Cyber-Defensive Industrial Control System With Redundancy And Intrusion Detection Based On Iot Technology

D.Manimegalai, S.Ezhilmathi, G. Amirthapriya, S. Arunthathi

Abstract: Today in the present situation, worldwide information correspondence, economical Internet association and quick reachable programming improvement, security has turned out to be increasingly more of an issue. Security is one of the fundamental prerequisites in this day and age as an interchange and capacity of information on the web is getting to be powerful. Ensuring the data access and information uprightness are the essential security qualities of PC security. In this system, we have proposed a system which is capable of detecting fire, any gas leakages or if any unofficial entries have been made and provide the location of the affected region. Raspberry Pi 3 has been used to reign this process by integrated with a couple of sensors and cameras. When the fire or smoke sensors captures something they signal the camera and activates the alarm and the sprinkler motor. The cameras provide a confirmation of the fire and take photographs in order to avoid any false alarm complaint or for insurance purposes. The system will immediately send the message along with the image of the affected spot and device location to the registered email ids which may includes the nearby fire brigade. In the case of an intruder or unofficial entry, the PIR sensor detects it and the camera captures the image and then activate the alarm. An admin can confirm or reject the impeachment by detecting the photographs the system send to the registered email ids.

Index Terms: Communication, Security, Information, Raspberry Pi, Data Analysis, Security Network,

1 INTRODUCTION

Information is the strategic resource, organizations spend in leading to a amount of their budget on economical information resources. Computer security has many security related objectives among them there are three fundamental objectives are: Secrecy i.e. to protect information, Incorruptibility, to protect information accurate; finally Access, to ensure information delivered. It is important to put most elevated need to framework security, limit the provisos and free from the PC framework against interruption. Now-a-day's standard of security to execute an arrangement firewall alongside an interruption recognition framework [1-3]. On the off chance that a gatecrasher can become familiar with a shortcoming in the system by examining the demonstration of host organize, he can easily infiltrate into the framework and acquire significant and right information. In the event that a gatecrasher is demonstrating his character for a firewall empowered administration and interruption location frameworks can't have the option to limit the damages. Most of the security methodologies are presently a day's attention on the adequacy instead of productivity of security framework [4-6]. One of the forceful for protection component that has gone to the fore Honeypots. It acts as a Booby trap equipment which are configured as the system weakness to attract intruders and gather all the information to eliminate future attacks thus eliminating security loop holes, these are known as Honeypots [7, 8]. The propounded architecture is based on Raspberry Pi using a range of sensors such as flame sensor, gas forth a simple, cost effective and an autonomous deployment in any environment sensor and intrusion detection sensor for detecting the problem and reporting in it. This architecture puts active and an autonomous deployment in an any environment [9, 10].

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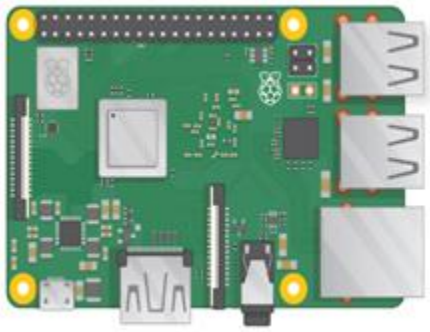

Fig.1 *Rasbperry pi*

2. METHODOLOGY

The security system uses Raspberry pi as a major component. The computer is then connected to the raspberry pi and which is in turn connected and wired to the sensors. The computer programs the raspberry pi with certain benchmark and how each sensor should respond when these conditions are met and installed in an computer before the program is written. The Raspian OS is stored in a micro SD card. After this the Raspberry pi is connected to couple of sensors. The sensors used in this program are flame sensor, PIR sensor and gas sensor. The programming language used in raspberry pi is python. The raspian operating system has to be first and then in the relay circuit the contact is made the sprinkler to be activated in the case of a fire sensor, gas sensor, PIR sensor. The flame sensor and the gas sensor are connected through a MCP3008 to the Raspberry pi 3. Once the sensor detects the picture to the registered email address.

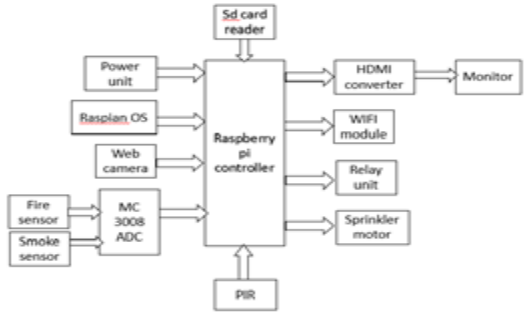

Fig. 2 *Block diagram*

3 EXISTING SYSTEM

The temperature and humidness detector network will monitor the temperature and humidness of the communication system. The necessities of user and key main problems with wireless detector network hardware and software package for observance fire[2]. Wireless detector Network technology for consistent with fire-fighting demand. The flame sensors, temperature sensors, smoke sensors and a re-engineered mobile CO2 air-conditioning unit Results[3] in automobile fire detection and system destitute of false alarms, detects and extinguishes fire using fuzzy logic.

4 PROPOSED SYSTEM

The circuit diagram of our proposed system is shown in fig. 3.

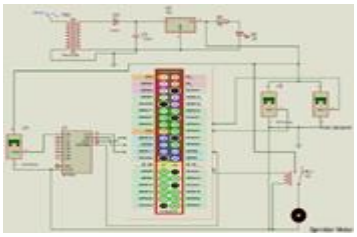

Fig. 3 *Circuit Diagram*

4.1.1 Flame Sensor

A fire identifier is a sensor planned to detect and react to the nearness of fire or fire, permitting fire identification .Responses to a recognized fire relies upon the establishment. It is utilized in applications, for example, modern heater. A fire finder can frequently react quicker and more precisely than a smoke or warmth identifier because of the instrument it uses to distinguish the fire.

Fig. 4 *Flame sensor*

4.1.2 Gas Sensor

A gas detector is a gadget that recognizes the nearness of gases in an area, often as part of a safety system. This kind of hardware is utilized to distinguishes a gas spillage or other discharge and can interface with a control framework so a procedure can be naturally closed down.

Fig. 5 *Gas sensor*

4.1.3 PIR Sensor

The PIR (Passive Infra-Red) Sensor is a pyroelectric gadget that distinguishes movement by estimating changes in the infrared levels radiated by environment objects. This motion can be distinguished by checking for a pinnacle signal on a solitary I/O stick. Pyroelectric gadgets, for example, the PIR sensor, have components made of crystalline material that produces an electric charge when presented to infrared radiation.

Fig. 6 *PIR sensor*

4.1.4 Relay Interface Circuit

At the point when a present courses through a loop, the subsequent attractive field draws in an armature that is precisely connected to a moving contacts. The development either makes or break an association with a fixed contact. The hand-off interface circuit is utilized to associate a PC with the family unit electronic or electrical apparatuses. The circuit comprises of a transfer (5v, 5A), a freewheeling diode, a transistor to run the hand-off information and connectors to interface parallel port.

Fig. 7 *Relay circuit*

4.1.5 HDMI adapter

The High density media interface. It is used to have association among PC and raspberry pi 3kit. This changing over the HDMI computerized sign to VGA simple sign It empowers the PC, Laptop DVD, PS3, Xbox360 Sky HD, Apple TV and another HD gadget to be wired to VGA screen, projector or other showcase for instruction, business introduction, business advancement, meeting, display, and so forth. It bolsters the superior quality yield of a 720P or 1080P.

Fig. 8 *HDMI Converter*

4.1.6 Micro SD Card:
As the R-Pi has no internal storage or built-in operating system it requires an SD for an storage purpose.

Fig. 9 *SD Card*

4.1.7 Internet Connectivity
The LAN link (standard RJ45 connector) or ethernet or a USB Wi-Fi adaptor. The R-Pi ethernet port is an auto-detecting which implies that it might be associated with a switch or straightforwardly to each other PC (without the requirement for a hybrid link).

4.2 Software

4.2.1: Operating system
Linux as it may seem, installing an operating system on your Raspberry Pi 3 requires a Windows, Mac or Linux computer. This is because the pure mini-computer uses an SD card as its storage device, and as the devices without the SD card, it is left to the user to login a suitable operating system and load it on into the card.

4.2.2: Programming languages
The programming language used is simple python language because it is easy to understand and easy to debug.

4.2.3: Raspbian
Raspbian is a free Operating System dependent on Debit. Upgraded for the raspberry pi equipment. Raspbian accompanies in excess of 35000 bundles; pre-consolidated programming enclose by a pleasant organization for simple establishment on Raspberry pi.

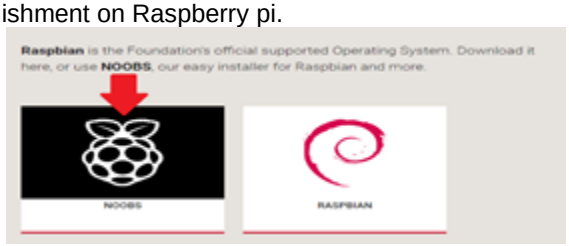

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Fig. 10 *Raspbian*

5 RESULTS AND DISCUSION

The purpose of our work is to provide an security and safety in an industries. If any gas leakage and fire occurrence in an industries is then detected by using a couple of sensors and CV cameras connected to a Raspberry pi3 which is coded with a simple python language and the software used is raspbian os and the output is seen through an php.If any accidents occurs that the sensors captures and detects the images of the affected location and the message will be send to an registered mail address of an admin and to an nearby fire office.

Fig. 11 *List of Login details*

6. CONCLUSION

In this project, we examined the most recent innovation that can decrease disastrous accidents brought about by flame. We planned the entire framework and assessed its viability just as adaptability. With the improvement of sensor innovation, the framework will turn out to be progressively proficient and helpful. In the event that this framework can be effectively incorporated in each processing plant, at that point it is trusted that the death toll and property because of the fire mishaps will lessen amazingly and the nation's economy won't be lurched by such shocking mishaps

FUTURE SCOPES

- . The system can be applied to industries, where the loss of life and property due to fire accidents will be reduced.
- The system is applicable to the confidential places of industries to detect the entry of unauthorized person.

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