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Ethical Explosive Explosion Computer Control For Disaster Management

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Abstract: ***This Research Paper is about Ethical Explosive Explosion Computer Control for Disaster Management. This particular Research based on the disaster management .The explosion of the explosive material is done where disaster is happened and the people suffer. The explosion is also done across the worldwide with the help of the computer. The concept of this Research of the disaster management has improved the safety of the people because the explosion is done with the help of the computer far away from the blast area.***

Keywords: Disaster, Arduino, Microcontroller, Explosion**.**

1. Introduction

The Ethical Explosion means the explosion by which no one is harm. This Explosion is done by the help of computer control. One such facility is provided by Arduino. The entire process has been automated using JAVA technology ,Java Server programming and Microcontroller Programming to smoothen the flow of information in a highly secure environment across the network. The solution has been deployed , tested and validated thoroughly. While designing the system , care has been taken in efficiency, maintenance and reusability of the software for the present and future changes in the system.

2. Review and Analysis

2.1 Research

Al-Nammari, Fatima & Alzaghal, Mohamad says in their paper entitled "Towards local disaster risk reduction in developing countries: Challenges from Jordan Disasters remain one of the main challenges facing nations of the developing world, as they not only cause high mortality and suffering, but also damage local economies that are in process of formation and thwart development achievements. The Hyogo Framework for Action emphasized the significance of making disaster risk reduction a national and a local priority with a strong institutional basis for implementation. However, local governments may not have the capacity yet to address this need. Therefore, this inquiry investigates the current status of disaster risk reduction in a local Jordanian municipality to understand the current limitations facing this approach. Such an investigation will help in understanding high dependency on the central government, in addition to fixation on a para-military approach to disaster management calls for reassessment the challenges facing local governments in non-capital cities of the region. The study provides several recommendations for initiating disaster risk reduction on the local level, stressing that the political culture and governance style in the region creates many obstacles. Further, the limited capability of local governments, the serious social and economic problems, and misleading natural disaster cognition create handicaps should the approach be implemented. The legal opaqueness in identification of jurisdictions and responsibilities compounded by the status quo of of disaster management policies and related laws in Jordan. [1]

Angela, Teo Yu Hui; Viswanathan, Vaisagh; Lees, Michael & Cai, Wentong says in their paper entitled "Analysing the Effectiveness of Wearable Wireless Sensors in Controlling Crowd Disasters The Love Parade disaster in Duisberg, Germany lead to several deaths and injuries. Disasters like this occur due to the existence of high densities in a limited area. We propose a wearable electronic device that helps reduce such disasters by directing people and thus controlling the density of the crowd. We investigate the design and effectiveness of such a device through an agent based simulation using social force. We also investigate the effect of device failure and participants not paying attention in order to determine the critical number of devices and attentive participants required for the device to be effective. [2]

Fakhruddin, S.H.M. & Chivakidakarn, Y. says in their paper entitled "A case study for early warning and disaster management in Thailand The article is suggesting that socio-economic change plays significant influence on disaster risk management, thus the current linear model for the assessment tool should be improved. This comprehensive instrument adopted an indicator-based approach for each element that makes up country×³s disaster management system. Using Thailand as a case for application, the author has developed a more comprehensive assessment tool for early warning system and disaster management at the national level. It keeps the ordinal quality for comparison, yet nominal details which appear crucial for institutional and social conditions. Also it is suggested that the outline is to be country specific as based on national disaster management institutional structure. The study builds upon the premise that early warnings will only be as effective as the collective strengths of policies, laws, institutional frameworks, and capacities of national and local officials responsible for disaster management systems; hence this assessment method

will clarify and advance the political mandate for disaster management responsibilities for Thailand. It also assesses policy and regulatory frameworks that define Thailand×³s approach to disaster management and support targeted national policy and regulatory interventions that strengthen overall national emergency management organizations and systems in Thailand. [3]

Labib, Ashraf says in their paper entitled "Chapter 4 - Bhopal Disasterâ€"Learning from Failures and Evaluating Risk Disasters are, by their nature, very complex phenomena. Their modeling, using a systematic and logical methodology, can help us identify their root causes and may facilitate in allocating appropriate resources to prevent the reoccurrence of such situations. Although techniques exist to model such phenomena, a single off-the-shelf model, due to its inherent assumptions, is insufficient to provide an effective and realistic analysis to prevent disasters. It is proposed that to overcome the limitations of single methods, and to optimize investment in safety, a hybrid model of disaster causation, combining different modeling methods, may be more effective. [4]

Nivolianitou, Zoe & Synodinou, Barbara says in their paper entitled "Towards emergency management of natural disasters and critical accidents: The Greek experience This paper presents the findings of a prototype study which sought to identify factors that contribute to effective emergency management in Greece and other European states regarding both natural disasters and critical accidents. The parameters for proper action and successful intervention in operational and logistical are identified based on the document analysis and interviews with emergency responders. TheÂ interviews are conducted between state-owned and voluntary organizations. They were asked to rate in terms of their importance for effective emergency response efforts. This paper offers useful information of the organization and management of emergency response in Greece, as well as provides interesting respondersâ€™ opinions data concerning important priorities in the emergency management area. Despite the fact that the data come from the Greek experience, the conclusions may be applied for a broader use in the emergency planning of disasters. The whole study has been undertaken within the European Pre-Emergencies (PreEm) project. [5]

Preece, Gary; Shaw, Duncan & Hayashi, Haruo says in their paper entitled "Application of the Viable System Model to analyse communications structures: A case study of disaster response in Japan Every year, natural and man-made disasters affect hundreds of thousands of people and cause extensive damage. \{OR\} has made substantial contributions to disaster response and these have been the subject of several recent literature reviews. However, these reviews have also identified research gaps for \{OR\} â€“ two of which are (1) limited contribution from soft OR, and (2) a need to model communications during disasters where there are complex interactions between stakeholders. At the intersection of these gaps we apply the Viable System Model (VSM) to examine challenges of rapid communication viability during dynamic disasters. The data that informs this paper were collected in four case studies in Japan â€“ three on its current capabilities (e.g. a local government disaster management office) and one on its response to a past disaster (the Great Hanshin-Awaji Earthquake in 1995). This paper shows how applying \{VSM\} identified generic gaps and opportunities for communication systems and shows how these case studies signal the utility of \{VSM\} structures to arranging communications for fast-paced and changing environments. This paper also contributes to \{VSM\} theory through developing two new concepts (1) environmental support mechanisms for viability; and (2) rapid implementation unit emergence. [6]

Syafwina says in their paper entitled "Recognizing Indigenous Knowledge for Disaster Management: Smong, Early Warning System from Simeulue Island, Aceh A 9.1 M earthquake occurred in Indian Ocean on 26 December 2004 and caused tsunami disaster that devastated many areas in Asian and African countries. Aceh Province, the closest areas from the epicenter, received huge impacts. With no early warning system, poor disaster management, not enough knowledge about tsunami disaster and the huge scale of disaster impacts, it caused a high number of victims. Death toll reached 200,000 people; while in Simeulue Island, the victims were only 7 people from 78,000 of the total population (2000). The story of Smong (means â€œtsunami inâ€? Devayan Language) that inherited from generation to generation since 1907 saved the Simeulueans. Smong naturally becomes an early warning system anytime earthquakes occur in this island. In other parts of Aceh in Sumatra, stories and messages about tsunami that occurred in the past can be found in some oral literatures, poems and songs; but the community did not recognize them and those cannot be used as Disaster Risk Reduction tool. Indigenous knowledge can be a powerful tool for disaster risk reduction; but, without recognition and utilization, it is merely a part of common things in community. The aim of this research was how to capitalize indigenous knowledge in order to improve disaster management and reduce the risk through the community based on success story of Smong Simeulue. Recognized indigenous knowledge should be adaptable, transferable and modified according to the community and environment conditions. Empowering local community to recognize valuable Indigenous Knowledge for Disaster Risks Reduction can improve the future of Human Security. This preliminary research was conducted by learning from Smong success story through the media, literatures and interview. To keep sustainability of Indigenous Knowledge for Disaster Risks Reduction, a combination of local knowledge with new technology will be very useful. [7]

Talarico, Luca; Meisel, Frank & SÃ¶rensen, Kenneth says in their paper entitled "Ambulance routing for disaster response with patient groups We consider a routing problem for ambulances in a disaster response scenario, in which a large number of injured people require medical aid at the same time. The ambulances are used to carry medical personnel and patients. We distinguish two groups of patients: slightly injured people who can be assisted directly in the field, and seriously injured people who have to be brought to hospitals. Since ambulances represent a scarce resource in disaster situations, their efficient usage is of the utmost importance. Two mathematical formulations are proposed to obtain route plans that minimize the latest service completion time among the people waiting for help. Since disaster response calls for

high-quality solutions within seconds, we also propose a large neighborhood search metaheuristic. This solution approach can be applied at high frequency to cope with the dynamics and uncertainties in a disaster situation. Our experiments show that the metaheuristic produces high quality solutions for a large number of test instances within very short response time. Hence, it fulfills the criteria for applicability in a disaster situation. Within the experiments, we also analyzed the effect of various structural parameters of a problem, like the number of ambulances, hospitals, and the type of patients, on both running time of the heuristic and quality of the solutions. This information can additionally be used to determine the required fleet size and hospital capacities in a disaster situation. [8]

Usman, Adil; Dutta, Rahul; Usman, Arif; Azmee, Farzana & Divakar, B.P. says in their paper entitled "Fire Disaster Management in Trains Using a New Technique of Water Pipelines-first Aid Mechanism Increasing number of disasters with a large number of victims and significant social and economic losses are observed in the past few years. Prevention is always better than the cure for any kind of problem, and this very concept applies to the disasters also. Recent events can catch our eyes on them as how much loss we have to suffer in both as life and as property. Such fatal accidental problems can occur in our everyday life as we come across the causes of these disasters. There are many forms of disaster and each has a terrific effect on man and material. As the paper progresses the disaster caused on Indian rails generally due to catching of fire is been highlighted. In this context a wide survey on Indian railways has been done and the recent statics of the railway disasters for the past few years in general shows the accident cum disaster in the form of fire in train. Therefore such consideration is kept in mind and with respect to that, the case study is carried out for a local area where an idea of using a water pipeline along the railway tracks is proposed the methods to prevent these disasters are discussed in this paper. The proposal of running a pipeline parallel with the railway tracks which will contain water which can be very useful in case of any kind of fire disasters. These pipelines will have water, which are conserved by rain using harvesting system or any other form of waste water. Water that come out as sewage from houses and canals can be purified to a usable form which will be stored in the water tanks at every railway station and used at the time of any minor or major railway accidents (fire disaster). [9]

Vink, Karina & Takeuchi, Kuniyoshi says in their paper entitled "International comparison of measures taken for vulnerable people in disaster risk management laws This paper focuses on measures taken for vulnerable people in Disaster Risk Management (DRM) laws in Japan, the Netherlands and the United States. As \{DRM\} laws were found to lack a definition of vulnerable people, an original working definition of vulnerable people in a community was defined. \{DRM\} laws and policies with a focus on flood disasters in Japan and the \{USA\} cover some groups of potentially vulnerable people who are supported during various phases of disaster management, such as elderly, children and people with disabilities. The basic disaster law in the Netherlands mentions â€˜not self-reliant peopleâ€™ during the response phase, and leaves further details to the regional safety plans. All countries lack clearly defined characteristics in the laws themselves as to who may be categorized among the various groups of potentially vulnerable people. Furthermore, there is little to no anticipation of expected increases in the amounts of vulnerable people. The support for vulnerable people in \{DRM\} laws has not been quantified on a global scale, even though the Hyogo Framework for Action called for the development of measurement tools in 2005. Further research should aim at developing tools with which to quantify the support of vulnerable people in \{DRM\} laws. [10]

Waheed, Muhammad Azeem Abdul says in their paper entitled "Approach to Fire-related Disaster Management in High Density Urban-area The first step to make any disaster plan for any urban area facilities, (such as any firm or industry), is to identify and mitigate the condition that might have caused the disaster. Karachi is one of the mega cities of Pakistan, having 18 large Towns which unplanned and internal conflict areas produced due to political instability and influence are involved. Unfortunately there are no comprehensive studies or statistical data that is available about the fire prevention emergency plans and disaster management plans for the commercial areas of Karachi. Using the case study of Baldia town factory, Karachi, this paper provides an approach to understand the system faults and the importance of development of a disaster management plan for an industrial unit. It recommends the co-ordination between various infrastructure facilities and Rescue agencies as well as government institutions. [11]

All we know what happened in Utrakhand. The below images is illustrate how this disaster is happened in Utrakhand.

Figure 2.1

1) Small lake formed during the rain.
2) Break the boundary of the lake.
3) The rock that get removed giving way to new stream
4) The new stream.

With the help of this system we can avoid the disaster. We can do a blast or an explosion of the explosive material and change the way of the stream of the water so the water is not going to villages or the place where people are live. And the disaster is not happened and people are safe.

2.2 Product Available

2.2.1 Phoenix BLST

The Phoenix BLST Series is an indoor/outdoor hazardous rated, weather proof high intensity discharge remote ballast used in conjunction with a variety of heavy duty Phoenix HID light fixtures.[12]

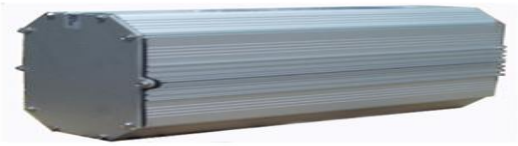


Figure 2.2

2.2.2 Pick N Place Robotic Arm and Movement Controlled by Android Wirelessly

Pick n place robotic vehicle with a soft catching gripper. For example, it can safely handle a bomb very carefully to avoid explosion while catching. The robotic vehicle is android application controlled for remote operation. The main advantage of this robot is its soft catching arm that is designed to avoid extra pressure on the suspected object for safety reasons.[13]

Figure 2.3

3. Design and Architecture

All the selected component are connected with each other in a proved sequence for a safe and perfect completion of the project. The overall project is designed on the basis of that the explosion is done safely with the help of the computer. A client sends a command to the server for explosion of the explosive material.

3.1 Components

3.1.1 Arduino

It is a tool for making computers that can sense and control more of the physical world. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. Arduino projects can be stand-alone, or they can communicate with software running on your computer (e.g. Flash, Processing, MaxMSP.)[14]

Arduino Uno Board

Figure 3.1

1. The Arduino Uno is a microcontroller board based on the ATmega328.
2. It has 14 digital input/output pins ,6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.
3. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

Technical Specification of Arduino

Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328)
EEPROM	1 KB (ATmega328)
Clock Speed	16 MHz

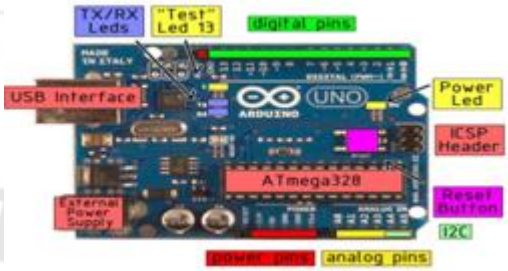


Figure 3.2

3.1.2 Relay

Relays are simple switches which are operated both electrically and mechanically. It consists of a n electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. The main operation of a relay comes in places where only a low-power signal can be used to control a circuit. It is also used in places where only one signal can be used to control a lot of circuits. The application of relays started during the invention of telephones. They played an important role in switching calls in telephone exchanges.

Working of Relay

I will first explain what and how the basic relay operates. Each relay has two mechanical parts inside. The first one is the contact(s) of the relay. The contacts operates similarly to the contacts of simple Switch of push button. You should consider the contacts as a pair of Metals like the following diagram:

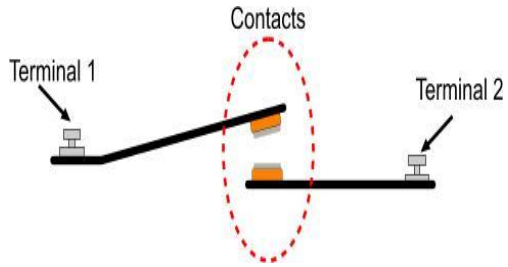


Figure 3.3

The two terminals operate as a switch. When the contacts are 'in contact' then the current flows from Terminal 1 to Terminal 2. There are two types of contacts:

The NO and NC. NO stands for **N**ormal **O**pen contact, while NC stands for **N**ormal **C**losed contact. The Normal Open is a contact like the one showed in the previous illustration. When the contact is still, then no current flows through it (because it is an OPEN circuit).On the other hand, a Normal Closed contact allows the current to flow when the contact is still.[15]

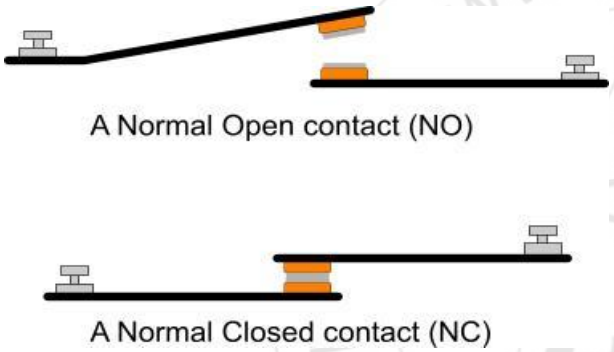


Figure 3.4

3.1.3 Shift Register 8-Bit - 74HC595:-

We use 8-Bit shift register. At one point or another, you're inevitability going to run into the problem of not having enough pins on your Arduino to meet the requirements of your project or prototype. The solution to this problem? A shift registers!

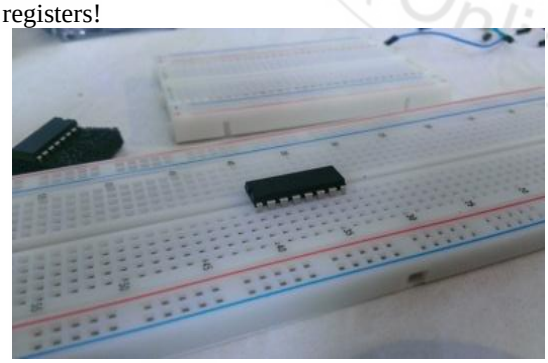


Fig 3.5

A shift register allows you to expand the number of pins you can use from your Arduino by using what is known as bit-shifting. If you have much experience with programming, there's a good chance you have come across bit-shifting previously. For the purpose of this guide though, we'll assume no prior knowledge.[16] In order to complete this guide you will need the following parts:

- An Arduino Uno
- A breadboard
- A 74HC595 shift register
- 8 LEDs
- A lot of jumper cables

Turning it on:-

Make the following connections:

- GND (pin 8) to ground of the arduino.
- Vcc (pin 16) to 5V of the arduino.

This set up makes all of the output pins active and addressable all the time. The one flaw of this set up is that you end up with the lights turning on to their last state or something arbitrary every time you first power up the circuit before the program starts to run.

Connect to Arduino:-

- Pin 3 of the IC 74595 is data pin it is connected to Ardunio Digital Pin 11.
- Pin 6 of the IC 74595 is to be connected to Ardunio DigitalPin 12.
- Pin 5 of the IC 74595 is to be connected to Ardunio DigitalPin 8.[17]

3.1.4 Battery

Electric battery is a device consisting of one or more electrochemical cells that convert stored chemical energy into electrical energy. Each cell contains a positive terminal, or cathode, and a negative terminal, or anode. The 12 Volt current is pass to the relay with the help of a battery. Another 5volt battery is used to give power to filament, the –ve pole is connected to the filament and +ve poles is connected to the relay.

3.1.5 Filaments

A very fine thread or thread like structure .The filament is burn when the current is passing through the wire from the relay and the battery.

3.1.6 Explosive Material

An explosive material is a reactive substance that contains a great amount of potential energy that can produce an explosion if released suddenly, usually accompanied by the production light, heat, sound, and pressure. The explosive material is set in any area where we want the explosion. When the current is passing and filament is burn then the blast is done.

3.2 Architectural Design

The entire components are connected with each other in a proved sequence. The Server will communicate to the arduino and give the command of the explosion. The arduino will communicate to the shift register and shift register will communicate to the relay. 12 volt current is give to the relay with the help of a 12 volt battery. With the help of the wire the filaments are connected to the relay. The explosive materials are set near to the filament. When the filament is burn the explosive material get the fire a blast is done.

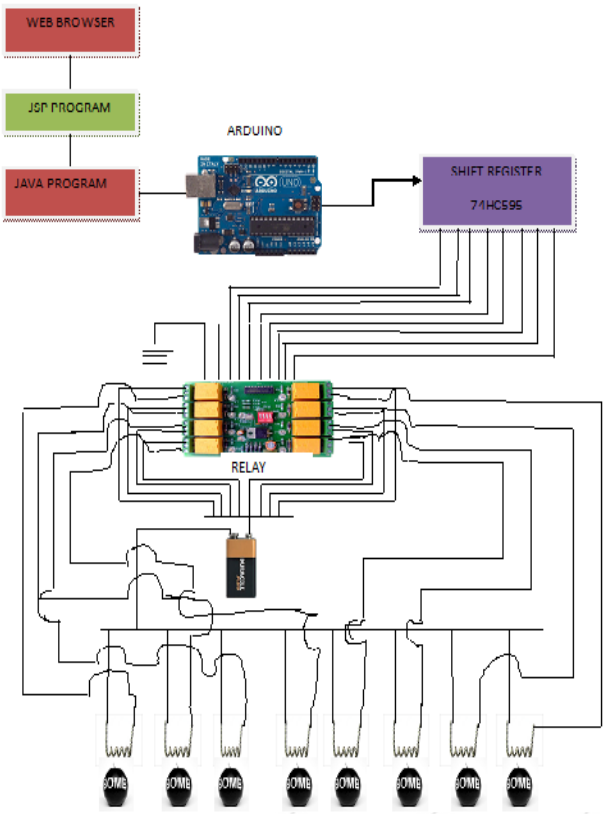
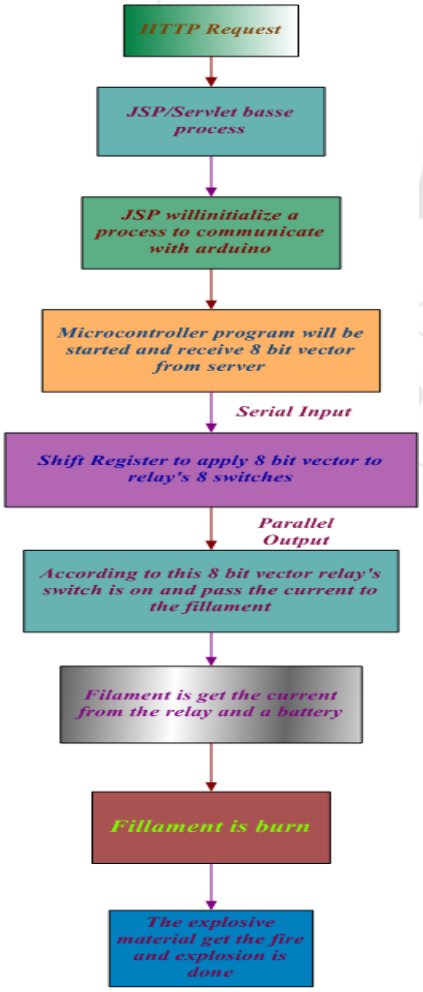


Fig 3.6

3.3 Work Flow



4. Realization

A client gives a command to the server. An http request is done. JSP/Server bases process is done. JSP program will initialize the process to communicate to the arduino. Java program is handling the arduino and send the 8 bit vector to the arduino. Microcontroller program will started and receive 8 bit vector from the server. The 8 bit vector will serially provide by the arduino to the shift register. The shift register get the serial input and provide the parallel output to the relay. According to this 8 bit vector relay's switch is on and passes the current to the filament. When the current is passing to the filament, the filament is burn and when the filament is burn the explosive materials get the fire and explosion is done safely.

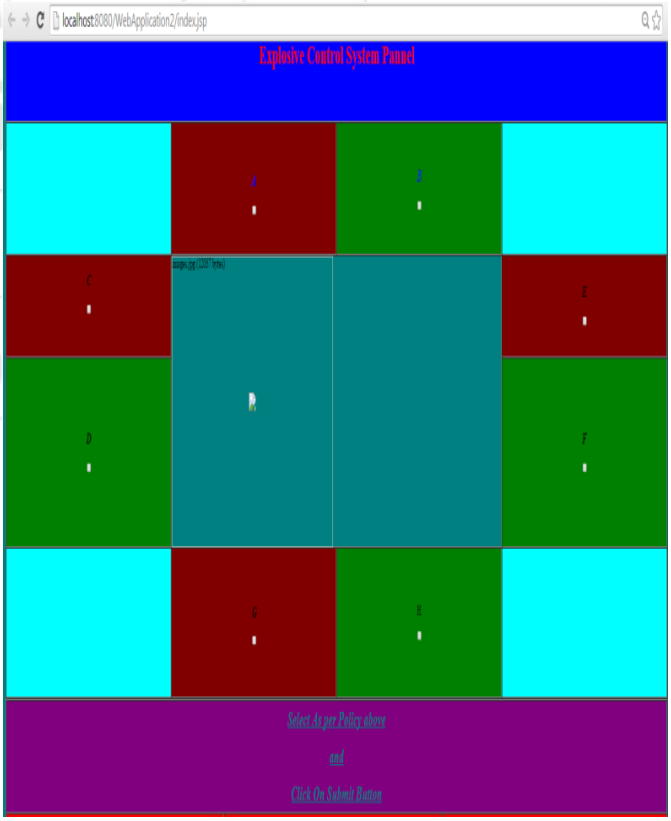
5. Result & Analysis

Advantages

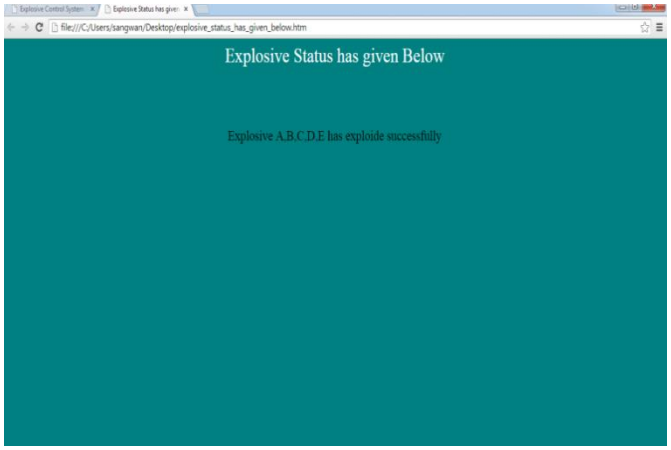
- Easy to use
- Global management
- Integrated Privacy and security
- Implementation with existing infrastructure
- Long term solution
- WWW administration
- It is safe
- Very helpful in disaster management.

Result:-

- User gives the command of the explosion

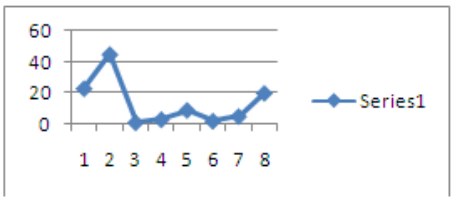


- The explosion is done successfully

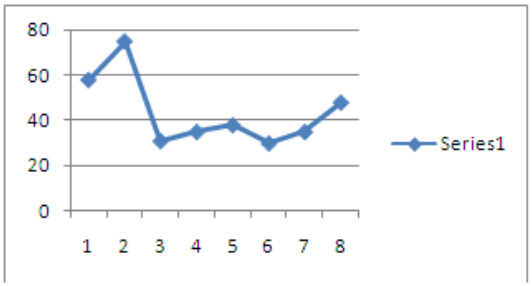


Message Send Time	Message Received Time at Application Server	Exploide Tme	Diff A and B	Diff B & C	Total
23	58	60	35	2	37
45	75	78	30	3	33
1	31	32	30	1	31
3	35	36	32	1	33
9	38	38.9	29	0.9	29.9
2	30	31.4	28	1.4	29.4
5	35	36	30	1	31
20	48	50	28	2	30

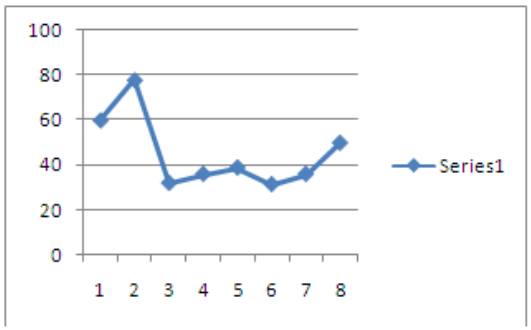
- Message Send Time:- Message is send to the server.



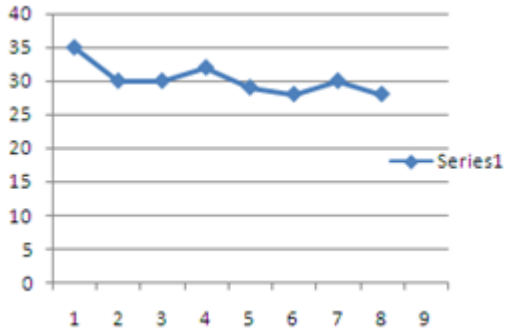
- Message Received Time at Application Server



- Explode Time

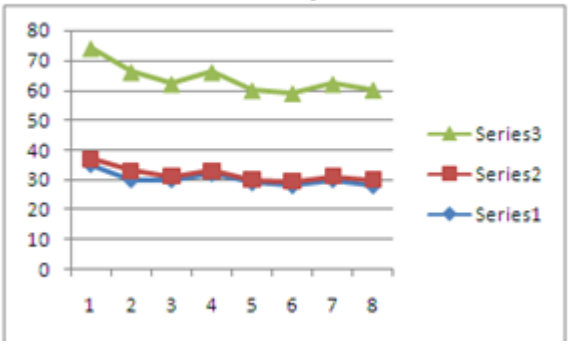


- Difference between the message send to the server and received by the server.



Conclusion

- Difference between th overall processes.



The system for the “Ethical Explosion” has a vast scope & almost limitless application today’s technology driven market. The system can be made efficient by modularizing each and every component of the system. The explosion is done very easily and safely across worldwide level with the help of this system.

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