



SRESA *Newsletter*

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SRESA (Chennai) Chapter Organizes National Conference on 'Reliability and Safety (NCRS-2022)' from 10/03/2022 – 12/03/2022 – Invites all to Participate

Editors

Prabhaka V. Varde
P.Vaishnavi

SRESA Mission

Having, adequate national codes, standard and guides, is one of the attributes, for a nation to be called as Advanced Nation. SRESA has in its charter - the development of codes, standards and guides in the area of Risk and Reliability, keeping in view national requirements. The codes, standards and guides developed by SRESA will be submitted to Government agencies for their approval, to facilitate their use in government, industrial and societal sectors.

From the President's Desk

I am glad to share with you that SRESA's flag bearer - the International Journal of 'Life Cycle Reliability and Safety Engineering' will be completing 10 successful and eventful years with the publication of 4th issue in 2021. This will mark an important milestone in SRESA's endeavour to take to the masses important research and development work being performed across the world in academic and R&D institutions, to their peers, students, scholars, academician and researches for furthering /referencing research and growth of science of Risk & Reliability at national and international level.



SRESA's Indian Institute of Risk and Reliability in association with safety Critical Systems lab, IIT Madras has hosted an webinar with the launch of SRESA Indore Chapter. The Chief Guest of Webinar was Prof. Neelesh kumar Jain, Director (officiating), IIT Indore. Guest of Honor was Prof. Oliver Straeter, University of Kassel, Germany. The key note speakers were Prof. Raghu V Prakash, IIT Madras, Prof. P.K. Kankar, IIT Indore, Prof. Guru Prakash, IIT Indore and; Mr. Surendra Yadav, RRCAT, Indore presented his doctoral work. The Presidential address was delivered by Prof. P.V. Varde and Welcome address by Shri. A.S., Ex-RRCAT and Dr. Rishi Pal Yadav, RRCAT while compering the programme, delivered the Vote of thanks. The first article in this issue presents the proceedings of the this webinar.

- Prabhakar V Varde

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Establishment of Center of Excellence on Safety Critical Systems at Indian Institute of Technology Madras, Chennai - Editorial Note

A Proposal is at an advanced stages to establish a Center of Excellence (CoE), in Department of Mechanical Engineering, at Indian Institute of Technology Madras, Chennai. I am happy to bring to your kind notice that SRESA will be playing an active role collaborating and supporting the academic and R&D activities at this Center. The project activities have been scheduled in three Phases running over total seven years. The major activities in the first phase includes starting course work in the area of risk and reliability aspects for safety critical systems. Also, it is proposed to establish a Safety Critical Systems lab in the subject area housing facility for environmental testing to facilitate research on material degradation behaviour, reliability testing, root cause analysis as also engineering component qualification testing in general and electronic components in particular. Research and development in the area of Physics-of-Failure (PoF) and Prognostic & Health Management (PHM) has been also been proposed. SCS will be open to developing Probabilistic Risk Assessment (PRA) Studies for Safety Critical Systems, viz, Nuclear, Defence, Aviation, Space, Railway, Process and Chemical Systems. Application of Digital Twins to safety critical Systems is one of the major areas of research in this lab. Members will be updated time to time on the progress of CoE-SCS activities.

SRESA'S Webinar- Reliability and Safety of Complex Engineering Systems – Report

Authors

Dr.P. Vaishnavi, Dr. Rishi Pal Yadav

SRESA's Indian Institute of Risk and Reliability in association with safety Critical Systems lab, IIT Madras has hosted an webinar with the launch of SRESA Indore Chapter. The Chief Guest of Webinar was Prof. Neelesh kumar Jain, Director (officiating), IIT Indore. Guest of Honor was Prof. Oliver Straeter, University of Kassel, Germany. The key note speakers are Prof. Raghu V Prakash, IIT Madras, Prof. P.K. Kankar, IIT Indore, Prof. Guru Prakash, IIT Indore and Mr. Surendra Yadav, RRCAT, Indore.



Invitation for the SRESA Webinar on Reliability and Safety of Computer Engineering Systems & Launch of SRESA (Indore) Chapter.

The Presidential address was delivered by Prof. P.V. Varde and Welcome address by Shri. A.S. Joshi and Dr. Rishi Pal Yadav while compering the programme, delivered the Vote of thanks. The invitation for the Webinar shown in Figure 1 provides the programme details.

Introduction and Highlights of Webinar

National, May 29, 2021. India is emerging as strong economy and its automobile, healthcare, pharma, nuclear, space sectors are growing at a pace never before seen or imagined. For India to accelerate this growth scenario, the reliability and safety of Indian products, infrastructures, assets and services should surpass all international bench marks. It is more true for safety critical systems, like nuclear, accelerators, space, aviation and transport systems that include rail and road transport systems. This is the only way to effectively achieve the national initiatives like Atmanirbhar Bharat and Make in India programmes.

The Society for Reliability and Safety (SRESA) established in 2010 has been working on this mission i.e. augmenting the already existing academic and research base to promote reliability and safety programmes such that Indian requirements can be effectively catered. The major objective is to create a risk and reliability conscious society where not only engineers but also all the section of society are aware of importance of reliability and safety in their day to day life. Indore is considered as the one of the important city in Indian and has distinction of being a commercial, Industrial and educational base in M.P. The subject of the webinar is more relevant to Indore in general and area around Indore. The growth of Indore can be

characterized by phenomenal growth of its assets i.e. industries, research centres like RRCAT - running mega machines like Indus-2 accelerators, healthcare systems, academic and research institutions like IIT, IIM, and other engineering institutions. These working on development of human resource, systems and other societal applications, particularly, rail and road transport etc. SRESA has been working relentlessly on this mission and emerged as one of the important organizations, not only in India but at international level. SRESA's flagship product the Int. Journal on Life Cycle Reliability and Safety Engineering has made its marks in many countries. SRESA's International Conference on Reliability, Safety and Hazard (ICRESH) being organized since 2005 has become popular amongst the researchers and experts not only from India but all over the world to present and discuss their results. Similarly, the national conference on reliability (NCRS) exclusively dedicated to national subjects has become a forum for exchange of ideas amongst the national level scientists and academicians across India.

SRESA has been working on many important areas of national importance. One of the major initiatives is setting up of a national institute Indian Institute of Risk and Reliability which will have its focus on academics and research in the area of risk and reliability and issues related to national importance. There are many areas like development of technical codes and standards, development of computerised software in support of reliability and risk analysis etc.

Welcome Address by Shri A.S. Joshi:



I welcome all the registered participants to webinar being held on occasion of opening of the Indore chapter of SRESA. The city of Indore, the medieval capital of Maharajas from the Holkar dynasty is presently a modern cleanest city in India and has very reputed national level educational and technical research institutes like Raja Ramanna Centre for Advanced Technology(RRCAT), and IIT(Indore). Many of

the technologists and researchers in Indore have been working in the field of reliability and safety and are members SRESA (Society of reliability and safety) with its head office in Mumbai. The opening of Indore chapter will bring together technical experts working in mainly the areas of accelerators and lasers and the professional expertise of scientists working in the areas of reliability and safety.

Today's webinar is being jointly organised by SRESA's Indian Institute of Risk & Reliability(IIRR) and Safety Critical Systems Lab, IIT, Madras and is titled "Reliability and safety of complex Engineering Systems". The topic of the webinar suggests it's usefulness to technologists working in complex engineering systems like accelerators in RRCAT, Indore. The organisers of the seminar are happy to have great luminaries like Prof Nilesh Kumar Jain, Director, IIT, Indore who is himself a leading researcher in the field of Production Engineering as the Chief Guest of the webinar and Prof Oliver Straeter from University of Kassel, Germany who is a leading researcher in the field of human behaviour and reliability as our Guest of honor. In addition to the dignitaries, the webinar has many interesting technical key note presentations from our own SRESA members Prof Kankar, Prof Raghu Prakash and Prof Guru Prakash. And an invited talk by Shri Surendra Yadav.

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Presidential address by Prof. Prabhakar V Varde



The Chief Guest of today's Inaugural Programme - Prof. Neelesh K. Jain, Director (Officiating), Indian Institute of Technology, Indore; Guest of Honor Prof. Oliver Straeter, University of Kassel, Germany; Key note speakers, Prof. Raghu V. Prakash, Indian Institute of Technology Madras ; Prof. Pavan Kumar Kankar, and Prof. Guru Prakash, IIT Indore; Invited speaker Shri Surendra Yadav, Scientist, RRCAT, Indore; Shri A.S. Joshi, Webinar Director;

distinguished and senior dignitaries, representative from media, participants of the seminar, ladies and gentleman.

It is an honor and privilege for me to be part of this SRESA Webinar on Reliability and Safety of Complex Engineering Systems organized by SRESA's IIRR in association with Safety Critical Systems Lab, IIT Madras. My personal thanks and gratitude to Prof. Neelesh Kumar Jain and Prof. Oliver Straeter, for gracing this occasion. I hope that the participants will benefited from the proceedings of this webinar. I also feel elated with the overwhelming response received from our participants.

When we look at the record of unfortunate accident from the existing databases, it obviously generates an urgency and inspire us as a conscious society to do something about it. Many of you may not be aware that in India, on an average over 300 human lives are lost per day in fire accidents; around 400 persons /day die due to road accidents. In Madhya Pradesh alone on-an-average, over 30 human die in road accident and do not return home.

There are more statistics of railways, aviation, for example, 2-7 / day deaths occur on track in local train accidents in Mumbai. We have still not forgotten frightening memory of Union Carbide accident, ~ 35 years ago on December 2 -3, 1984, in Bhopal, Madhya Pradesh caused by leakage of Methyl Isocyanate in public domain and left over 3700 fatalities and many fold long term consequences. Many of you must be knowing that human contribution to incidents ranges from 50% to 90% in in many sectors. One of the major challenges that the safety community has been facing is to reduce human error. There is recognition that human reliability is an important element of systems reliability.

These data convince us that risk and reliability are the important areas that need to be our priority in India, particularly, if India has to effectively embark on Atma Nirbhar Bharat and Make in India initiatives and shine on world stage as a Super Power in the coming time. The specific message is that if awareness about the risk and reliability programme makes the society at large in Indore, Indore can lead

other cities towards creating an awareness about reliability of product and services and risk reduction in industries and societal domain.

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One additional and vital observation has been that the traditional reliability and risk assessment procedures, even though very useful (towards providing a quantitative estimate of risk and reliability and associated parameters that is vital in support of operational and regulatory decision making), reveal only a part of the story, that is the probability of event; they are incapable of providing the information about root causes of failure and instant of failure. Knowledge about the cause of failure, accessed through the physics-of-failure approach or root cause analysis is vital towards avoiding recurrence of the failure.

Further, the assets management requires advanced diagnostics / prognostics and health management techniques to improve the system reliability and safety by detecting the onset of failure in advanced towards eliminating or reducing the the consequences of failure.

From this perspective, today's seminar is relevant, as the speakers in this seminar, will be discussing, the state-of-the art in the reliability improvement and risk reduction techniques, by employing deterministic and probabilistic approaches. Of course, the discussion is focused not only on hardware but human reliability also. Apart from this, one more striking features of this webinar is that many speakers here will discuss the deployment of intelligent or machine learning algorithms in their respective areas of expertise. So, this seminar has this distinction that it discusses how to track performance or failure precursors and avoid or reduce the chances of the catastrophic failure at component, system and plant level – A critical objective function of risk and reliability.

One more interesting feature of this webinar is that it is being organized in INDORE. Of course all of you know that Indore has earned this reputation of THE CLEANEST CITY IN INDIA FOR FOUR CONSECUTIVE YEARS. This shows that INDORE has this potential consciousness for embracing improvements and respect for human life. There is a demonstrated awareness in Indore and capability to respond against the unhygienic condition that can adversely affect the human life, On similar line, I hope there is a potential individual and collective consciousness exists towards responding to the high RISK factors in the society, that is causing, loss of life, property, economics, and reputation, etc..

The message is loud and clear the human consciousness to risk aversion should be raised to avoid the repeats of past miseries. And the good news is that Indore as a society which is receptive to positive developments can work towards raising the risk and reliability consciousness. For this to happen the academics and institutions, in the area are supposed to take the lead in creating the right awareness. The road transport, industrial safety, fire, asset and infrastructure induced accidents / events, are just few areas need special attention.

This is one reason, the SRESA Indore Chapter is being launched today ... I hope that not only Indore but area around Indore will see the benefits of this initiative of SRESA

Brief Introduction & highlights of the Chief Guest, Prof. Neelesh Kumar Jain's Presentation



Introduction of Chief Guest Prof. Dr. Neelesh kumar Jain is Director, IIT, Indore and he has completed his B.E. from SGSITS Indore in 1993 and has done M.Tech and Ph.D from IIT Kanpur.

Prof. Neelesh kumar Jain has played significant role in developing Under Graduate and Post Graduate curriculum, academic infrastructure and in setup of academic procedures, IIT Indore. He played significant role in the development of Virtual Classroom (VCR) under National Knowledge Network (NKN) and Central Workshop. He has developed five state of art research and teaching labs at IIT Indore. Prof. N.K. Jain has published more than 118 papers in refereed journals, National and International conferences and authored more than 6 books. He is editorial board member in Journal of Micromanufacturing and is associate editor for International Journal of Precision Technology.

Highlights of Dr. Neelesh's Presentation

Dr. Neelesh delivered his talk on "Reliability in Today's scenarios" and the important focus in all fields of Electronics, Chemistry, pharmaceuticals, medicine, vaccine all needed to be of high reliability. He quoted that how we can get inspired from nature towards making reliable products like heart filters like kidney and lungs that works without failure throughout the life of person. He complemented the efforts being done by SRESA towards spreading the reliability awareness in India. Also he informed that at IIT Indore the Centre for Excellence for gears is working for the reliability of gears and extended its service can be explored. He further talked about the need of Introduction of reliability at graduate and post graduate level and counted some of IIT's are already having some of these courses. He further emphasis on the need of extending such courses at larger level in colleges and Universities.



Prof. Oliver Straeter, Introduction and highlights Inaugural Talk

Prof. Oliver Straeter is well-known personality from the field of reliability and is known for his work in the field reliability assessment regarding the human impact on the safety of complex systems like nuclear installations and Air- traffsyc control. In this talk he is going to

discuss about the human automation issues, and how these issues can be resolved by conducting a combined reliability analysis of the automated systems and its limitations combined with human performance analysis and human limitations.

Highlights of Inaugural Talk

Prof. Oliver Strater, from University of Kassel, Germany talked about the human reliability and emphasized in hazardous industries the safety and reliability of the system is highly dependent of the appropriate treatment of the human impact on the safe functioning of the system and showed with example from aviation and auomatic driving vehicle case studies that to avoiding severe accidents the safety impact of human - automation relationships are essential to be taken into account and accordingly analyzed.

Introduction about Prof. P.K. Kankar Keynote Speaker

Prof. Pawan kumar Kankar has published more than 100 papers in refereed journals National and International conferences and has published 3 books. Prof. Kankar has guided 5 Ph.D thesis. Prof. Pawan kumar kankar is member of American Society of Mechanical Engineers, Society for Reliability and Safety (SRESA) and fellow of International Institute of Acoustics and Vibration.



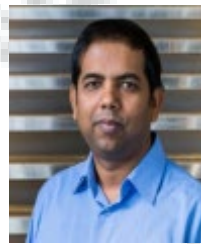
Introduction about Prof. Raghu Prakash Keynote Speaker

Prof Raghu Prakash is a Senior professor with the Department of Mechanical Engineering, IIT Madras and he specializes in the area of fatigue, fracture materials (metals, composites, hybrids), transportation apart from new product design. He has more than twenty five years of experience in the field of fatigue, and fracture; has more than 131 papers in refereed journals and has published 4 books. Prof. Raghu Prakash has guided 16 Ph.D thesis. Prof. Raghu V Prakash is Editor - in- Chief, for Journal of structural Integrity and Journal of Life Cycle Reliability and Safety Engineering. Prof. Raghu V Prakash has been the Vice- Chairman of, ASME Technical Committee on Materials Processing, Materials Division, 2018 and Chairman for the ASME Technical Committee on Materials Processing, Materials division, 2019.



Introduction about Prof. Guru Prakash Keynote Speaker

Prof. Guru Prakash had completed his B.E from IIT Kanpur in 2005 and has completed MAsc and Ph.D from University of Waterloo, Canada. Presently Guru Prakashji is Asst.Professor at IIT Indore. He has published more than 19 papers in referred journals, national and International conference. He is life member for Society of Reliability and Safety (SRESA). He has been honored with certificate of reviewer recognition for the year 2019 by IEEE.



Introduction about Mr. Surendra Yadav Invited Speaker

Mr. Surendra Yadav has received the degree of Bachelor of Engineering in 2003. He is working as scientific officer in Raja Ramanna Centre for Advanced Technology, Indore, India. He is involved in design and development of various beam diagnostics systems for Indus Accelerator.



Launching of SRESA (Indore) Chapter

One of the major highlights of the webinar was the 'Launching of SRESA-Indore Chapter' by President SRESA, Prof. Prabhakar V. Varde. He expressed happiness that this event kicks off the functional activity of SRESA-Indore Chapter and will fulfil the regional academic and research aspirations in and around Indore. There was a consensus that this event will light a new consciousness on Safety and Reliability in the region.

Health Care Informatics: FMEA analysis for critical datasets in cloud database

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1. Introduction

In Medical field, earlier diagnosis of the disease would help to analysis the facts and to cure the disease for the patient [1]. In order to improve the life time of the patients; the hospital has to maintain patient's dataset in electronic storage devices. Threat of Medical errors is biggest challenges in healthcare informatics which lead to the malfunction of devices and warning to patient's health status. The criticalness is affected by two approaches either by human error or systematic device error [4][5]. In the risk analysis, the phenomenal task is to identify the failure and impacts on the device process. U.S. Joint Commission on Accreditation of Healthcare Organization (JCAHO) and the International Organization for Standardization (ISO) enforce the task of performing risk analysis. The aim of the FMEA analysis in health care datasets in cloud is to ensure Patients safety, unsafe design and manufacturing defects of medical devices and the sensitive healthcare data will be protected [2]. FMEA technique for analyzing risk assessment for patient Health care system to find potential severity of risks associated with them. The FMEA also discover the severity and occurrence of failure of data in the cloud service. In Root Cause Analysis (RCA) and sentinel event analysis, which are carried out after an adverse event occurs, failure modes and effects analysis (FMEA) is used prospectively to identify possible system failures and to fix these risk priority numbers and determination of action plan.

Risk priority number from expert opinion and statistical calculation catastrophic patient injury often occurs because of an unanticipated sequence of active failures and latent conditions, which are difficult to foresee. Such "sentinel" events can be understood by creating similar conditions and studying the team performance to understand the vulnerabilities and the failure modes.

Hue (Hadoop User Experience) is an open-source Web interface that supports Apache Hadoop and its ecosystem, licensed under the Apache v2 license. It has fascinated features which is an open source Analytics Workbench for browsing, querying and visualizing data. Its concept works in many applications like Editors for Hive, Impala, Pig, MapReduce, Spark and any SQL like MySQL, Oracle, SparkSQL, Solr SQL and Phoenix. The type of application is Dashboards to dynamically interact and visualize data with Solr or SQL which is Scheduler of jobs and workflows. The browser Jobs are, HDFS, S3 files, SQL Tables, Indexes, Git files, Sentry permissions, Sqoop and more. Hue is also present in some major Hadoop distributions (CDH, HDP, MapR, AWS EMR) and demo VMs.

The working process of hue is shown in figure 1. It shows that, the hue server is a "Container" and web application sits in between CDH (Cloudera Distribution Including Apache Hadoop) installation and the browser. It hosts the Hue applications and communicates with various servers that interface with CDH components

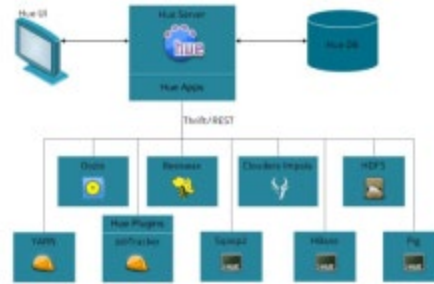


Figure 1: Hue Working Process

Cloudera's open source Apache Hadoop distribution, CDH targets enterprise class deployments of that technology. Cloudera says that more than 50% of its engineering output is donated upstream to the various Apache-licensed open source projects (Apache Hive, Apache Avro, **Apache HBase**, and so on) that combine to form the Hadoop platform. The query in the health care database is transformed as Hadoop data files either produced by MapReduce or loaded into Hive tables. The YARN resource management component lets the Impala coexist on clusters running with batch workloads concurrently with Impala SQL queries. The Cloudera Search Provides near real-time access to health care datasets stored in or ingested into Hadoop and HBase. Search provides near real-time indexing, batch indexing and full-text exploration on the specific files stored in the database. Fully integrated in the data-processing platform, search uses the flexible, scalable, and robust storage system included with CDH. This eliminates the need to move large data sets across infrastructures to perform business tasks. The Cloudera Navigator – an end-to-end data management and security tool for the CDH platform and enables administrators, data managers, analysts to explore the large amounts of data in Hadoop, simplifies the storage and management of encryption keys. It provides data governance for Hadoop, offering capabilities such as data discovery, continuous optimization, audit, lineage, metadata management and policy enforcement. Cloudera Enterprise helps to meet regulatory compliance requirements and Cloudera Navigator Optimizer (beta). A software as a service tool to provide insights into workloads and recommend optimization strategies.

2. FMEA Analysis in Healthcare Monitoring System

The FMEA implementation steps are choosing a process to be studied, assembling a multidisciplinary risk management team and organizing information on the process studied, conducting a hazard analysis, developing and implementing actions and outcomes measures with two analysis such as Failure Mode Effective Analysis (FMEA) and Criticality Analysis (CA). The main measures are Severity (S), Occurrence (O) and Detection (D). FMEA identifies and removes hazards, ensure

the safety and increasing customer satisfaction. It can also be applied to the design of medical device in order to prevent errors, accidents and adverse reactions [10, 11]. Healthcare organisations may use FMEA to determine failure mode that could be obviated with technology software and hardware solutions and work with device vendors to achieve these changes. Although contributions about FMEA/FMECA underline the usefulness of this method to evaluate risks in medical devices, some recent contributions identify some limitations [3,4], especially when it comes to the reliability and validity of the FMEA process and its output. Some authors highlight the mathematical limitations of FMEA output, the risk priority number (RPN) and the different modes of FMEA application in practice [6]. In fact, there is considerable variation within the process steps, e.g. in team composition, frequency of meeting, duration and quantization of the probability. The main fault of FMEA therefore deals with subjectivity, although the use of numerical scores gives an impression of mathematical impartiality.

The evaluator assign the FM based on the of S, O, and D and it gives a risk priority number (RPN). The average values of S,O,D and RPN were assigned to different FMs. The FMs were sequenced according to their final RPN. As on other analyses published [14] a threshold value of RPN and S was chosen, above which the number of FMs was manageable to analyse these failures more thoroughly.

FMs with $RPN \geq 50$ were prioritized and new tools for quality management were proposed to avoid a recurrence. Similarly, the FMs with $S \geq 7$, even with latively low RPN value were also given priority because it was deemed necessary to implement the corrective action.

The working process of hue is shown in the above figure 1. It shows that, the Hue Server is a "container" and web application sits in between CDH (Cloudera Distribution Including Apache Hadoop) installation and the browser. It hosts the Hue applications and communicates with various servers that interface with CDH components.

The inputs of the healthcare monitoring systems are Devices, Software System, Catastrophic errors and Data from cloud has to be analyzed to treat the patient with reliable and safe. In order to solve this catastrophic error, process on reliable analysis has to be performed for health care system with cloud service. This approach initiates a new paradigm shift in the process analysis error "Mitigation" approach has to be adopted. The Failure Mode Analysis is a systematic and structured analysis procedure to detect the error by processing the entire dataset for failure analysis.

In the failure mode its sequences towards the effect, the potential failure probability and an error correcting procedure have been adopted to detect the occurrences and to do necessary action (O -Occurrence, S - Severity, D - Detection).

$$RPN = O \times S \times N$$

Cloud dataset has to be analyzed to identify the fault associated with Health care systems. This reliability on cloud dataset analysis enforced to improve the patients safety. A cloud service in health care EHRS has formed success with cloud services.

3. Cloud in Healthcare Security

Software system will degrade over time,

- 1) Software will leak memory and resources (Eg.) Application framework operating system and device drivers.
- 2) File system will fragment over time and impact performance.
- 3) Hardware devices will physically degrade over time.

The Hospital Cloud service is taken for the FMEA analysis to identify the failure mode and its severity towards its Catastrophic errors. The potential failure mode analysis in the cloud database will enhance the quality of treatment and emphasis the severity of the operational failures during the feed of datasets in the hospital monitoring system. The design framework to improve the failure analysis by performing FMEA analysis in the design level of establishing health monitoring system and a periodic assessment of failure modes will enhance the quality of treatment towards the patient. In the case of radio therapy treatments many of the critical occurrences due to failures in the controlling component [1]. In this case the change in the pattern towards quality management in radio therapy is emphasized [2]. This research paper, we enforce the issues of analyzing concepts on potential failure in the cloud database. Risk analysis using FMEA identifies the possible potential failures during the process of dataset in the health monitoring system. The methodology will be adopted in the process such that one of the expert team is to identify the errors, failure sequences, severity of the problems and reason for the possibility of potential failure in the system cloud database. The need for the risk analysis is ensure safety of the patient and to improve the quality of treatment [12]. In most of the hospitals the quality assurance [9] programs were not initiated properly and the risk in the treatment process and this makes the problem more severe.

In the FMEA analysis process, initially a team experts have to be involved to analysis the health monitoring system and the cloud data storage for potential errors. The history of failures in the system during the operating of system with dataset in the cloud environment is analyzed. This system is connected to patient monitoring system. This step of analyzing the datasets in cloud gives clarity of analyzing procedure to identify the risk factors prevailing in the existing system. The next step in the procedure is the brain storming procedure [13] which will be adopted by the team members to continuously monitor the cloud datasets during the patient treatment process and records the possible events of errors during the process of treatment. Also the team will identify the possible cause and consequence of error leads to failure of the specific component. The specific design framework for potentially will be developed to identify the causes and its consequences in the data health monitoring system [7,8].

Results and Discussions

In essence, the evolution of Hadoop as a viable large-scale data management ecosystem has also created a new software market that's transforming the business intelligence and analytics industry. This has expanded both the kinds of analytics applications that user organizations can run and the types of data that can be collected and analyzed as part of those applications. The Cloudera HADOOP distributed system allows the datasets in cloud environment to process for data analytics, high level search using indexing and direct access to the storage system. The Cloudera is able to perform interactive SQL query executions in the

stored cloud databases. The real time data processing and indexing can perform complex text searches. The search process in the hospital cloud database is used to diagnose the patients' health status, monitor the medical records and extraction of reports i.e. daily, monthly.

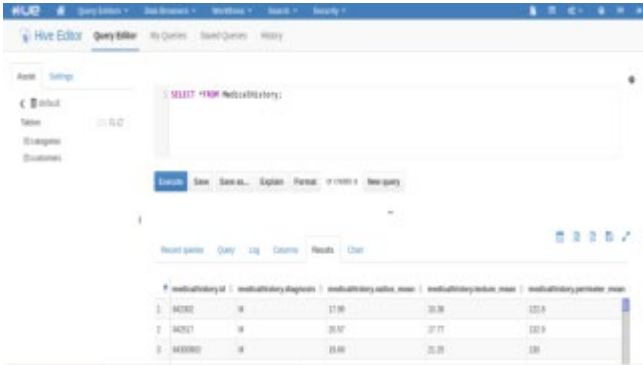


Figure 2 Hue editor

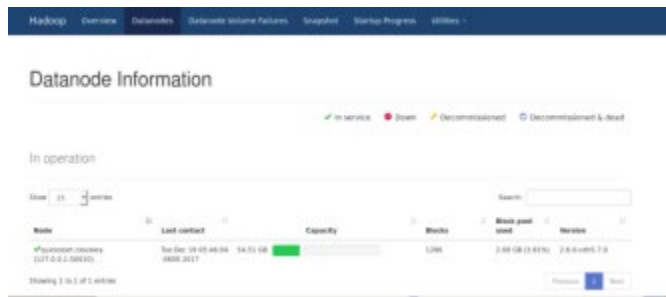


Figure 3 Data node information

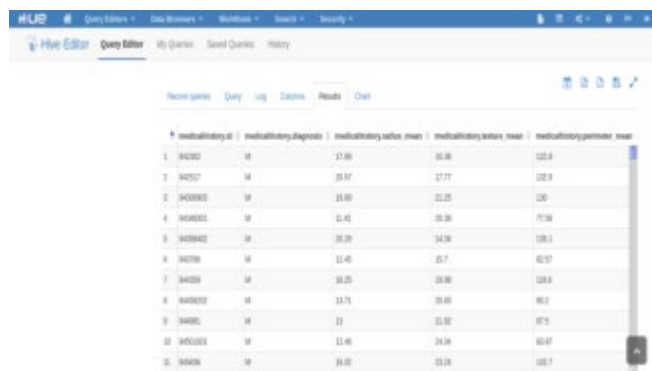


Figure 4 Data node information

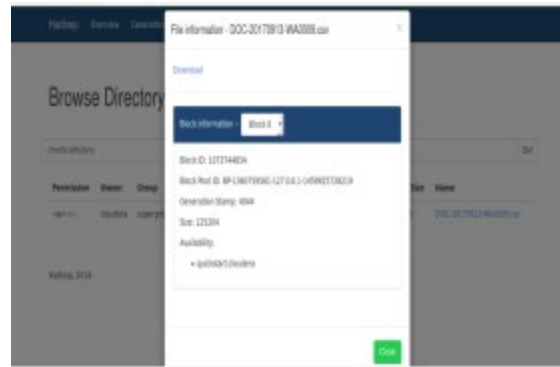


Figure 5 Block information

The important causes of error are inadequate training, lack of documentation; heavy patients work load, equipment and hardware/software malfunction. Due to this the patients were affected by wrong medicine distribution it leads to unavoidable situation. The result shows that FMEA analysis enforce the operators to perform the preventive and maintenance procedure in handling the patient's health care services and also gives a proper guidance to handling the emergency situation.

Conclusions

This paper discussed the FMEA in cloud environment for the critical datasets. The intensive data analytics process are evaluated and the risk factors are found during device operation. The important causes of error are inadequate training, lack of documentation; heavy patients work load, equipment and hardware/software malfunction. Due to this the patients were affected by wrong medicine distribution it leads to unavoidable situation. The result shows that FMEA analysis enforce the operators to perform the preventive and maintenance procedure in handling the patient's health care services and also gives a proper guidance to handling the emergency situation.

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Authors Profile



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Invitation for the National Conference on Reliability and Safety Engineering

SRESA since its inception in 2010, has been organizing International and national events in the area of risk and reliability. In fact, SRESA has organized 4 International and National Conferences,

During COVID times it is not possible to have the traditional approach to seminar where the dignitaries and participants present themselves face to face and discuss the subject and exchange programs. It is scheduled to conduct National Conference on Reliability and Safety Engineering March 10th - 12th, 2022 NCRS'22 is a focuses on latest developments in niche areas of reliability, probabilistic safety assessment. In this technical forums researchers and scientists creates an platform for discussion pertaining to all aspects of reliability, safety, risk assessment, topics for future research and their application to wide range of areas including industry, safety critical systems, nuclear power plant, security systems etc., The Conference encourages every technical papers to be focused on certain thrust areas of Physics of Failure, Uncertainty analysis reliability prediction, prognostics and Health Management. The topics is not limited and authors are encouraged to submit their research articles with wide scope and to share their knowledge through these technical forums.

NATIONAL CONFERENCE ON RELIABILITY AND SAFETY
(NCRS-2022)
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SOCIETY FOR RELIABILITY AND SAFETY (SRESA) - CHENNAI CHAPTER
CENTRE OF EXCELLENCE IN SAFETY CRITICAL SYSTEMS, IT SANKARAI
Sankarai Road,
Tamil Nadu Institute of Risk and Reliability (TIIRR), C-108, NEST, Chennai, C-108, Anna University, Chennai
MARCH 10 - 12, 2022 (ONLINE)

THEME

NCRS2022 is a conference to focus the developments in the latest developments in Reliability and Probabilistic Safety Assessment. The scope and all aspects of reliability, safety, risk assessment, topics for future research and their application to a wide range of areas including industry, safety critical systems, nuclear power plant, security systems, etc.

CALL FOR ABSTRACTS

Abstracts are invited for online abstracts and extending 500 words through a google form provided to the conference website: <https://www.sresaindia.com/nrcs2022/home>

CONFERENCE TOPICS

<ul style="list-style-type: none"> Physics of Failure (POF) and its Modeling Power systems in context of Cyber Protection Automated Air Traffic Control Production Manufacturing & Assembly Engineering Reliability Modelling Aviation System Reliability Uncertainty Modelling in Structural Health Reliability Modelling Reliability Modelling Reliability Modelling 	<ul style="list-style-type: none"> Human Reliability Modeling Risk Assessment Probabilistic Safety Assessment (PSA) Reliability Modelling Reliability Modelling Reliability Modelling Risk Assessment Approach in Accident Analysis Reliability Modelling in Risk Engineering Reliability Modelling in Risk Engineering Reliability Modelling in Risk Engineering Reliability Modelling in Risk Engineering
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IMPORTANT DATES

Abstract Submission	08.03.2022
Abstract Review	15.03.2022
Final Paper Submission	22.03.2022
Final Paper Review	29.03.2022
Final Paper Acceptance	05.04.2022
Final Paper Presentation	12.04.2022
Final Paper Publication	19.04.2022
Final Paper Distribution	26.04.2022
Final Paper Archiving	03.05.2022

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DETAILS FOR CONTACT

Dr. P. Vaishnavi, Assistant Professor, University College of Engineering, BIT Campus, Anna University, Chennai. Email: pvaishnavi@annauniv.edu

Up Coming EVENT

SRESA(Tichy) Chapter:

It is proposed to organize SRESA (Trichy) Chapter in association with Anna University, BIT Campus to conduct workshop on “ Machine learning techniques for safety Critical systems – Advancing Reliability and Safety Considerations during uncertain conditions ”

Date : April 2nd, 2022

Mode of Workshop – Virtual

Invitation for Contribution to the Newsletter

SRESA Newsletter published Articles under the following major categories:

1. Brief technical article up to four pages (Max.) discussing a new idea, design, achievement in operational performance, major result(s)/finding(s) of a study or experiment, and review.
2. Insights and experiences of collaborative research, development and applied research work, visiting position and postdoctoral research, academic achievements,
3. Book review particularly, review of book written by SRESA members.
4. Announcement of upcoming conferences of having relevance to SRESA members.
5. Major events organized and activities by SRESA chapters
6. Information on publications in the form of extended abstracts by SRESA members for wider publicity

For submission of article editor on contact: newsletter@sresa.org.in,
editor@sresa.org.in

SRESA invites the engineering professionals to become member of the Society. The SRESA membership forms duly filled and signed along with applicable membership fee, as per the guidance provided at the bottom of the membership form, should be sent to the Hon Secretary SRESA at secretary@sresa.org.in. Once the SRESA executive committee approves the membership, the same will be communicated by email along with the membership Certificate. For details visit SRESA web-site: www.sresa.org.in

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Society for Reliability & Safety (SRESA)

(REG. NO. : F-43051 (Mumbai))

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OPP. CARDINAL GRACIOUS HIGH SCHOOL; BANDRA(E) MUMBAI - 400051

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MEMBERSHIP APPLICATION FORM.

MEMBERSHIP No.

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(Sangli Chapter)

1.	Name of applicant			
2.	Qualification			
3.	Affiliation			
4.	Position held			
5.	Specialization			
6.	Official address <input type="checkbox"/>	Residential Address <input type="checkbox"/>	Affix your stamp / passport size photograph and send a soft copy by email	
(Please tick the address to be used for official communication)				
7.	Brief Bio-data:			
8.	Cell phone number and email address	Email:	Cell No:	
9.	Date of birth (DD/MM/YY)			
10.	PAN Number (not applicable for student)			
11.	Type of membership (Tick applicable category)	Petron (By Invitation) : Nil Honorary Member (By Invitation): Nil Life membership : Rs. 2,200/- Membership (annual) : Rs 1200/- Student membership : Rs 500/- (Please tick the applicable category)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
12.	Payment mode: i) Cheque <input type="checkbox"/> ii) Demand draft <input type="checkbox"/> iii) On-line transfer: <input type="checkbox"/> Cheque /DD/online transfer details :Date: Amount: Name of the Bank:.....Account number.....ISFC code			
12.	Signature of applicant:			

• Please send the scanned copy of the form duly signed by email to Secretary, SRESA along with a soft copy of the passport size photograph to secretary@sresa.org.in and a copy to treasurer@sresa.org.in

• SRESA account details are as follow; Money to be transferred in favour of 'Society for Reliability and Safety', SRESA Account number: 31110442604, Bank Name: State Bank of India, Branch: Anushaktinagar, Mumbai 400094, Branch Code 010124, IFS Code: SBIN0010124;

• *will be allotted by SRESA Office.

Form was approved in SRESAme held on 16/1/2021