A Review: IoT Based Camera Surveillance System

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Abstract — IOT based Security systems are developed for keeping money safe. In this research objective is to provide more security to the physical wallet with reduced storage cost. The proposed model is capable to solve issues related to expenses and performance. Research is supposed to provide security at remote location without requirement of human attention with help of graphical processing. This research would establishment of cloud environment to host application. Implementation of frame 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. Applying Edge detection mechanism would allow fetching only comparable information make system fast.

Keywords: IOT, Edge Detection mechanism, camera surveillance,

I.   INTRODUCTION

IOT 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 is large due to limited storage capacity of storage devices. Moreover, the recording of video data gets lost after 15 days. To provide more security to the physical wallet with reduced storage cost. The IOT based devices provide security at remote location without need of human attention using image processing.
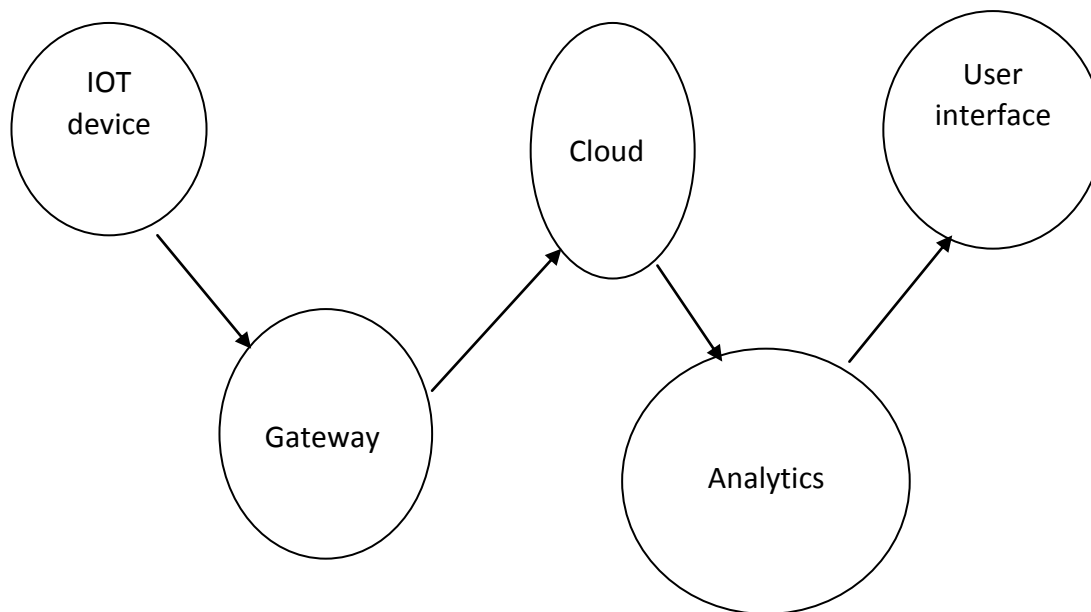

Figure 1 Major Component of IOT

II.   ARCHITECTURE OF CAMERA SURVEILLANCE

Camera based security is frequently used in financial organization. But cameras need to be regularly supervised by human being. Moreover expenses of storage have been increased because of cost of storage devices. Recording of video data remains for 15 days in case of non HD and 10 days in case of HD cameras. Burgers can also make fool by playing loop of recording from one dimension. In traditional approach the video information is captured and the size of file is too large. There is no mechanism to   find suspicious activity. There is need of human to observe through CCTV Camera. But these limitations have been overcome by introducing automation system that would warn automatically in case of any suspicious activity**.** In this system multiple Cameras are used in order to capture the snapshot from two different dimensions. One camera is capturing picture frame I1, I2, I3….In. Second camera would capture picture frame X1, X2, X3…Xn.

Then picture size is to be reduced by size then Canny based edge   find or get edge of graphics. This would remove the useless part of graphics.

The picture database would store images. Comparator is to compare In with In-1 and Xn with Xn-1. If there is any suspicious activity then information is send to physical vault security system. This system captures the notification from picture comparator if there is any suspicious activity. This system activates actuator by triggering alarm in case of any suspicious activity. Images are stored in form of matrix in & these images are compressed using lossless picture compressing method   s used in MATLAB. Here captured picture is resized so that size of picture gets reduced as a result dimension of matrix also gets reduced. Due to reduced size picture [5] comparison time get reduced in order to find motion. But the limitation of tradition work was that someone could make fool by displaying same picture from one dimension thus we are going to enhance the security using multidimensional security mechanism.

- *Algorithm*
    1. Switch on first camera, Switch on Second camera
    2. Capture current picture from one dimension, Capture current picture from second dimension
    3. Capture second picture $I1_{n+1}$ after time
       Interval, Capture second picture $I2_{n+1}$ after time interval
    4. If $I1_n$ is equal to $I1_{n+1}$ send notification to second dimension
    5. If $I2_n$ is equal to $I2_{n+1}$ send notification to first dimension
    6. Otherwise send notification and stop

III.   PARAMETERS OF PROPOSED SYSTEM

In proposed work the following parameters have been considered in order to improve the traditional work. Some parameters would reduce the time consumption while other would reduce the cost by reducing space requirement.

1. Edge detection time: Time taken to get the edges of graphics need to be reduced.
2. Image capturing time: Time taken to capture image after processing need to be reduced..
3. Image comparison Time complexity: The time taken to comparison of graphics need to be reduced.
4. Space complexity: The storage space taken while storing image need to be minimized. This would reduce the cost of storage.
5. Quality of Edge: the quality of edge does matter while comparing edge of images thus the proposed model focus on the better quality of edge detector.
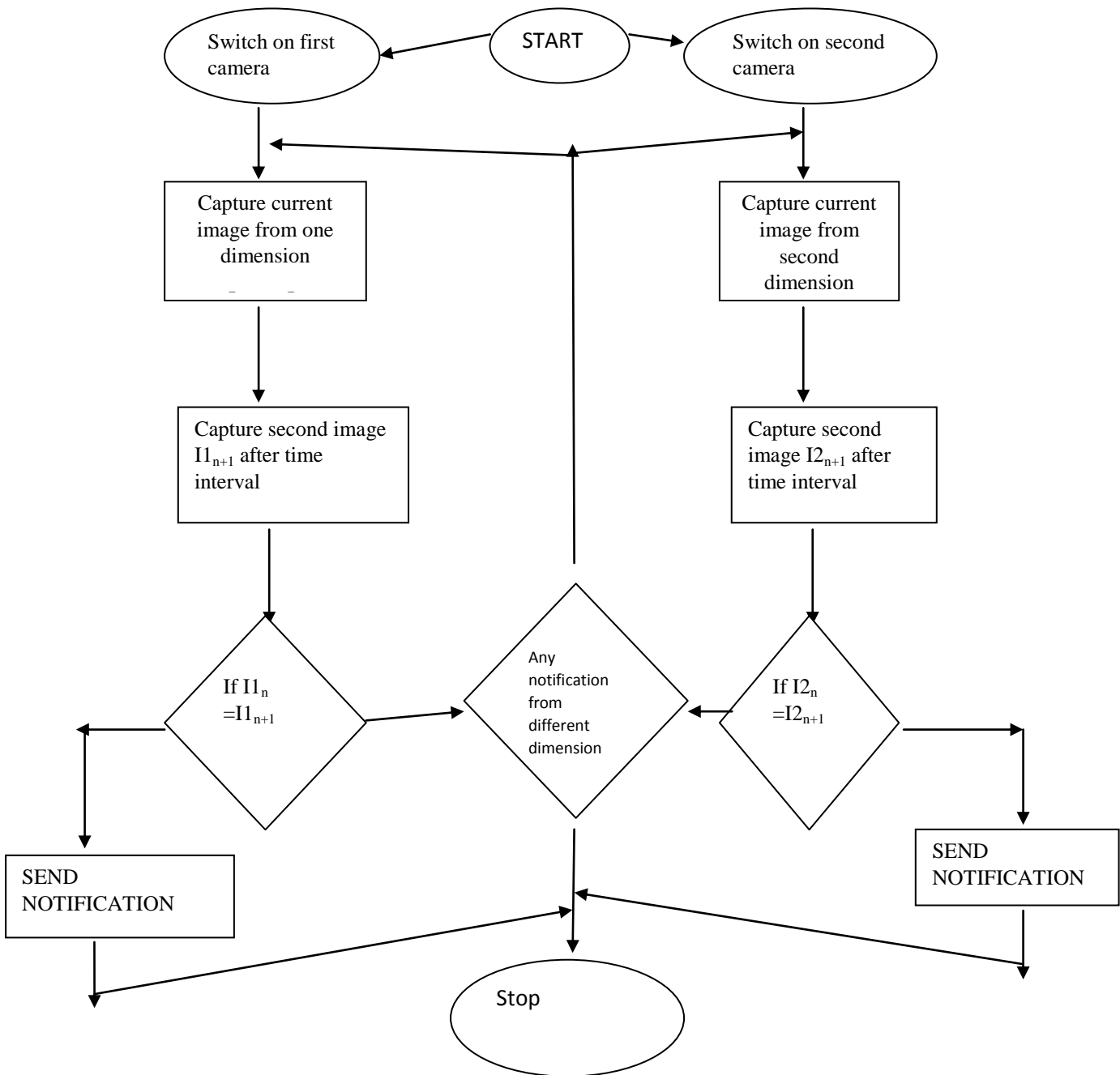
Figure 2.ARCHITECTURE OF CAMERA SURVEILLANCE

IV. LITERATURE REVIEW

However there are several researches in the field of smart surveillance system. The following research present some existing field concerned for space.

Muthukrishnan et al(2011)
The authors analyzed the edge capturing methods. Such methods are used for graphic segmentation. The research work is an effort. It has been done to review the efficiency of capturing techniques. Such techniques are most commonly used for image segmentation.[1]

Suryakant et al(2012)
The authors explained the edge detection. In the research work the Fuzzy Logic has been used in Matlab. This paper proposed the implementation of fuzzy logic. It is very simple and capable technique. Its algorithm has been used to capture the edges of a graphic content. Using the Fuzzy logic, the threshold value is not required. In the presented technique the several detected graphic contents are compared to the content got from the linear Sobel operator.[2]

Jayavardhana Gubbi et al.(2013)
The authors wrote Vision, Architectural Elements, and Future Directions in IOT. In the present scenario many areas of daily life are covered by Ubiquitous sensing. Ubiquitous sensing is making possible because of Wireless Sensor Network (WSN) technologies. With the help of this it is possible to figure out, Therefore it is considered as next revolutionary technology. It would be helpful in transforming the Internet into a fully integrated Future Internet.[3]

S. Saluja et al(2013)
The authors studied the edge-detection methods. Edge is known as the basic feature related to a picture. Edges are represented as boundary of two separate regions in a picture. Edge detection has been applied to classify and locate the dissimilarity in a picture. In the research work they have been proposed the study of edge capturing detection procedure related to several techniques.[4]

Chirag M. Shah, et al(2014)
The authors introduced efficient protected solutions related to IOT. The demand of Internet of Things &its appliance are increasing at a rapid rate. In this paper the concept of improving access control systems is described. It is ensure by the methods which are used for boosting to get the control of system. [5]

Indrajeet Kumar et al(2014)
The authors proposed a conventional review related to edge capturing method in digital image processing. The research work has shown the comparative results of edge capturing method under several situations. In the comparison the benefit along with the loopholes is also described. Here the Matlab has been used.[6]

A. R. Biswas et.al(2014)
The authors explained IoT as well as cloud convergence. The researcher has explained the chances as well as issues of IOT. Therefore the paper has explained an innovative IoT centric Cloud smart infrastructure. This system addresses the IoT individually. The paper also highlights the issues related to Cloud Computing.[7]

J. E. E. Syst , et al(2015)
The authors evaluated the electrical and electronic architecture technique of graphic edge capturing. The research work explained the standard edge capturing techniques. Such techniques are basically applied in image processing. Name of such techniques are Prewitt, Canny, Sobel, Robert etc. a new concept of Fuzzy logic also has been discussed here.[8]

Kwok-Yan LamI and Chi-Hung Chi(2016)
The several benefits as well as need of IOT are discussed here. Such are limited compute resources, power, bandwidth etc. To offer the possible and practical solutions related to the security of IOT application. [9]

A. Bayoumi et al.(2016)
The authors wrote a review on Iot. The researchers have considered the security with privacy need. Therefore, this new (IoT) devices create on the basis of Internet. Such involves the new type of issues from a security and privacy perspective. Existing proteciton primitives are not directly used in IoT devices. The reason is that the sepetate standards as well as transmission stacks includes.[10]

Anurag Tiwari et al.(2017)
The authors reviewed the Challenges and Ongoing Researches for IOT. From the last few years it is seen that Internet of Thing has become arising technology in Information technology discipline particularly in networking field. For IOT, Internet is the keystone. Using IOT technology it is possible to handle the electrical, mechanical objects if they are connected to the internet remotely from anywhere of the world. A number of profitable data and information will be exchanged by millions of devices and facilities. All these facilities and devices will be powered by Internet of Things. The IOT systems are very common and are widespread. Therefore chances of security and privacy problems are common. Due to this all the things which are associated

with internet may face safety issues. Due to the issue which is related to security and privacy IOT could not set himself as a reliable technology. [11]

Mahdi H. Miraz et al(2017)
The authors reviewed the IoT, IoE. They also reviewed the IoNT, IoE and Internet of IoNT have been expansively considered by them. They also offered the summary review report. The analysis result obviously differentiates between IoT and IoE. [12]

Ahmed ElShafee(2017)
The research work has proposed a design and prototype implementation. Their work was related to home automation architecture. WiFi methodology is applied as network architecture. It is utilized to make a connection to its several parts. The researchers have considered two basic factors. The first part that is server (web server), presented the system core. It has been used to manage, control and monitor the home of users. Users as well as the system administrator are capable to manage locally and remotely. Second part has been known as the hardware interface module. Such model is capable to provide the suitable interface. Such interface is provided to sensors as well as the actuator of home automation system. On the other side the proposed system is scalable. [13]

Wei Zhou et.al(2018)
The author represented the Effect of IOT New Features on Security and Privacy. They provided New Threats, Existing Solutions, and Challenges. The growth of Internet of Things (IOT) in future is totally depending upon us. At present the application of IOT has home automation and industrial automation. In addition to the facilities and efficiency which is provided by IOT to us, certain threats are also presented by IOT. [14]

S. Schefer-wenzl (2018)
The authors evaluated the IoT. It has been known as inter- connection of billions of efficient appliance. In the research work, the researchers have proposed NFV enabled IoT system. This system has been made for a state-of-the art operating room. They have used the web services related to REST web system. They also illustrated the applicability using two separate scenes. [15]

E. P. Yadav(2018)
The author wrote on IoT . They also discussed the challenges and issues by Indian point of view. IOT has been determined as connections of related mechanisms. These include the physical objects. These IOT devices are used in order to communicate. Such devices interact with the inner states and surroundings externally. Instead of people to people dealing, IoT focuses to do dealing with machine to machine. The review also offered the status of IoT progress. In the India as well as other country are facing the issue of safety. [16]

Akanksha Bali et al.(2018)
The authors studied various applications of IOT. The internet of Things has shown a great performance in this era which is related to networking. It will be very helpful for the inclition of information technology future. With the help of IOT user can use connections from anywhere, anything and at any moment. The concept of IOT is very productive. It has capabilities, with the help of IOT it is feasible to manage labeled items like door locks, lights, microwave, Led, Lcd, coffeemaker, washing machine, window locks etc. In this way it will enlighten the state. The definition of IOT concept represents various technologies. These technologies make the internet available to each real world tangible objects.[17]

T. Haikun (2018)
The author proposes review on surveillance cameras and crime. He explained the effectiveness of surveillance cameras to reduce the offence. The results are indicating the surveillance cameras applicability. Such cameras are efficient to reduce the offence, especially property crime, in many settings. [18]

R. K. Kodali (2018)
The author proposed on Energy Efficient Home Automation. In the research work they have used the IoT system. Smart home automation is introduced for management and controls the household energy successfully.[19]

M. N. Ali(2018)
The author provided a literature Review on Home Automation system. This system has been applied to help the physically disabled candidates**.** Usually home automation system is an art to control the home devices remotely. The proposed work is related to study and review of several home automation systems. Such system is introduced to assist the disable candidates. The research paper is efficient to offer the help to the disable candidate. [20]

K. Ito, (2019)

The research work has proposed a home automation platform. For this purpose they have used the interaction related sensing method. Particularly, an experimental home has been introduced with home automation platform. It is connected to a prototype system related to interaction sensing.[21]

IP. Rai (2019)

Author analyzed Smart Surveillance System. They explained that the surveillance systems are important factor of industries. It also has been used in factories, companies as well as in homes. The researcher has actually provided the hardware as well as the software implementation. Their work was related to the efficient surveillance system. They have used the innovative microcontroller. [22]

TABLE 1 PERFORMANCE PARAMETER OF ALL RELIVENT PAPER (WITH COMPARISION FORM)

SNO.	NAME OF AUTOR,YEAR	TITLE	ADVANTAGE	LIMITATION
1	Muthukrishnan ,et al. [2011]	Edge Detection methodology for Graphic Segmentation	Analyzed the edge detection methodology for Graphic Segmentation	Limited scope of research
2	Suryakant ,et al.[2012]	Edge Detection with the use o Fuzzy Logic in Matlab	Explained the edge capturing with the use of Fuzzy Logic	Consider the limited issues in the field of Edge Detection
3	J.Gubbi, et al.[2013]	Internet of Things: A vision , architectural elements , and future directions	Provided the views on vision, whole system Elements and Future scope in IOT	Lack of technical work
4	S.Saluja, ,et al.[2013]	A Review of Edge-Detection technique	Study the edge detection process with several methods	Requirement of technical implementation
5	Chirag M. ,et al.[2014]	Smart Security Solutions with IOT	Introduced the smart Security Solutions based on Internet of Things	Requirement of more work
6	Indrajeet Kumar,et al.[2014]	A Conventional Review Of Edge Detection method with Digital Image Processing	Proposed a review of edge detection method with digital image processing	Only theoretical work has been proposed
7	A. R. Biswas ,et al.[2014]	IoT and Cloud Convergence with the Opportunities and Issues	Explained the IoT as well as cloud convergence	Need of more work
8	J. E. E. Syst ,et al.[2015]	A Review of Electrical and Electronic Systems technique of Image Edge Detection	Evaluated the electrical & electronic systems methods of image edge detection	Limited research work has been made.
9	K. Lam ,et al.[2016]	Identity in the IOT with New issues and opportunities	Proposed the identity in the Internet-of-Things	Lack of new concept
10	M. A. Iqbal, ,et al.[2016]	A Review of IOT with its security and privacy needs with the solution	Provided a review on Internet of Things	Only review has been proposed
11	A. Tiwari ,et al.[2017]	A Review of issues and ongoing researches for IOT	Study the issues and Ongoing Researches for IOT	Lack of technical work
12	Mahdi H. Miraz, ,et al.[2017]	IOT, IOE and IONT :A Review	Proposed a review the IOT, IOE and IONT	Requirement of implementation work
13	K. A. H. Ahmed ElShafee, [2017]	Design and Implementation of a WiFi Based Home Automation System	Offered a WiFi Based Home Automation System	Requirement of implementation work
14	W. Zhou, ,et al.[2018]	The Effect of IoT :New challanges , Existing Solutions , and Challenges Yet to Be Solved	Highlight the Effect of IOT with New Features on Security as well privacy	Consider the limited challenges
15	S. Schefer-wenzl, [2018]	NFV Enabled IoT Architecture for an Operating Room Environment	Provided a novel NFV enabled IoT system targeted for a state-of-the art operating room environment	Requirement of more work
16	E. P. Yadav, [2018]	Challenges and Issues in Indian Perspective: IoT	Highlighted the hurdles with challenges by Indian point of	Requirement of technical implementation

			view in IOT	
17	Akanksha Bali, et al.[2018]	REVIEW OF APPLICATIONS OF INTERNET OF THINGS	Presented the review on several applications of IOT	Only review has been proposed
18	T. Haikun, ,et al.[2018]	Research and Application of the IOT Gateway with Real-Time Specification	Discussed the research and Application of the IOT Gateway with the Real-Time Specification	The research work is not sufficient work.
19	R. K. Kodali ,et al.[2018]	Energy Efficient Home Automation with the use of IoT	Offered the research work on Energy Efficient Home Automation with the use of IoT	Requirement of implementation work
20	M. N. Ali, [2018]	A review of Home Automation system for Physically disabled Peoples	Proposed a review of Home Automation system for Physically disabled Peoples	Lack of technical work
21	K. Ito, T. Miura, 2019	Home Automation Platform Using Interaction-Based Sensing	Proposed a home automation platform using interaction based sensing technology	Only theoretical work has been proposed
22	I. P. Rai ,et al.[2019]	ESP32 with Smart Surveillance System	Evaluated the hardware and software implementation of smart surveillance system with the use of latest microcontroller	Limited research work has been made.

V.   CONCLUSION

In the research work the integration of three dimensional biometric mechanisms has been proposed in IOT. The implementation grid array sensor module has been proposed for security of Physical Vaults for. MATLAB & ASP.NET are used for implementation purpose. In the research work the picture is captured using camera & compare current picture with previous one in order to find changes. In case of any suspicious movement then it transfers signal to an interface that is running on cloud server & connected to a remote database. Event database gets updated & actuator is connected to database. Time by time a clock signal checks updates in database & responds to actuator. In the research work the comparative analysis of proposed work and existing mechanism has been presented. The comparison is made on the base of time consumption, Queuing delay and file size. The proposed system aims at the security of financial institution with the integration of image capturing and processing techniques with Internet of Things.

VI.   FUTURE SCOPE

Research would provide security at remote location without need of human attention using image processing. This research would establish the cloud environment to host application. Implementation of image capturing module works from three different dimensions to boost the security. The size of captured frame sample is reduced in order to save the storage space. Any suspicious event would be traced more quickly using edge detection mechanism during frame comparison in order to make system fast. This type of system would be beneficial for banks and financial institutions. Thus system would be proven secure and cost effective.

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