signal.
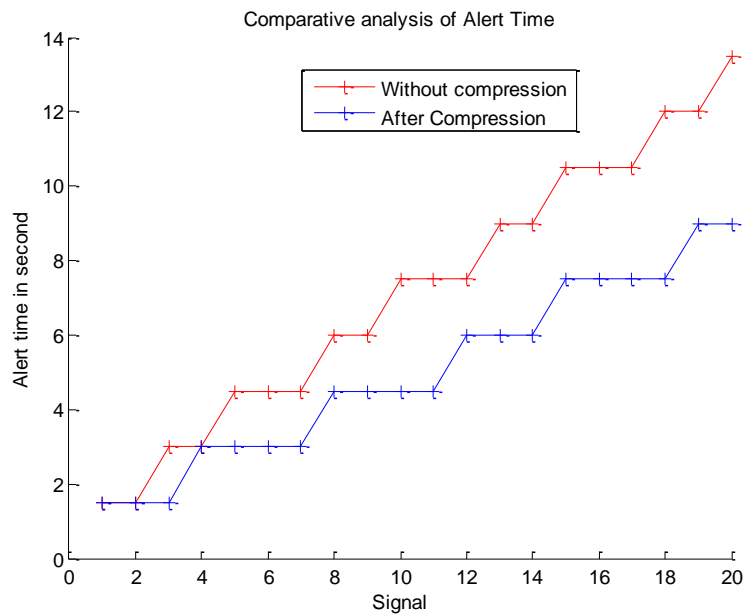

Figure 3: Comparison of Time Taken to Alert

6. Conclusion

Proposed System allows user to access the entire appliance to make our industry more efficient remotely. The storage requirement has been reduced in proposed work. System is capable to take action on which appliances should turn on or turn off at a particular time. System is smart enough to trigger security alarms after detection of any suspicious entry in our industry.

7. Future Scope

It is expected that a huge amount of impact has been put by Internet of Things on every part of our living standards. Use of smart hardware which are connected with each other become very common and adjust in our daily routine works in a very effective manner. When internet of things is adopted it brings opportunity and challenges across all industries, with clear impacts on manufacturing, logistics, and life sciences. The Objective of our research is to set up industry system security from fire that is internet of things based in order to provide security at remote locations. We have tried to put the setting of cloud inorder to host usage of internet of things application, using **matrix laboratory** platform. Research has integrated internet of things in the company of artificial intelligence industry to manage and secure industrial appliances remotely that could be beneficial for further development and its efficiency.

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