REPORT FORMAT OF
ALL INDIA SEMINAR/CONFERENCE/WORKSHOP
FOR PUBLICATION IN IEI NEWS

Name of Centre / Overseas Chapter:	

Title of Activity:	**Two-Day Seminar on Health Monitoring System for Building Structures using Deep Learning**
Activity under Divisional Board	

Date:	20-21 February 2025	Venue:	National Institute of Technology Puducherry

INVITATION

The Institution of Engineers (India)
Puducherry State Centre

and

National Institute of Technology Puducherry

IE(I) Students Chapter

cordially invite you to the inaugural of

A Two - day Seminar on

Health Monitoring System for Building

Structures using Deep Learning

(20 - 21 Feb 2025)

Presided over by

Dr. Makarand Madhao Ghangrekar
Director, National Institute of Technology Puducherry

Chief Guest

Dr. S. Mohan
Vice - Chancellor
Puducherry Technological University

In presence of

Dr. S. Thirougnaname	**Er. K. Soundararajan**	**Dr. S. Sundaravarthan**
Chairman	Honorary Secretary	Registrar,
IE(I) Puducherry State Centre	IE(I) Puducherry State Centre	National Institute of Technology Puducherry

Venue: SIGMA HALL, SCB, NIT PY, Date: 20-Feb-2025 @ 10:00 AM

Inauguration Ceremony Agenda

10.00am	:	Invocation Song
10.02am	:	Lighting the Lamp
10.05am	:	Welcome Address by Dr. A. Hemachander, IE(I) Coordinator, NIT Puducherry
10.07am	:	Presidential Address by Dr. Makarand Madhao Ghangrekar, Director NIT Puducherry
10.12am	:	Address by Dr K Soundararajan, Honorary Secretary, IE(I) Puducherry State Centre
10.17am	:	Address by Dr S Thirougnaname, Chairman, IE(I) Puducherry State Centre
10.22am	:	Introduction to Chief Guest Address by Chief Guest - Dr. S. Mohan, Vice-Chancellor, Puducherry Technological University
10.37am	:	Presentation of Memento's to Dignitaries
10.40am	:	Vote of Thanks by Dr Sunanda Ambulker, Faculty Advisor, IE(I) ECE Student Chapter, NIT Puducherry
10.42am	:	National Anthem

A Two - day Seminar on Health Monitoring System for Building Structures using Deep Learning
(20 - 21 Feb 2025)

20.02.2025 (Day 1)		21.02.2025 (Day 2)	
10.00 AM - 10.45 AM	Inaugural	10.00 – 11.15	Corrosion and Non-Destructive Techniques Er Vimal Mohan, Principal Scientist, CSIR SERC, Chennai
11.00 AM – 12.30 PM	Deep Learning: An Introduction Dr S Mohan, Vice-Chancellor, Puducherry Technological University, Puducherry	11.15 – 11.30	Tea Break
12.30 PM – 02.00 PM	Lunch Break	11.30 – 01.00	Corrosion and Non-Destructive Techniques Er Vimal Mohan, Principal Scientist, CSIR SERC, Chennai
02.00 PM – 03.30 PM	Deep Learning Techniques Dr Sanjay Bankapur, Assistant Professor, Department of CSE, NIT Puducherry	01.00 – 02.00	Lunch Break
03.30 PM – 03.45 PM	Tea Break	02.00 – 03.30	Structural health monitoring of slender masonry heritage structures Dr Nidhi M Assistant Professor, Department of Civil Engg., NIT Puducherry
03.45 PM – 05.15 PM	Mathematics for Machine Learning applications in Structural Health Monitoring Dr Naveen Raj Assistant Professor, Department of Mechanical Engg., NIT Puducherry	04.00 – 04.30	Valedictory

Dr. S. Thirougnaname, Chairman, IE(I) Puducherry State Centre, who highlighted IE(I)'s collaborative efforts in fostering strong industry-academic partnerships

Er. K. Soundararajan, Honorary Secretary, IE(I) Puducherry State Centre, addressed the gathering,

Dr. Makarand Madhao Ghangrekar, Director, NIT Puducherry, delivered the presidential address, emphasizing the institution's commitment to innovation and technical excellence

Dr. S. Mohan, Vice-Chancellor, Puducherry Technological University, addressed the audience about Deep Learning and its Techniques

Photo of Inaugural Session with banner of IEI	Photo of Technical Session

Report of All India Seminar/Workshop

Introduction

The two-day seminar on Health Monitoring System for Building Structures using Deep Learning was conducted successfully on February 20-21, 2025. The event brought together leading experts, researchers, academicians, and industry professionals to discuss recent advancements, challenges, and

applications of deep learning in structural health monitoring. The seminar provided a comprehensive platform for exploring innovative techniques, including non-destructive evaluation (NDE), corrosion detection, and the role of machine learning in predictive maintenance.

Day 1: February 20, 2025

Inaugural Session

The inauguration ceremony began with an invocation Song, setting a solemn and respectful tone for the event. This was followed by the lighting of the Lamp symbolizing the pursuit of knowledge and enlightenment. Dr. A. Hemachander, IE(I) Coordinator, NIT Puducherry, delivered the welcome address, highlighting the significance of integrating deep learning into structural health monitoring and the impact of such initiatives on the engineering community. Dr. Makarand Madhao Ghangrekar, Director, NIT Puducherry, delivered the presidential address, emphasizing the institution's commitment to innovation and technical excellence. He urged students to actively participate in professional bodies like IE(I). additionally, he underscored the institution's dedication to cutting-edge research and the importance of interdisciplinary collaboration in engineering. Following this, Er. K. Soundararajan, Honorary Secretary, IE(I) Puducherry State Centre, addressed the gathering, emphasizing the crucial role of engineers in leveraging artificial intelligence and deep learning to enhance infrastructure safety. He discussed how these advanced technologies contribute to predictive maintenance, real-time monitoring, and overall structural reliability, ensuring the longevity of engineering systems. He was succeeded by Dr. S. Thirougnaname, Chairman, IE(I) Puducherry State Centre, who highlighted IE(I)'s collaborative efforts in fostering strong industry-academic partnerships. He underscored the importance of bridging the gap between theoretical knowledge and practical applications, enabling students and researchers to actively engage in real-world engineering challenges.. The Chief Guest, Dr. S. Mohan, Vice-Chancellor, Puducherry Technological University, addressed the audience, emphasizing the transformative role of deep learning in predictive maintenance and real-time monitoring of building structures. He encouraged students and researchers to explore AI-driven solutions for civil engineering challenges while also motivating students to embrace innovation and technological advancements. Dr. Sunanda Ambulker, Faculty Advisor, IE(I) ECE Student Chapter, NIT Puducherry, delivered the Vote of Thanks.

Session 1: Deep Learning - An Introduction

Speaker: Dr. S Mohan

Dr. Mohan provided a foundational understanding of deep learning:

- ✓ Basics of artificial neural networks and their learning mechanisms
- ✓ Differences between traditional machine learning and deep learning
- ✓ Common architectures: CNNs, RNNs, and transformers
- ✓ Applications in anomaly detection and predictive maintenance in building structures
- ✓ Case studies showcasing the application of AI in structural monitoring

Session 2: Deep Learning Techniques

Speaker: Dr. Sanjay Bankapur

This session focused on advanced deep learning techniques tailored for structural health monitoring. Highlights included:

- ✓ Feature extraction techniques in image-based structural analysis
- ✓ Automated crack detection using deep neural networks
- ✓ Role of generative adversarial networks (GANs) in structural damage prediction
- ✓ Integration of IoT and real-time sensor-based health monitoring systems

Session 3: Mathematics for Machine Learning Applications in Structural Health Monitoring

Speaker: Dr. Naveen Raj

Dr. Naveen Raj explained the critical mathematical foundations required for deep learning, including:

- ✓ Linear algebra concepts in neural networks
- ✓ Probability and statistical models for predictive maintenance
- ✓ Optimization techniques and gradient descent
- ✓ Fourier and wavelet transforms for vibration analysis
- ✓ How mathematical modeling aids in developing AI-based structural monitoring solutions

Day 2: February 21, 2025

Session 1: Corrosion and Non-Destructive Techniques

Speaker: Er. Vimal Mohan, Principal Scientist, CSIR SERC

This session introduced participants to corrosion assessment and non-destructive evaluation techniques. Topics covered:

- ✓ Causes and effects of corrosion in reinforced concrete structures
- ✓ Non-destructive testing (NDT) methods such as ultrasonic testing, infrared thermography, and magnetic particle inspection
- ✓ AI-powered NDT techniques for large-scale infrastructure assessments
- ✓ Case studies highlighting early detection of corrosion in bridges and high-rise buildings

Session 2: Corrosion and Non-Destructive Techniques

Speaker: Er. Vimal Mohan, Principal Scientist, CSIR SERC

The session continued with deeper discussions on:

- ✓ Advanced NDT methods such as acoustic emission monitoring
- ✓ Use of drones and AI-driven image processing for remote corrosion detection
- ✓ Role of predictive analytics in estimating structural degradation over time
- ✓ A comparison of NDT techniques and their suitability for different infrastructure types

Session 3: Structural Health Monitoring of Slender Masonry Heritage Structures

Speaker: Dr. Nidhi M

Dr. Nidhi M's presentation focused on challenges and methodologies for monitoring heritage structures, including:

- ✓ Common structural vulnerabilities in historical buildings
- ✓ Sensor-based real-time monitoring techniques
- ✓ Use of AI models to analyze deformation patterns and predict failure risks
- ✓ Case studies of conservation projects on churches, temples, and forts

Session 4: Valedictory Session

The valedictory session served as the seminar's conclusion, summarizing key insights and acknowledging the contributions of speakers, participants, and organizers.

Key discussion points:

- ✓ The increasing role of deep learning in automating structural health assessments
- ✓ The need for interdisciplinary collaboration between AI researchers, civil engineers, and conservation experts

- ✓ Industry-academia partnerships to develop real-world applications for AI in structural monitoring
- ✓ Potential research areas for improving the efficiency of non-destructive testing methods
- ✓ The importance of training young professionals in AI-powered infrastructure monitoring

Participant feedback:

- ✓ The seminar received highly positive feedback from attendees. Participants appreciated:
- ✓ The practical insights shared by expert speakers
- ✓ The real-world case studies demonstrating deep learning applications
- ✓ The balance between theoretical concepts and practical implementation
- ✓ Opportunities for networking and collaboration with professionals in the field

Some participants expressed interest in **hands-on workshops** and **live demonstrations of AI-based monitoring tools** in future events.

Conclusion

The two-day seminar successfully highlighted the transformative potential of deep learning in structural health monitoring. Discussions emphasized the integration of AI with non-destructive evaluation techniques, offering new possibilities for real-time damage detection and preventive maintenance. The event fostered a collaborative environment, paving the way for future research, industry collaborations, and knowledge-sharing in this critical domain. The seminar concluded on a high note, with participants expressing enthusiasm for further engagement in AI-driven innovations for structural safety and sustainability.

Details of the Sessions:

Day-1 (Forenoon) Inaugural Session Inaugural programme, Keynote Address	Deep Learning: An Introduction Dr S Mohan
Day-1 (Afternoon) Technical Session I 1 Invited Lecture (about 1 hour duration) and minimum 4 papers or two invited lectures / presentations	1. Invited Lecture by: Dr Sanjay Bankapur Topic: Deep Learning Techniques 2. Invited Lecture by: Dr Naveen Raj Topic: Mathematics for Machine Learning applications in Structural Health Monitoring
Day-2 (Forenoon) Technical Session II 1 Invited Lecture (about 1 hour duration) and minimum 4 papers or two invited lectures / presentations	1. Invited Lecture by: Er Vimal Mohan Topic: Corrosion and Non-Destructive Techniques 2. Invited Lecture by: Er Vimal Mohan Topic: Corrosion and Non-Destructive Techniques
Day-2 (Afternoon) Technical Session III Minimum 2 papers or two invited lectures / presentations	1. Invited Lecture by: Dr Nidhi M Topic: Structural health monitoring of slender masonry heritage structures
Day-2 (Afternoon) Valedictory Session	Valedictory Address by Er Vimal Mohan

என்ஐடியில் 2 நாள் கருத்தரங்கம்

காரைக்கால், பிப். 21: என்ஐடியில் பல்வேறு கல்லூரி மாணவர்கள் பங்கேற்ற கருத்தரங்கம் நடைபெற்றது.

இன்ஸ்டிடியூஷன் ஆஃப் என்ஜினியர்ஸ் இந்தியா நிறுவன (ஐஇஐ) புதுச்சேரி மையமும், என்ஐடியும் இணைந்து ஆழமான கற்றலைப் பயன்படுத்தி, கட்டட கட்டமைப்புகளுக்கான சுகாதார கண்காணிப்பு அமைப்பு குறித்த 2 நாள் கருத்தரங்கை என்ஐடி வளாகத்தில் வியாழக்கிழமை தொடங்கியது.

இதில் நாகப்பட்டினம், மயிலாடுதுறை, விசாகப்பட்டினம் பகுதியைச் சேர்ந்த கல்லூரி மாணவர்கள், கல்வியாளர்கள் உள்ளிட்ட பலர் பங்கேற்றனர்.

என்ஐடி இயக்குநர் மகரந்த் மாதவ் காங்ரேகர் தலைமை வகித்துப் பேசினார். புதுவை தொழில்நுட்ப பல்கலைக்கழக துணை வேந்தர் எஸ். மோகன் சிறப்பு அழைப்பாளராகக் கலந்து கொண்டு கருத்தரங்கை தொடங்கிவைத்துப் பேசியது:

கட்டமைப்பு ஆரோக்கியத்தைக்கண்காணிப்பில் ஆழமான கற்றலின் பங்கு முக்கியம். கற்றுச்சூழல் நிலைகளை புரிந்துகொள்

கருத்தரங்கில் பேசிய என்ஐடி இயக்குநர் மகரந்த் மாதவ் காங்ரேகர். உடன், புதுவை தொழில்நுட்ப பல்கலைக்கழக துணை வேந்தர் எஸ். மோகன் உள்ளிட்டோர்.

வதில் சிறப்பு கவனம் செலுத்த வேண்டும்.

மாணவர்கள் சுதந்திரமாக கேள்விகள் கேட்கவும், விவாதங்களில் ஈடுபடவும் அனுமதிக்கும் திறந்த கல்வி கலாசாரத்தை மேம்படுத்த ஆசிரியர்கள் உரிய செயலாற்றவேண்டும்.

வெற்றிகரமான மற்றும் நிறைவான வாழ்க்கைக்கு முக்கிய கூறுகளாக அறிவு, திறன்கள் மற்றும் நேர்மறையான அணுகுமுறை முக்கியம் என்பதை மாணவர்கள் உணர்ந்து செயல்படவேண்டும்

என்றார்.

தொடக்க அமர்வில் ஐஇஐ புதுச்சேரி மையத் தலைவர் எஸ். திருஞானம், மைய கௌரவ செயலாளர் கே.சௌந்தரராஜன், என்ஐடி பதிவாளர் எஸ். சுந்தரவரதன் ஆகியோர் கலந்துகொண்டனர்.

கட்டமைப்பு சுகாதார கண்காணிப்பு மற்றும் அவற்றின் நடைமுறை பயன்பாடுகளுக்கான ஆழமான கற்றல் நுட்பங்களின் முன்னேற்றங்களை ஆராய்வதைநோக்கமாகக் கொண்டு இந்த கருத்தரங்கு நடைபெற்றது.

Newspaper Cutting