1- Publication in National Journal.

PUBLICATION IN NATIONAL JOURNAL

A.Y 2025-2026

AIML Department

St. John College of Engineering and Man

2- Publication in
international Journal.

Autonomous Institute
(A Christian Religious Minority Institution)
Approved by AICTE and DTE, Affiliated to University of Mumbai / MSBTE
DTE Code : 3218 AICTE Permanent ID : 1-4790201
NAAC Accredited with Grade 'A+', Three Programs NBA Accredited

PUBLICATION IN INTERNATIONAL JOURNAL

A.Y 2025-2026

AIML Department

Trusha

Fair and Transparent AI-Driven Resume Screening: Enhancing Recruitment with Bias-Aware Machine Learning

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KEYWORDS
AI-driven recruitment, resume screening, Natural Language Processing, Machine Learning, bias mitigation, deep learning, recruitment automation.

ABSTRACT:
The increasing volume of job applications has made resume screening a time-consuming and challenging task for recruiters. Traditional keyword-based filtering methods often fail to capture the true relevance of resumes to job descriptions, leading to inefficiencies and potential biases in candidate selection. To address these challenges, we propose an AI-driven Intelligent Resume Sorting System that leverages Natural Language Processing (NLP) and Machine Learning techniques for automated resume categorization. The system employs TF-IDF, BERT embeddings, and deep learning classifiers to extract and analyze key resume attributes, ensuring accurate classification based on job roles. Our model achieves 93% accuracy, significantly outperforming traditional screening methods while reducing processing time by over 50%. Additionally, by minimizing human intervention, our approach enhances fairness and mitigates biases in recruitment. This research contributes to the advancement of AI-driven hiring solutions, offering a scalable, efficient, and equitable method for modern talent acquisition.

1. Introduction

In today's competitive job market, organizations face the daunting task of efficiently and effectively screening a vast number of resumes to identify the most suitable candidates. Traditional resume screening methods, which often involve manual review, are increasingly proving inadequate due to several inherent challenges. Recruiters frequently encounter an overwhelming volume of applications, many of which are irrelevant to the job requirements, leading to significant time consumption and potential fatigue. This scenario not only delays the hiring process but also increases the risk of overlooking qualified candidates.

Moreover, traditional screening methods tend to focus heavily on candidates' past experiences and educational backgrounds, which may not accurately predict future job performance. This emphasis can result in the exclusion of individuals with unconventional career paths or those who have acquired relevant skills through non-traditional means. Additionally, manual screening is susceptible to unconscious biases, potentially leading to a lack of diversity within the organization.

To address these challenges, many organizations are turning to artificial intelligence (AI) and machine learning (ML) technologies to enhance the resume screening process. AI-driven systems can efficiently process large volumes of applications, identifying candidates whose skills and experiences align closely with job requirements. By leveraging natural language processing (NLP) techniques, these systems can analyze the context and relevance of information presented in resumes, going beyond simple keyword matching to assess the true suitability of candidates.

Furthermore, AI-powered screening tools have the potential to mitigate human biases by standardizing the evaluation criteria and focusing on objective data points. However, it is

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crucial to implement these technologies thoughtfully, as AI systems can inadvertently perpetuate existing biases present in the training data. Therefore, continuous monitoring and refinement of AI algorithms are essential to ensure fairness and equity in the hiring process.

2. Problem Definition

The increasing reliance on **Artificial Intelligence (AI) and Machine Learning (ML) in recruitment and resume screening** has significantly improved efficiency, reducing manual effort in hiring processes. However, **several critical challenges persist**, as identified in the comparative study. **Bias, fairness, interpretability, and ethical concerns** remain major obstacles in AI-driven hiring solutions. AI models, especially deep learning and Generative Adversarial Networks (GANs), often inherit biases from training datasets, leading to **unfair candidate evaluations**. Additionally, **lack of transparency in AI decision-making** makes it difficult for hiring managers to trust automated screening results, impacting the credibility of these systems.

Another **major gap is the absence of fairness-aware AI models** that can detect and mitigate biases in recruitment data. Existing ML and NLP-based resume screening tools tend to favor specific demographic groups, resulting in unintended discrimination. **Explainability and interpretability remain key concerns**, as most deep learning models function as "black boxes," offering little insight into why a particular candidate is preferred over another. Without proper validation and auditing mechanisms, AI-generated resume rankings may lack accountability, leading to **ethical and legal concerns** in hiring.

Furthermore, while **Generative AI techniques have enhanced data augmentation** and resume summarization, **their outputs lack validation**, sometimes misrepresenting candidates' skills and experience. This can lead to unreliable hiring decisions and an increased risk of misinformation in recruitment. There is an urgent need to **develop AI-driven hiring frameworks that balance automation with fairness, transparency, and accuracy**. Future research must focus on **bias detection, ethical AI governance, and explainable AI techniques** to ensure **equitable and just recruitment decisions**.

Thus, the core problem lies in developing an **AI-based resume screening system that is transparent, bias-aware, and explainable while maintaining efficiency**. Addressing these challenges will lead to **more ethical, accountable, and reliable AI hiring solutions**, fostering a **fair and inclusive recruitment environment**.

3. Literature Survey

Smith and Johnson (2021) conducted a comprehensive survey on generative adversarial networks (GANs) for text generation, analyzing their effectiveness in various NLP applications. The study covered different GAN architectures, including sequence-to-sequence models and transformer-based networks, discussing their advantages in generating human-like text. The authors also highlighted key challenges, such as mode collapse, training instability, and the need for large datasets. Their work provided insights into the applicability of GANs for text synthesis in domains like automated content creation, chatbot dialogue generation, and text summarization. The study concluded that while GANs hold great potential for improving text generation quality, further advancements in training stability and evaluation metrics are necessary to enhance their real-world usability [01].

Lee et al. (2020) explored an AI-driven automated resume screening system that integrates natural language processing (NLP) and machine learning algorithms to enhance recruitment efficiency. The study introduced a multi-stage filtering approach that evaluates resumes based on keyword extraction, semantic similarity, and predictive analytics. Using a dataset of over 10,000 resumes, the model demonstrated improved accuracy compared to traditional keyword-matching techniques. The researcher's highlighted issues related to bias in AI-based hiring and suggested incorporating fairness-aware algorithms to mitigate discrimination. Their work emphasized the importance of explainable AI in HR applications to ensure transparency and accountability. The study concluded that while AI can significantly improve hiring efficiency, human oversight remains necessary to handle edge cases and ethical concerns in resume evaluation [02].

Kim and Park (2021) examined deep learning approaches for resume classification and matching, emphasizing the use of transformer-based models such as BERT and GPT. Their study compared various machine learning algorithms, including decision trees, support vector machines (SVMs), and deep neural networks, for classifying resumes into relevant job categories. Results showed that deep learning models outperformed traditional classifiers in terms of accuracy and contextual understanding. The authors also addressed the issue of algorithmic bias, proposing a fairness-aware training framework that ensures equal opportunity for diverse candidates. Additionally, they discussed the scalability of AI-powered recruitment systems, highlighting challenges such as computational costs and data privacy concerns. The study concluded that while AI significantly enhances resume classification, ongoing research is needed to improve fairness and interpretability in automated hiring processes [03].

Wang and Li (2020) conducted a review of generative AI models for text and image synthesis, providing a detailed comparison of various architectures such as GANs, variational autoencoders (VAEs), and transformer-based models. The study explored the applications of generative AI in multiple fields, including automated content generation, image enhancement, and deepfake detection. The authors emphasized the role of self-supervised learning in improving model efficiency and generalization. They also addressed ethical concerns related to AI-generated content, discussing the potential for misinformation and intellectual property violations. Their work suggested incorporating adversarial training techniques and regulation frameworks to ensure responsible AI development. The study concluded that while generative AI has revolutionized content creation, more research is needed to address bias, authenticity verification, and security concerns associated with its widespread adoption [04].

Patel and Shah (2019) investigated machine learning techniques for resume parsing and candidate matching, comparing rule-based, statistical, and deep learning-based approaches. The study proposed an NLP pipeline that extracts key entities from resumes, such as education, skills, and work experience, and maps them to job descriptions using similarity measures. Using a dataset of 50,000 resumes and job postings, the system achieved a 20% higher matching accuracy than conventional keyword-based methods. The authors also examined biases in resume screening models, highlighting how unbalanced training data can lead to discriminatory hiring practices. They suggested using debiasing techniques and fairness-aware embeddings to mitigate these risks. The study concluded that AI-driven resume screening can improve efficiency and consistency in recruitment but requires continuous monitoring and updates to align with evolving job market demands [05].

Brown et al. (2021) analyzed the role of generative AI in personalized content creation, focusing on its applications in text synthesis, automated storytelling, and user-specific recommendations. The study explored models such as GPT-3 and BERT, evaluating their ability to generate coherent and contextually relevant content. The authors identified key challenges, including ethical concerns, content originality, and potential misuse in generating fake news. They proposed reinforcement learning-based fine-tuning methods to improve content quality and mitigate biases. Additionally, the research highlighted how AI-generated content can enhance marketing, customer engagement, and personalized learning experiences. The study concluded that while generative AI presents promising opportunities in content creation, its adoption requires ethical guidelines and monitoring mechanisms to prevent misuse and ensure fair representation in AI-generated narratives [06].

Nguyen and Tran (2021) explored AI-driven recruitment processes, focusing on how machine learning and natural language processing (NLP) can streamline resume screening. The authors proposed a hybrid AI system integrating keyword extraction, sentiment analysis, and predictive analytics to evaluate candidate suitability. The model was tested on a dataset of over 15,000 resumes and showed a 30% improvement in hiring efficiency compared to manual screening. However, the study raised concerns about algorithmic bias, particularly in gender

3- National Conference.

NATIONAL CONFERENCE

A.Y 2025-2026

AIML Department

4 - International conference.

INTERNATIONAL CONFERENCE

A.Y 2025-2026

AIML Department

DeepScience

Published online at Deep Science

International Journal of Applied Resilience and Sustainability

Journal homepage: https://deepscipub.com/ijars

Artificial intelligence-driven intelligent concrete crack detection and real-time width estimation for smart structural health monitoring systems: A review

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Article Info:
Received 02 January 2026
Revised 27 February 2026
Accepted 02 March 2026
Published 05 March 2026

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Abstract

It is partly the concrete infrastructure degradation (mainly crack formation and crack propagation) that is one of the most significant challenges facing the contemporary civil engineering. The traditional inspection procedures, which are based on a regular manual survey, non-destructive testing (NDT) guidelines, and an elementary image processing pipeline, have proven their constant incapacity to achieve sensitivity, scalability, and real-time reactivity. This combination of deep learning, computer vision, and embedded edge computing has also been the driving force behind a paradigmatic shift to the creation of intelligent, autonomous structural health monitoring (SHM) systems with the capability to operate in continuous, high-fidelity crack detection and quantitative width measurements. The present paper is a critical, interdisciplinary survey of the current state-of-the-art in AI-driven concrete crack detection that includes the following architectures, object detectors, semantic segmenters and detectors, and emergent paradigms of vision transformer (ViT) and vision-language paradigms (CLIP). Specific analytical focus is given to real-time crack width estimation techniques - such as pixel-to-millimetre calibration, stereo vision triangulation, laser profilometry, and Structure-from-Motion (SfM) 3D reconstruction techniques and their corresponding error metrics and deployment limits. The review also discusses how these AI components are integrated into smart SHM systems, which include edge AI systems, IoT data pipelines, cloud-edge hybrid systems, drone-based inspection systems, and digital twin systems. The critical research gaps that have been observed are lack of standardised benchmark datasets, lack of rigorously validated real time deployment studies, lack of cross-domain model generalisation, and unsolved hardware-software co-design issues.

Keywords: Structural health monitoring, Crack detection, Convolutional neural networks, Semantic segmentation, Deep learning, Vision transformers.

1. Introduction

1.1 Criticality of Crack Monitoring in Structural Health Monitoring

The concrete structures form the base of the world-built infrastructure including bridges, tunnels, dams, highways, high-rise and nuclear buildings and containment facilities. Mechanical degradation of these assets predominantly by crack initiation and propagation is a major failure mode of these assets that has extensive safety, economic, and societal consequences. Cracks are considered to be a first-hand indication of structural distress such as overloading, fatigue cycling, and reinforcement expansion due to corrosion, alkali-silica reaction, and settlement variation. Most importantly, the rich diagnostic data is encoded as crack width, depth, orientation, and propagation velocity and, when monitored continuously and with the appropriate degree of precision, allows undertaking the necessary actions before the occurrence of a disastrous failure. According to the estimates provided by American Society of Civil Engineers, the U.S. is facing a multi trillion dollar infrastructure repair gap with bridge decay being one of the most severe elements [1].

Devices that can automatically capture crack behavior, real-time crack warnings and generate useful maintenance information can be described as a paradigm shift capability in the management of infrastructure assets. The shift towards continuous and data-based condition monitoring as an alternative to the periodic inspection campaign is part of the larger trends of digitalization in construction and infrastructure where owners of assets are increasingly insisting on objective and quantitative condition information, as well as information that is dense in time and location, to facilitate risk-based maintenance scheduling and regulatory compliance.

1.2 Conditions of Manual and Conventional NDT

Visual inspection that is done manually is the most commonly employed crack detection method in the world. Structures are checked by trained inspectors who record the surface anomalies with crack gauges and photographs and prepare periodical reports of condition. Although this method has the advantage of human contextual judgement, it is essentially limited on the basis of subjectivity, varying as an inspector dependent variability, accessibility, sparsity in time, and failure to identify sub-millimetre cracks under varying lighting conditions or on a contaminated surface. Inter-rater reliability coefficients have always been reported to be less than 0.70 when assessing manual measurements of the crack width and this reduces the repeatability that is very necessary when tracking Easterlin over time [2].

Non-destructive testing (NDT) techniques, such as ultrasonic pulse velocity (UPV), ground-penetrating radar (GPR) and acoustic emission monitoring and impact-echo, have an extension of the inspection sensitivity into the sub-surface space, but introduce their limitations. UPV needs close contact with the transducer, and acoustic emission also has limitless scale. GPR requires expertise and post-processing skills. No of these modalities naturally yields the spatially continuous, picturally interpretable crack mapping most indicating of maintenance prioritisation.

1.3 The development of the Artificial Intelligence in infrastructure diagnostics has emerged

The coming of age of deep learning models and specifically convolutional neural networks in the wake of the historic ImageNet performance of Krizhevsky et al. (2012) [3] signaled a paradigm shift in the research of computer vision towards feature extraction guided by data. In the field of civil engineering, this change has allowed the substitution of manually designed image processing pipelines with trainable end-to-end models that can acquire discriminative representations directly trained on annotated crack imagery. These shifts in the state of the art of the field have been enabled by the presence of GPU-accelerated computing, open-source deep learning platforms (TensorFlow, PyTorch), and increasingly large matching annotated datasets, all of which have spurred the transition between field-deployable prototypes and their realization in the lab.

At the same time, with the advent of edge AI hardware platforms, such as NVIDIA Jetson boards, Google Coral TPUs, and Raspberry Pi microcomputers, on-device inference required by real-time SHM applications in infrastructure settings with either limited or intermittent connectivity has become a reality. The combination of AI-based crack detection with IoT sensor networks, cloud analytics platforms, and UAV inspection systems has increased the range of operation of intelligent SHM further.

1.4 The reason why Real-Time Crack Width Estimation is a motivated field is given in this section

Crack detection Binary or multi-classification of regions in images as either cracked or not detection is a required but not a sufficient requirement to operate SHM. Structural safety and maintenance scheduling engineering standards (ACI 224R, Eurocode 2, BS 8110) give precise limits on crack width limits above which remediation is required. In aggressive conditions with reinforced concrete, the width of surface cracks that are greater than 0.2-0.3 mm in width are linked to faster chloride penetration and reinforcement corrosion; in prestressed concrete, still smaller values are used. Therefore, proper quantitative width estimation is not only a research goal, but also an operational requirement.

2. Literature Survey: Traditional Crack Detection Techniques

2.1 Protocols to be followed in visual inspection

Normal visual inspection practices, which are documented in standards like the AASHTO Manual of Bridge Evaluation and the UK Highway Agency BD 63/07, involve regular close-range surveys by trained inspectors at given intervals - normally bi-annual inspection of bridges. The Crack mapping is done by hand drawing, photography, and direct measurement by using the crack comparator gauges, which are graded at 0.05 mm. Although such processes provide a baseline condition record, their inherent constraints, namely, subjective evaluation, observer exhaustion, impossibility of monitoring critical areas and failure to measure dynamic crack behavior, have created a longstanding interest in automated methods.

2.2 Ultrasonic and Acoustic NDT Methods

The ultrasonic pulse velocity (UPV) testing is used to measure the compressive wave transit times in concrete with the aberrant transit time showing the existence of crack planes or voids [4]. Stress wave events that are produced during propagation of a crack or reinforcement slip are recorded using acoustic emission (AE) monitoring, and may be used to detect active cracking passively. Time-of-flight diffraction (TOFD) and phased array ultrasonic testing (PAUT) provide better spatial resolution, but are very expensive and complex to operate, only used on critical infrastructure components.

2.3 Classical Image Processing Techniques

Before the deep-learning age, automated crack recognition had been based on classical image processing pipelines including image acquisition, pre-processing (contrast enhancement, noise reduction), feature extraction (thresholding, edge detection, morphological operations) and classification [5]. The thresholding of Otsu takes advantage of bimodal pixel intensity histograms to divide crack areas, and of the Canny edge detector to determine intensity gradients at the boundary of the cracks. These methods have acceptable performance in strongly controlled laboratory settings but perform badly when there is variation in illumination, surface heterogeneity, occlusion, and complicated crack morphologies typical of the infrastructure in the real world. The main weaknesses of classical image processing are that they rely on a manually tuned parameter, sensitivity to change in image qualities and lack of generalization when used with different types of infrastructure.

3. Methodology: Ai-Based Crack Detection Techniques

3.1 CNN-based Classification Models

Convolutional neural networks are trained in hierarchy learning to produce successive layers of convolution, batch normalization, non-linear activation, and pooling to produce spatial features representations. The deep homogeneous convolutional stacks of VGGNet [6] were one of the earliest architectures used to tackle the problem of crack image classification achieving accuracy over 98% on controlled benchmark datasets [7] with these stacks. ResNet [8] proposed residual skip connections which address the vanishing gradient issue in very deep networks, and allows one to use 50-152 layer models to extract more multi-scale features. EfficientNet [9] uses scaling of network width, depth and resolution of the network to compete with accuracy with reduced parameters as a result of which it is appealing to network edge deployment. MobileNet versions apply depthwise separable convolutions to minimize computational costs but still feature discrimination sufficiently to make use of the available features in a crack classification task.

3.2 Frameworks of Object Detection

Object detection models go further than binary classification to offer bounding box localisation. YOLO family works with the implementation of single-stage detection architectures, which can simultaneously estimate binding boxes and a probability of a class in a grid of anchor locations, and provide real-time inference rates that are needed to operate in the field. Kim and Cho [10] reported strong accuracy of encoder-decoder CNN-based crack detection on bridge images. Two-stage Faster R-CNN [11] uses region proposal network (RPN) to produce candidate crack regions then a classification and regression head, which usually has better localisation accuracy at a cost of higher inference latency.

3.3 Semantic Segmentation Models

Semantic segmentation models are utilized in classifying objects on the basis of the meaning or intention (Frisch 2010, p. 1).To map cracks at pixel scale, semantic segmentation models generate dense pixel-wise classification maps, in which the geometry of crack regions are directly coded. Originally created to perform biomedical image segmentation, U-Net [12] has been widely modified to crack segmentation. Encoder-decoder structure and skip connections between similar resolution levels allow it to localise the spatial information accurately and maintain the semantic information with IoU values above 0.80 on the conventional datasets of cracks [13]. DeepLabv3+ [14] uses atrous (dilated) convolutions and spatial pyramid pooling to learn multi-scale context, and can be seen to be scale-variation robust in terms of crack width

3.4 Vision Transformer Models

Vision Transformers (ViT) [15] break down input images into fixed-size patches sequences and use self-attention mechanisms to embed long-range spatial relationships. ViT-based models are especially favorable in detecting diffuse, branching crack networks in which the global context of structural features is diagnostically relevant in crack detection. Hierarchical versions like Swin Transformer [16] use shifted window attention and multi-scale extraction of feature learning which showed competitive results on dense prediction tasks like segmentation without compromising viable inference times.

3.5. Transfer Learning and Domain Adaptation

Using transfer learning (where models trained on large scale datasets (ImageNet, COCO)) are re-trained on crack-specific data has become the standard form of training crack detectors, due to the relative dearth of annotated infrastructure imagery. Interestingly, the few-shot learning methods [17] are specifically applicable to rare crack structures or new infrastructure varieties in which the labelled data are limited in reality. Domain adaptation methods deal with the distribution difference between source domains (e.g., bridge concrete) and the target domains (e.g., tunnel lining or pavement) with the help of adversarial training, style transfer, and data augmentation.

4. Results: Real-Time Crack Width Estimation

4.1 Image-Based Measurement Methodologies

Findings and estimations in 2D imagery of crack width are basically based on a form of matching the gap between pixels on a picture plane and dimensions on a physical object plane. The simplest method involves using reference objects with known size that are co-located in inspection images to estimate a pixel to millimetre scale factor [18]. Perpendicular distance transform techniques quantify crack width to be the shortest distance between crack opposing edges at a given point in the crack skeleton, giving spatially resolved width distributions. Measurement uncertainties of 0.0515mm in controlled conditions are attained by these approaches but when under perspective distortion, out of plane tilt and varying inspection distances, degradation occurs.

Table 1. Comparative analysis of AI-based crack detection models

Author(s)	Year	Model	Dataset	Acc/mAP	IoU/F1	Key Limitation
Zhang et al.	2016	VGG-16	Custom concrete (40k patches)	98.1%	—	Patch-level only; no width estimation
Zou et al.	2019	U-Net (DeepCrack)	DeepCrack (537 images)	—	IoU: 0.83	Under-segments hairline cracks
Kim & Cho	2018	Encoder–Decoder CNN	Custom bridge imagery	94.3%	—	Reduced accuracy on complex backgrounds
Dung & Anh	2019	ResNet-50 + UNet	Crack500	—	IoU: 0.86	GPU-dependent; not real-time on edge
Pauly et al.	2017	Faster R-CNN	Road pavement (2,000)	mAP: 84.7%	IoU: 0.78	Slow inference (~8 fps); inaccessible edge
Chen et al.	2021	DeepLabv3+	CrackForest + custom	97.2%	IoU: 0.81	Scale sensitivity in dense crack scenes
Fan et al.	2022	EfficientDet-D3	Tunnel lining dataset	mAP: 89.6%	F1: 0.88	Limited generalisation across infra. types
Hoskere et al.	2018	MobileNetV2 (Multi-scale)	UAV bridge imagery	94.8%	F1: 0.87	Reduced accuracy vs. larger CNNs
Liu et al.	2021	Swin Transformer	Mixed infrastructure	96.40%	F1: 0.91	High compute; not deployable on edge
Chen et al.	2023	CLIP fine-tuned	Custom multi-infra.	93.10%	F1: 0.85	Zero-shot; width estimation absent

Note: "—" denotes metric not reported. Acc = classification accuracy for patch-level models; mAP at IoU = 0.5 for detection models.

AI Model Performance: IoU vs. Real-Time Inference Speed for Crack Detection Architectures

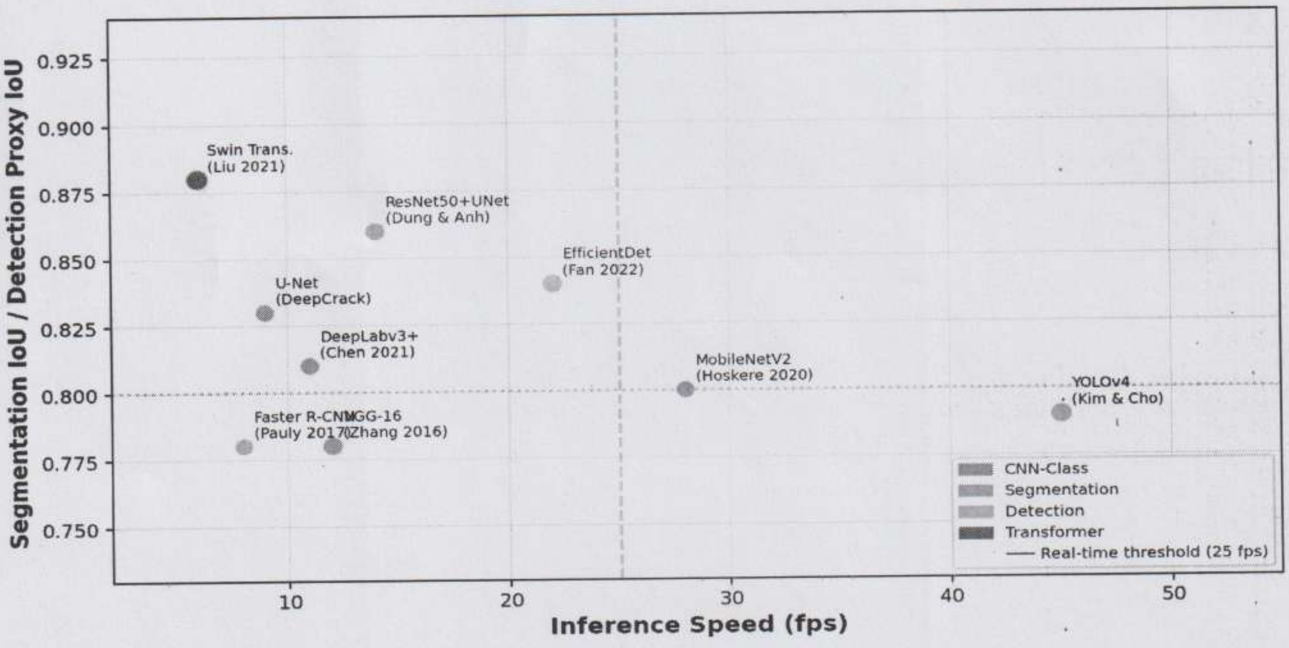

Figure 1. Comparative scatter plot of AI crack detection architectures by segmentation IoU versus real-time inference speed (fps). Bubble size indicates relative model complexity. The vertical dashed line marks the 25 fps real-time threshold; the

horizontal dashed line marks the IoU = 0.80 performance benchmark. Colour coding distinguishes architecture categories. Sources: compiled from references [7,10,13,14,16,26,27,28,29].

4.2 Pixel-to-Millimetre Calibration

Metrical conversion is sensitive and proper geometric camera calibration is necessary with either the planar calibration method (as presented by Zhang) [19] or the direct linear transformation (DLT) which takes into consideration the lens distortion parameters and projection geometry. In cases of mobile inspection systems - UAVs, ground robots, handheld devices - adaptive calibration with reference markers in sight simultaneously or Stereo baselines is required to consider the changeable camera-to-surface ranges. The analyses of uncertainty propagation show that a 10 percent error in distance measurement spreads to a similar relative error in width measurement, as the analysis shows the depth information is very essential.

4.3 Stereo Vision and 3D Reconstruction

Stereo vision systems utilise two calibrated cameras having known baseline to triangulate 3D crack geometry giving a depth resultant that facilitates measurement of width without dependence on distance. Multi-view stereo and Structure-from-Motion (SfM) on overlapping sequences of UAV photos re-create dense 3D point clouds of scanned surfaces, where the width of cracks can be measured in the physical coordinate system with uncertainty of less than 0.1 mm at inspection distances of less than 2 m [20]. Real-time 3D reconstruction is still a computationally expensive technique to work with embedded systems.

*4.4 IoT and Laser-Ba*sed Integration of M*easurements*

In laser triangulation systems, the pattern of lines or dots on the inspection surface is provided with a laser and geometric distortion of the pattern is measured using a camera positioned laterally displaced to obtain a topography of the surface with a resolution in the micrometre scale [22]. IoT-based crack gauges based on resistive, capacitive, or fibre Bragg grating (FBG) sensing technologies can use continue monitoring of the crack opening displacement at discrete points in space, to complement AI-based spatial mapping with high-temporal-resolution point measurements.

*4.5 Metrics and Measure*ment Issues *of error*

The three most commonly used quantitative measurements of the crack width estimation performance include Mean Absolute Error (MAE), Root Mean Square Error (RMSE) and relative percentage error based on measurements on ground truth of the optical microscopy or contact gauge measurements of high preciseness. According to the literature, MAE values are 0.02 mm in case of laboratory stereo vision devices [21] and 0.25 mm in case of hand-held smartphone-based systems in outdoor conditions, respectively, which are a considerable difference between controlled and operational conditions.

The main issues facing the real-time estimation of crack widths are: the change in illumination to give inconsistent contrast at the crack boundary; the noise in surface texture creating artificial crack boundaries; the overwhelming class disparities between the crack and non-crack pixels making it difficult to train; and the inability to see hairline cracks (below 0.1 mm in width) which are diagnostically significant but close to the optical resolution of the standard inspection cameras.

Table 2. Crack width estimation methods-performance comparison

Author(s)	Year	Method	MAE (mm)	RMSE (mm)	Key Finding
Xu et al.	2019	Stereo vision + CNN	0.020	0.031	Sub-0.1 mm accuracy in lab; degrades >1.5 m
Adhikari et al.	2014	Calibrated monocular + ResNet	0.080	0.120	Practical for field use with reference calibration
Mohan & Poobal	2018	Smartphone camera + IP	0.250	0.380	Low-cost but insufficient for structural assessment
Yang et al.	2022	Laser profilometer + YOLO	0.015	0.022	High accuracy; limited to accessible surfaces
Fan et al.	2021	UAV SfM 3D reconstruction	0.060	0.090	Distance-independent; scalable to large structures

Note: IP = image processing; SfM = Structure-from-Motion. Ground truth via calibrated optical microscopy or contact gauge in all studies.

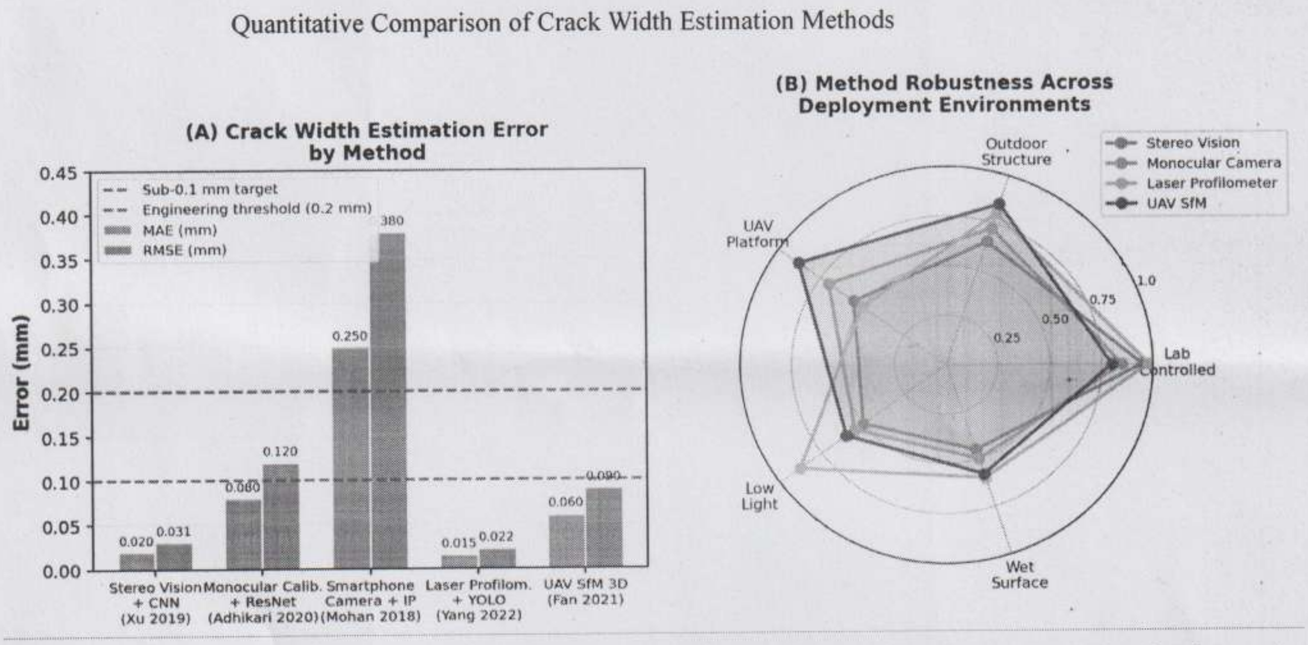

Figure 2. (A) Bar chart comparison of Mean Absolute Error (MAE) and RMSE for five crack width estimation methods. The green dashed line marks the sub-0.1 mm engineering target; the red dashed line marks the 0.2 mm intervention threshold mandated by ACI 224R and Eurocode 2. (B) Radar plot of robustness across five deployment environments. Sources: [21,18,5,22,26].

5. Smart Structural Health Monitoring Systems

5.1 Conceptual Architecture of an AI-based SHM Device.

A full AI-based SHM system addressing concrete crack monitoring consists of 5 functionally different layers including (1) data collection, (2) on-device inference, (3) local data management, (4) network communication, and (5) cloud-based analytics. In the acquisition camera, inspection images are captured by a multi-spectral (or high-resolution) visible-light camera module at the acquisition layer (optionally with a laser profilometer and environmental sensors). Depending on its deployment requirements, this unit can be attached as a fixed node onto a bridge deck, fitted on a robotic crawler, or suspended under a UAV inspection platform.

The inference engine is located on an embedded AI accelerator - NVIDIA Jetson Nano, Google Coral Edge TPU or similar - and is running an optimised crack detection and segmentation model (usually at INT8 (quantised) precision to achieve throughput). Communication layer The layer sends summarised condition data over cellular (LTE/5G), Wi-Fi, or LoRaWAN connections to a cloud analytics platform. The cloud layer combines information of various monitoring nodes and communicates with BIM and digital twin models [23].

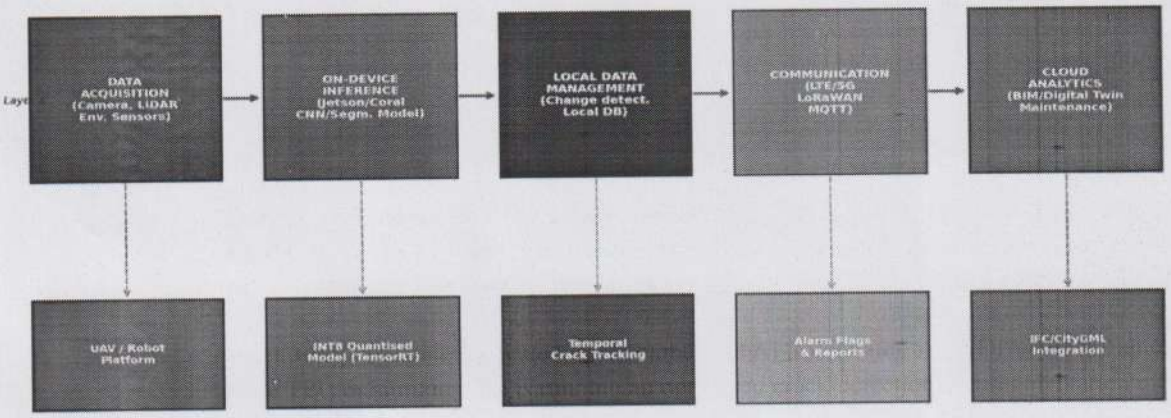

Figure 3. Five-layer smart SHM system architecture for AI-based concrete crack monitoring. Each layer performs a distinct function: data acquisition (Layer 1), on-device AI inference (Layer 2), local data management (Layer 3), network communication (Layer 4), and cloud analytics with digital twin/BIM integration (Layer 5). Sub-components for each layer are shown below.

5.2 Edge AI Systems and Inference on a chip

NVIDIA Jetson Nano offers 472 GFLOPS of GPU computing performance, which consumes 5 10 W of power, allowing the inference of small segmentation models (MobileNetV2-UNet) at 1525 fps on 640 480 pixel input images. This is extended to around 275 TOPS of tensor-optimised compute on the Jetson AGX Orin. The GOogles Coral TPU modules are characterized by an incredible energy saving in INT8 inference of lightweight models. Edge deployment Model optimisation uses pruning, knowledge distillation and after-training quantisation, and published works have shown 36x throughput and 24x memory savings with INT8 quantisation, and 24 accuracy reduction by absolute IoU [23].

5.3 IoT Implementation and Pipelines

SHM IoT implementations scatter smart sensor nodes throughout the extensive structural structures such as bridge spans, tunnel rings, building facades, and each sensor node does local AI inferences and sends condition summaries over standardised protocols (MQTT, CoAP, HTTP REST). Scalable, message brokering, time-series storage, and rule-based alerting are offered in data ingestion platforms (AWS IoT Core, Azure IoT Hub, ThingsBoard). The low-latency edge inference to detect real-time anomalies and cloud-based batch analytics to data to determine longitudinal trends is the best architectural pattern to adopt when deploying SHM on a large scale.

5.4 UAV-Based Crack Inspection

Unmanned aerial vehicles have come in as exceptionally well-performing systems to crack surveying of large, geometrically intricate, or inaccessible structures such as bridge soffits, dam faces, tall building fronts and wind turbine towers [20]. UAVs used in inspection have high-resolution camera pay loads, usually complemented with LiDAR or structured light sensors, and operate under pre-programmed flying profiles at predictable standoff ranges to ensure repeatable image scale. Onboard AI inference allows real-time crack sensing and GPS-referenced mapping of the aircraft in flight and post-flight SfM reconstruction creates centimetre-resolution 3D models to allow correct width measurement. Rigid regulatory requirements, wind sensitivity, battery duration (usually 2030 minutes) are all major operational issues.

6. Multimodal and Advanced AI Approaches

6.1 CLIP and Vision-Language Models

Contrastive Language-Image Pre-training (CLIP) and later vision-language foundation models are trained to acquire similar visual and textual representations based on enormous web-scale data sets enabling zero-shot and few-shot inference on new visual tasks via natural language prompting. Early research [24] indicates that fined tuned CLIP variants can obtain competitive crack classification behavior using minimal labelled data implying a positive outlook with respect to generalisation between the typologies of infrastructure without retraining per-domain.

6.2 Few-Shot Learning and Self-Supervised Learning

Few-shot learning models allow effective crack detection with as little as five to twenty labelled examples per class, which is a solution to the endemic lack of data of many specialised interfaces in infrastructure inspection. Designed Prototypical Networks, MAML and Matching Networks have been scaled to crack classification and detection problems and have shown ability to quickly adapt to new types of cracks [17]. Self-supervised pre-training approaches SimCLR (Masked contrastive learning), MoCo, MAE (masked image modelling), BEiT: Unlabelled inspection imagery is used to learn powerful visual representations.

6.3 Digital Twin Integration

Dynamic computational models co-ordinated with physical structures via data provided by continuous sensors (digital twins) give the semantic information required to transform AI detection of cracks on images into an integrated assessment of the condition of the structure as a whole. Crack maps found by AI can be automatically mapped to the geometric model of the digital twin so that spatially indexed crack inventories can be stored between inspection campaigns. When BIM environments (Autodesk Revit, Bentley OpenBuildings) are integrated with AI crack monitoring data using standardised data exchange formats (IFC, CityGML), then field condition data that is linked to the maintenance scheduling process and lifecycle cost analysis can be used.

7. Discussion

7.1 Performance Assessment Model

Comparable AI crack detection methods cannot be made without the prior performance evaluation. In the case of binary crack classification, the standard set is Accuracy, Precision, Recall, and F1-score; in crack detection, where the cost of a false negative (missed crack) is much higher than the cost of a false positive, Recall is usually the most important performance measure. In the case of object detection models, localisation and classification performance are combined by the mean Average Precision (mAP) as functions of the IoU thresholds. Measurement accuracy of crack width is measured using MAE, RMSE, and relative percentage error and Bland-Altman analysis gives agreement limits of automated and reference measurements.

7.2 Comparative Analysis and Critical Observations

A comparative analysis conducted in Tables 1 and 2 indicates a number of important observations. First, there is no AI architecture that can be used in all practically relevant deployment situations, segmentation models (U-Net, DeepLabv3+) can provide pixel-level granularity required to measure width, but require intensive computational resources; object detectors can perform real-time inferences at lower geometric accuracy; transformer models can provide better global context modelling, but at a high computational cost. Second, the relation between benchmark dataset performance and operational field accuracy is not well defined in the literature and most studies do not have formal measures of uncertainty or field validation guidelines. Third, performance based on crack width estimation would significantly worsen between laboratory and field conditions. The MAE(smartphone based) (0.25mm) is greater than 0.2mm engineering limit that would initiate maintenance action in most structural standards and this indicates the inefficiency of the existing field-ready width estimation techniques.

The numerical under-representation of quantitative width estimation in the AI crack detection literature is both an indication of the increased technical challenge of the measurement problem, and a history of segregation between computer vision scholars and structural metrologists. The solution to this disconnect is to incorporate metrological rigour into the processes of AI development, by developing interdisciplinary research programmes that integrate metrological rigour into the process of finding solutions.

7.3 Research Gaps Structured Analysis

The five identified gaps in Table 3 are not independent of each other - they multiply each other in a manner that seriously slows the pace of the deployment of operational SHM. The lack of standardised datasets does not allow rigorous cross-method comparison, field validation protocols do not ensure improvements on the apparent benchmark do not translate into operational improvements, and problems in hardware-software co-design do not allow the efficient deployment of a model on the edge platforms needed to make SHM practical.

Table 3. Structured analysis of key research gaps, current state, and proposed directions

Research Gap	Current State	Proposed Direction
Standardised benchmark datasets	Fragmented datasets (CRACK500, DeepCrack, CrackForest) inconsistent annotation, limited infrastructure diversity	Large-scale, multi-infrastructure, metrologically validated open benchmark
Real-time deployment validation	Lab/controlled-condition evaluations dominate; operational field validation is rare	End-to-end field studies with metrological rigour and statistical uncertainty reporting
Cross-domain generalisation	Models trained on pavement fail on bridges/tunnels without fine-tuning	Domain adaptation, meta-learning, and domain-randomised augmentation frameworks
Hardware-software co-design	Model accuracy and edge compute constraints evaluated independently	Co-optimised NAS for target hardware; standardised SHM AI benchmarking protocols
Longitudinal width estimation at scale	Width estimation confined to static lab setups; no long-term SHM studies	UAV-adaptive calibration; temporally consistent crack tracking with uncertainty bounds

Note: NAS = Neural Architecture Search; infra. = infrastructure.

8. Future Research Directions

8.1image TinyML and Extreme Edge Deployment

TinyML involves optimisation and execution of machine learning models in microcontroller-sized (ARM Cortex-M, RISC-V) platforms (under milliwatt power constraints) to allow literally ubiquitous battery-powered nodes that monitor cracks. Microcontroller-optimised neural architecture search (NAS) algorithms can optimally identify CNNs with competitively high accuracy of crack detection with memory footprints of just a few kilobytes. TinyML frameworks (TensorFlow Lite Micro, CMSIS-NN, Edge Impulse) are quickly growing the capabilities of exceptionally resource-constrained platforms - although themetrological estimated width estimation in TinyML conditions is still an open challenge on par.

8.2 Centre of Autonomous Inspection Robotics

AI-powered inspection robots on the ground offer complementary benefits to UAVs - more payload capacity due to high-endurance sensor payloads (laser profilometers, LiDAR, acoustic sensors), they can be operated indefinitely with no battery charges, and can be used to inspect areas that are closed like tunnel interiors or building basements. Legged robots (Boston Dynamics Spot, ANYbotics ANYmal) offer agile movement on rugged surfaces. The integration of real-time crack detection with autonomous path planning, i.e., an adaptive approach in which the robot trajectory is steered toward areas of high crack density, is an interesting feature towards effective inspection of large scale.

8.3 Self-learned and Never-ending Learning SHM Systems

Self-learning SHM systems use the uninterrupted information provided by operation monitoring to optimize the model of crack detection with time without manual annotation or retraining. Active learning models find the most informative images in the monitoring data stream that can be annotated by experts and reduce the labelling work, maximizing the model enhancement rate. Continual learning algorithms online update weights of the models on a continual basis using new observations and avoiding catastrophic forgetting.

8.4 BIM, Digital twins and multi-modal sensor Fusion

The most significant immediate effect of AI-crack detection is the interaction with the BIM and digital twin systems that would relate the data on the field condition to the engineering analysis, lifecycle management, and regulatory reporting processes. To achieve interoperability Standardised data description of crack observations - geometry, width, depth, location, confidence, and measurement provenance Standardised data descriptions based on IFC and the built environment ontologies should be created. The next generation SHM system will add visual crack identification and acoustic visualisation of the localisation of acoustic emission, distributed fibre optic, and sub-surface GPR AI analysis.

9. Conclusion

This review has critically analyzed the state-of-the-art in AI-assisted concrete crack detection and real-time width prediction in smart structural health monitoring, the range of technical structures beginning with the classical CNN architectures, a range of new vision transformer and vision-language frameworks, and the range of laboratory measurement systems to deployed operational edge AI systems. The synthesis demonstrates a field of dynamic transition: on the one hand, technically, it has reached its peak with the laboratory-proven detection capabilities, and on the other hand, it remains in many ways undeveloped in the field of metrological width estimation at scale, cross-domain generalisation, as well as operated deployment.

This review has undertaken a critical examination of the state-of-the-art in AI-driven concrete crack detection and real-time width estimation for smart structural health monitoring, spanning the technical landscape from foundational CNN architectures to emerging vision transformer and vision-language paradigms, and from laboratory measurement methodologies to operational edge AI deployment systems. The synthesis reveals a field in dynamic transition: technically mature in laboratory-validated detection capabilities, but still substantially immature in the dimensions of metrological width estimation at scale, cross-domain generalization, and rigorously validated operational deployment.

The comparative analysis of AI model architectures demonstrates that no single approach dominates across all practically relevant deployment scenarios. Segmentation models offer pixel-level granularity essential for width measurement but challenge edge deployment; object detectors enable real-time inference at the cost of reduced geometric precision; and transformer models offer superior global context modelling at elevated computational cost. Transfer learning from large-scale pre-trained models remains the most practically effective training strategy for data-sparse applications, while domain adaptation techniques require further development to achieve reliable cross-infrastructure generalization.

Crack width estimation emerges from this review as the most consequential and least resolved frontier in AI-based SHM. Engineering standards mandate width thresholds requiring sub-0.1 mm field accuracy, a target current AI systems approach only in controlled laboratory scenarios. Closing the gap between laboratory-demonstrated accuracy and field-validated precision requires systematic research into calibration stability, illumination robustness, and uncertainty quantification currently underrepresented in the literature. At the system integration level, the convergence of edge AI acceleration hardware, IoT data infrastructure, UAV platforms, and digital twin architectures has created the technical substrate for transformative SHM capabilities but the interdisciplinary gap between AI researchers and civil infrastructure practitioners continues to retard translation from research prototype to operational deployment. Sustained collaborative engagement between computer vision, embedded systems, structural engineering, and metrology communities, alongside investment in standardized benchmark datasets and field validation protocols, is the critical enabling condition for realizing the transformative potential of AI-enabled structural health monitoring.

Author Contributions

MSK: Conceptualization, study design, analysis, data collection, methodology, software, resources, visualization, writing original draft, writing review and editing, and supervision. ARP: Conceptualization, study design, analysis, data collection, methodology, software, resources, visualization, writing original draft, writing review and editing, and supervision. RP: Conceptualization, study design, analysis, data collection, methodology, software, resources, visualization, writing original draft, writing review and editing, and supervision.

Conflict of interest

The authors declare no conflicts of interest.

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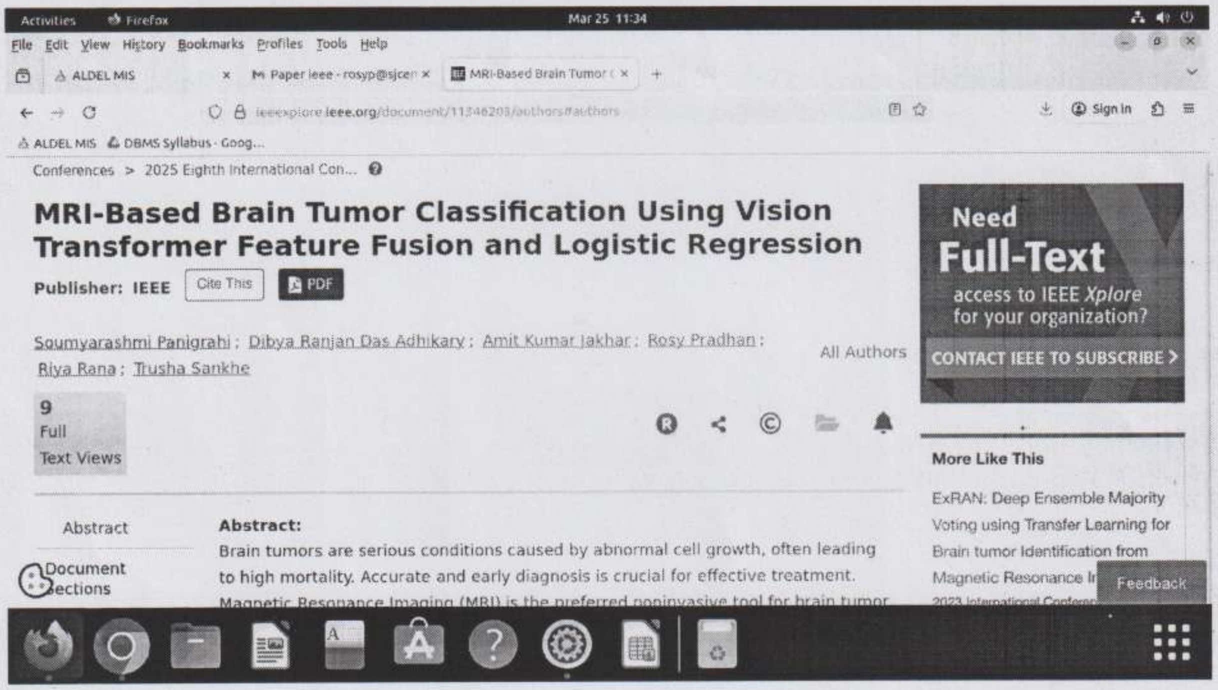
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Date of Issue :

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Ajaya m.

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते
GOVERNMENT OF INDIA

Controller General of Patents,Designs and Trademarks
Department of Industrial Policy and Promotion
Ministry of Commerce and Industry

Design Application Details

Application Number:

495353-001

CBR Number:

206767

CBR Date:

19/03/2026 16:04:57

Applicant Name:

1. St. John College of Engineering and Management 2. Mr. Ajay Sirsat 3. Dr. Nilesh Deotale 4. Siddhesh Shukla 5. Zaid Choudhary 6. Ayush Singh 7. Eshan Thakur

Design Application Status

Application Status:

Application Under Process(awaiting for Technical Examination)

Back (/DesignApplicationStatus/)

6-patent Granted.

PATENT GRANTED

A.Y. 2025-26

AIML Department

Ajaya sir.

INTELLECTUAL PROPERTY INDIA

प्रमाणपत्र सं. / Certificate No.: L-163232/2025

प्रतिलिप्याधिकार कार्यालय, भारत सरकार | Copyright Office, Government Of India

प्रतिलिप्यधिकार प्रमाणपत्र | Copyright Certificate

प्रतिलिप्यधिकार नियम का नियम 70 | Rule 70 of The Copyright Rules

प्रतिलिप्यधिकार रजिस्टर से उद्धरण | Extracts from the Register of Copyrights

आवेदन सं. / Application No.: 3567/2025-CO/L   **दाखिल करने की तिथि/ Date of Filing:** 31/01/2025

एतद्द्वारा यह प्रमाणित किया जाता है कि प्रतिलिप्यधिकार अधिनियम, 1957 के प्रावधानों के अनुसार, उपर्युक्त आवेदन में प्रकट किए गए "Student Mental Health Wellness Hub" नामक कार्य के लिए प्रतिलिप्यधिकार प्रदान किया गया है।

This is to certify that a copyright has been registered for the work titled "Student Mental Health Wellness Hub" as disclosed in the below mentioned application in accordance with the provisions of the Copyright Act,1957.

रचयिता / Authors:

सं. / SNO.	नाम / Name	पता / Address
1	Ajay Sirsat	St.John College Of Engineering And Management Palghar-Manor Road Near Shakti Udyog Industrial Area Vevoor Palghar Maharashtra-401404
2	Aayush Patil	At Post Near Bhandari Society Hall Dahanu Agar-401601
3	Krutika Parte	Room No.2 Pancham Chal Vittbhatti Western Express Highway Goregaon East-400063
4	Vivek Pal	A/504 Atharva Heights Manvelpada Road Virar East-401305
5	Dipali Sharma	Satpati Bus Stop Near Pandu Karkhana-401404

स्वामी / Owners:

सं. / SNO.	नाम / Name	पता / Address
1	Ajay Sirsat	St.John College Of Engineering And Management Palghar-Manor Road Near Shakti Udyog Industrial Area Vevoor Palghar Maharashtra-401404
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3	Krutika Parte	Room No.2 Pancham Chal Vittbhatti Western Express Highway Goregaon East-400063

प्रकाशक विवरण / Publisher Details:	N.A.
कार्य की भाषा / Language of the Work:	English
कार्य का विवरण / Description of the Work:	N.A.
(शर्तें / टिप्पणियाँ, यदि कोई हो) / (Conditions/ Remarks, if any):	N.A.

आर. ओ. सी. जारी होने की तिथि / Date of ROC: 03/04/2025

Registrar of Copyrights

For Additional details please see next page.

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4	Vivek Pal	A/504 Atharva Heights Manvelpada Road Virar East-401305
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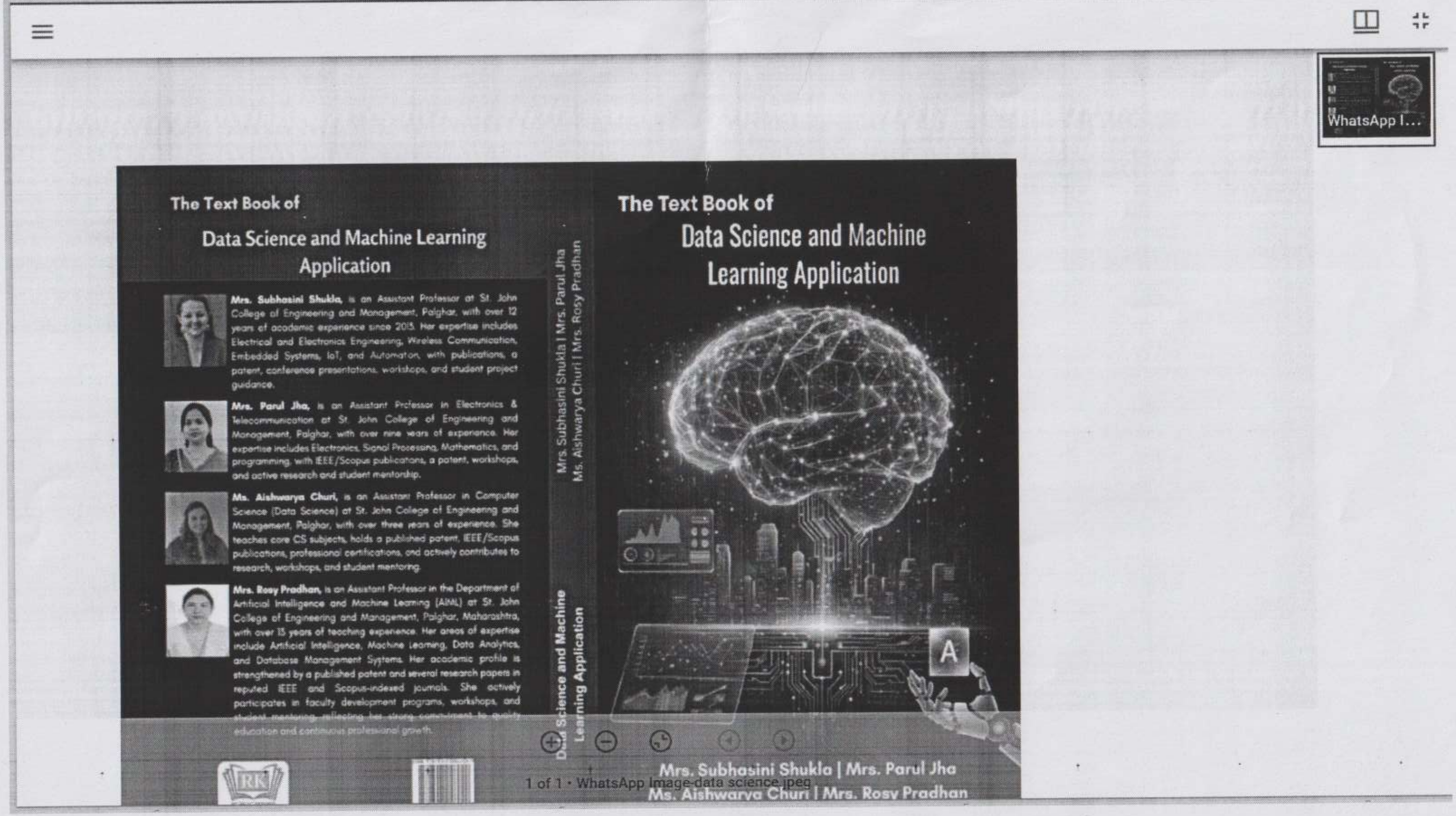
Registrar of Copyrights

7- Books.

BOOKS

A.Y. 2025-26

AIML Department


The Text Book of
Data Science and Machine Learning Application
Mrs. Subhasini Shukla, is an Assistant Professor at St. John College of Engineering and Management, Palghar, with over 12 years of academic experience since 2013. Her expertise includes Electrical and Electronics Engineering, Wireless Communication, Embedded Systems, IoT, and Automation, with publications, a patent, conference presentations, workshops, and student project guidance.
Mrs. Parul Jha, is an Assistant Professor in Electronics & Telecommunication at St. John College of Engineering and Management, Palghar, with over nine years of experience. Her expertise includes Electronics, Signal Processing, Mathematics, and programming, with IEEE/Scopus publications, a patent, workshops, and active research and student mentorship.
Ms. Aishwarya Churi, is an Assistant Professor in Computer Science (Data Science) at St. John College of Engineering and Management, Palghar, with over three years of experience. She teaches core CS subjects, holds a published patent, IEEE/Scopus publications, professional certifications, and actively contributes to research, workshops, and student mentoring.
Mrs. Rosy Pradhan, is an Assistant Professor in the Department of Artificial Intelligence and Machine Learning (AIML) at St. John College of Engineering and Management, Palghar, Maharashtra, with over 15 years of teaching experience. Her areas of expertise include Artificial Intelligence, Machine Learning, Data Analytics, and Database Management Systems. Her academic profile is strengthened by a published patent and several research papers in reputed IEEE and Scopus-indexed journals. She actively participates in faculty development programs, workshops, and student mentoring, reflecting her strong commitment to quality education and continuous professional growth.
RK
Mrs. Subhasini Shukla | Mrs. Parul Jha
Ms. Aishwarya Churi | Mrs. Rosy Pradhan
Data Science and Machine Learning Application
The Text Book of
Data Science and Machine Learning Application
A
Mrs. Subhasini Shukla | Mrs. Parul Jha
Ms. Aishwarya Churi | Mrs. Rosy Pradhan
1 of 1 • WhatsApp Image-data science.jpeg
WhatsApp I...

8 - Book chapter

BOOK CHAPTERS

A.Y. 2025-26

AIML Department

9 - ~~Patent~~ Grant Applied.

GRANTS APPLIED (RS---)

A.Y. 2025-26

AIML Department

10. ~~Patent~~ Grant Received.

St. John College of Engineering and Mar
Autonomous Institute
(A Christian Religious Minority Institution)
Approved by AICTE and DTE, Affiliated to University of Mumbai / MSBTE
DTE Code : 3218 AICTE Permanent ID : 1-4790201
NAAC Accredited with Grade 'A+', Three Programs NBA Accredited

GRANTS RECEIVED (RS---)

A.Y. 2025-26

AIML Department

ROM
(BIS)

St. John College of Engineering and Management
Autonomous Institute
(A Christian Religious Minority Institution)
Approved by AICTE and DTE, Affiliated to University of Mumbai / MSBTE
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NAAC Accredited with Grade 'A+', Three Programs NBA Accredited

2/09/2025

To,
Sh. Satish Kumar
Senior Director/Head
Mumbai Branch Office -I
Bureau of Indian Standards

Subject: Grant of 1st Half Fund for Standard Club Activity AY 2025-26.

Respected Sir,
We, Department of Artificial intelligence and machine learning Engineering St. John College of Engineering & Management, Palghar (E), we are proud member of **BIS Standards Club**. Our mentor Mrs. Rosy Pradhan was trained under your guidance for the standards club activities in Mumbai dated 08th May 2025. We have planned to conduct the standard club activity **Standard Presentation Competition** on dated **10/09/2025.** As per the guidelines Doc No: TNMD/SP/04 Issue: 15th November 2022, clause no 5.4; financial support for Standards Club in Engineering Institute would be max of Rs. 50,000/- per activity
In view of above, you are requested to provide an 1st half amount equal to 50% of the estimated expenditure i.e. Rs. 25,000/- to our Standard Club for conducting the activity. The Detailed of the event will provide you asap.
The details of **Standards Club** are as:

1	Name and Address of Educational Institute	Department of Artificial intelligence and machine learning Engineering St. John College of Engineering & Management Vevoor, Manor Road, Palghar (E)
2	Contacts	1. Dr.Kamal Shah (Principal) Kamal.shah@sjcem.edu.in 2. Mrs. Rosy Pradhan (Mentor) rosyp@sjcem.edu.in Mob. No.: 9766160629
3	Bank Account Details: Account No. IFSC Code	Karnataka Bank LTD. Palghar Account No. 6272000100000201 IFSC Code KARB0000627

Thanking you,

Regards
Dr. Kamal Shah
Principal

ALDEL EDUCATION TRUST

S/2, West View Avenue Co-op Soc. Ltd., Holy Cross Road, I. C. Colony, Borivli (W), Mumbai-400 103

Ph.: 022 - 28910964 E-mail: aet.office@sjcem.edu.in Website: www.aldel.in

(A Christian Religious Minority Institution) [Regn. No.: E-24542 (Mumbai) dtd. 26/10/2007]

18th September 2025.

Dear Dr./Mr./Mrs./Ms. Sandeep Dwivedi (PI) and Juily Tarade (Co-I)

With reference to your original/revised proposal titled "5G Gesture Management using Drone Assistance" for support under the Scheme "Seed Money for Research", the Management of Aldel Education Trust and the CRRC is pleased to announce that your proposal has been accepted for financial support to the tune of **₹. 50,000 (Fifty Thousand only)**, subject to the following Terms and Conditions.

1. The date of commencement of the project is 1st October 2025, and the end date is 31st March 2027. There will be a mid-term review of the project, in the month of October 2026. The date and time of the meeting will be notified to you in due course. The Utilization Certificate (UC) and Project Completion Report (PCR) should be submitted to CRRC (a hard and soft copy) within one month of the date of completion of the project, i.e. no later than 30th April 2027. The formats of the UC and PCR will be given in due course.
2. The distribution of financial support under the various heads is as follows:
   A. Consumables and Chemicals ₹ 10,000, **B.** Equipment (Minor) ₹ 35,000, **C.** Student (UG) Stipend ₹ 5,000.
3. PI and Co-I will complete the work (meet all project objectives) as stated in the original/revised proposal within the Sanctioned amount. Any request for additional funds or extension in the time for executing this project will not be entertained.
4. For projects which are part of the PI's PhD dissertation or a student's Master's dissertation, the sanctioned amount has been proportionately reduced by the amount sanctioned by the Management for doctoral/Master's research.
5. While working on this project, you will be governed by the policies of the college/institution with which you are associated.
6. Purchase of equipment/instruments/glassware/consumables/fabrication of equipment etc. will be routed through the Central Stores of the respective institute/college and will be in accordance with the campus purchase policy.
7. While executing this project, you will be guided by the UGC publication "Guidance Document - Good Academic Research Practices" by Patwardhan et. al., September 2020.
8. You will ensure that at least one research paper related to the project will be published in a Scopus Indexed Journal with a minimum impact factor of 1.0.
9. If you have requested a 2nd Year or 3rd Year UG student to assist you in carrying out this project, kindly ensure that all students have an equal chance of being selected to work on the project. A committee consisting of the HoD, the PI and Co-I should screen the candidates. Details of the student (Name, Year of Study, Institute/Department) selected should be sent to the CRRC. The student will be paid the stipend only after the completion of the project.
10. If the PI leaves the services of the institute before completing the project, the Co-I will be responsible for completing the project, attending review meetings and timely submission of project status reports.

Kindly sign a copy of this letter as an acceptance to abide by the Terms and Conditions of this project.

Regards

Dr. Evans Coutinho
On behalf of CRRC

Mr. Albert W. D'Souza
Chairman, Aldel Education Trust

Signature: PI S. A. Dwivedi 8/10/25

Date:

Co-I 30-9-25

Dr. Juily T.

Rosy Pradhan <rosyp@sjcem.edu.in>

Invitation to Participate in BIS National Online Quiz – World Consumer Rights Day

1 message

BIS Mumbai Branch Office I <mubo1@bis.gov.in> 13 March 2026 at 15:04

To: anuja <anuja@nkc.ac.in>, prinmittalcollege <prinmittalcollege@gmail.com>, aprajput <aprajput@kkwagh.edu.in>, principalengg <principalengg@kkwagh.edu.in>, principal <principal@sjipr.edu.in>, office <office@sjcem.edu.in>, jnvsind <jnvsind@gmail.com>, jnvraigadms <jnvraigadms@gmail.com>, jnvratnagiri <jnvratnagiri@gmail.com>, kvthane <kvthane@gmail.com>, vpmkinhavalicollege <vpmkinhavalicollege@gmail.com>, smvbhadgaon <smv.bhadgaon@gmail.com>, aecstar1 <aecstar1@yahoo.co.in>, globalschool186 <globalschool186@gmail.com>, farooqgirls <farooqgirls@gmail.com>, jamv <jamv@asmitatrust.org>, balvikasvidyamandirsec <balvikasvidyamandirsec@gmail.com>, cnhhschool <cnhhschool@gmail.com>, stxaviersschool <st.xaviersschool@yahoo.com>, twinklestarsschool196 <twinklestarsschool196@gmail.com>, dames2791 <dames.2791@gmail.com>, kamathenesrr <kamathenesrr@gmail.com>, sdvmadhaymik2016 <sdvmadhaymik2016@gmail.com>, shramjivijanta <shramjivijanta@gmail.com>, turbhenesrr <turbhe.nesrr@gmail.com>, j1707001 <j1707001@gmail.com>, girishvpatil7890 <girishvpatil7890@gmail.com>, sgsh1982 <sgsh1982@gmail.com>, shaikhhusainka2i <shaikhhusainka2i@gmail.com>, svmjcpen <svmjcpen@gmail.com>, tvvmgulsunde <tvvmgulsunde@gmail.com>, gbvaderhighschoolpali <gbvaderhighschoolpali@gmil.com>, apbvdapoli <apbvdapoli@gmail.com>, prashantmokal12329 <prashant.mokal12329@gmail.com>, mspashti <mspashti@gmail.com>, poladpurvprr <poladpur.vprr@gmail.com>, mnnenekanyavidyalay <mnnenekanyavidyalay@gmail.com>, palspescshrr <palspe.scshrr@gmail.com>, anudattvidyalaya <anudattvidyalaya@gmail.com>, gavhanscsvrr5 <gavhan.scsvrr5@gmail.com>, smvmambet <smvmambet@gmail.com>, sshighschool <sshighschool@gmail.com>, dcosta_mspt <dcosta_mspt@yahoo.in>, dharmishtagedia <dharmishta.gedia@gpph.ac.in>, cummoo_j2005 <cummoo_j2005@yahoo.com>, akigirlsmadanpura <akigirlsmadanpura@gmail.com>, shailendra_society <shailendra_society@yahoo.com>, kesvkhighschool <kesvkhighschool@gmail.com>, kamotheemsrr <kamotheemsrr@gmail.com>, nachiketas_highschool <nachiketas_highschool@yahoo.in>, betvidyalaya <betvidyalaya@gmail.com>, srvmahad <srvmahad@yahoo.com>, holycrosslowerparel <holycross.lowerparel@gmail.com>, stisabelhighschool <stisabelhighschool@gmail.com>, anjumanislamsaiftyabj <anjumanislamsaiftyabj@gmail.com>, abges1942 <abges1942@gmail.com>, shethnlhs <shethnlhs@gmail.com>, rohinjanhighschool <rohinjanhighschool@gmail.com>, panduranghambir995 <panduranghambir995@gmail.com>, jdcvytco123 <jdcvytco123@gmail.com>, phatak_highschool <phatak_highschool@rediffmail.com>, mestalsure <mestalsure@gmail.com>, jvghoti <jv.ghoti@mvp.edu.in>, gghsnashik <gghsnashik@gmail.com>, mahatmaiphule <mahatmaiphule@gmail.com>, prinhptryknsk <prinhptryknsk@rediffmail.com>, marathahsnashik2 <marathahs.nashik2@mvp.edu.in>, bmcoffice <bmcoffice@yahoo.co.in>, principal <principal@tcsc.edu.in>, shriram_vidyalaya <shriram_vidyalaya@yahoo.in>, amarnathhighschool <amarnathhighschool@gmail.com>, lsbwvsinnar <lsbwv.sinnar@mvp.edu.in>, rachanaschoolnsk <rachanaschool.nsk@gmail.com>, nesjrneware <nesjr.neware@gmail.com>, dccsecschnsk <dccsec.sch.nsk@gmail.com>, principalphcet <principal.phcet@mes.ac.in>, stanthony559 <stanthony559@gmail.com>, tcetprincipal <tcet.principal@thakureducation.org>, csmmschool <csmmschool@gmail.com>, jyotinpatil30 <jyotinpatil30@gmail.com>, shabbirfaroqui4321 <shabbirfaroqui4321@gmail.com>, mgvambarnath <mgvambarnath@yahoo.com>, mvns2122 <mvns2122@gmail.com>, hmgpatil <hmgpatil@gmail.com>, shivkandeshwari96lonad <shivkandeshwari96lonad@gmail.com>, bvmmms <bvmmms@gmail.com>, jesdindori <jes.dindori@mvp.edu.in>, marwaricommercial <marwaricommercial@gmail.com>, 1603014vmanjur <1603014vmanjur@gmail.com>, rzidake <rzidake@gmail.com>, dp3112 <dp3112@gmail.com>, lcph1603018 <lcph1603018@gmail.com>, vnes1985 <vnes1985@gmail.com>, alkathorat <alkathorat@abmsds.org>, ddvidyalaya <ddvidyalaya@gmail.com>, 1603015tbmvanjurdive <1603015tbmvanjurdive@gmail.com>, 163007kmespadgha <163007kmespadgha@gmail.com>, kshankar1485 <kshankar1485@gmail.com>
Bcc: rosyp@sjcem.edu.in

Dear Sir/Madam,

Greetings!

On the occasion of **World Consumer Rights Day**, the **Bureau of Indian Standards (BIS)** is organizing a **National Online Quiz** to promote awareness about standards and consumer rights.

Theme: *Safe Products, Confident Consumers*
Date: 15 March 2026
Time: 4:30 PM – 5:15 PM
Duration: 30 Minutes

Participants will have the opportunity to **win exciting cash prizes**:
🥇 First Prize – ₹5,000
🥈 Second Prize – ₹4,000
🥉 Third Prize – ₹3,000
🎉 Consolation Prizes – ₹1,000

The quiz is **open to students, youth, and the general public**. It is a great opportunity to test your knowledge and contribute to building awareness about quality standards and consumer rights in India.

Registration Link: https://quiz.bis.gov.in

We encourage you to register and participate in this informative and engaging event.

Thanks & Regards,
Sameer Kumar
SPO

Dr. Juily T.

ATAL/2025/1757572953

Skill India
कौशल भारत - कुशल भारत

ATAL

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

Nelson Mandela Marg, Vasant Kunj, New Delhi -110070

AICTE Training and Learning (ATAL) Academy

Certificate

It is certified that ***Mrs. Juily Nachiket Tarade, Assistant Professor*** *of* ***St. John College of Engineering and Managment*** *has successfully participated & completed AICTE Training And Learning (ATAL) Academy Faculty Development Program on* ***Intelligent Connectivity: AI-Driven Evolution in Next-Gen Communication Networks*** *at* ***ST. FRANCIS INSTITUTE OF TECHNOLOGY (ENGG. COLLEGE)*** *from* ***03/11/2025*** *to* ***08/11/2025.***

Kevin Noronha
Professor Level (AICTE Institute), Coordinator
ST. FRANCIS INSTITUTE OF TECHNOLOGY (ENGG. COLLEGE)

Dr. Sunil Luthra
Director & Bureau Head
Training and Learning Bureau, AICTE

11- FDP Completed through ATAL.

FDP Completed through ATAL

A.Y. 2025-26

AIML Department

ATAL/2025/1757116982

Skill India
कौशल भारत - कुशल भारत

ATAL

DYP
SALOKHENAGAR

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

Nelson Mandela Marg, Vasant Kunj, New Delhi -110070

AICTE Training and Learning (ATAL) Academy

Certificate

It is certified that ***Mrs. Rosy pradhan, Faculty members of the AICTE approved institutions*** *of* ***sjcem*** *has successfully participated & completed AICTE Training And Learning (ATAL) Academy Faculty Development Program on* ***Green Technology for Engineering Faculty*** *at* ***DR.D.Y.PATIL PRATISHTHAN'S CO*** *from* ***15/09/2025*** *to* ***20/09/2025.***

Suresh D Mane
Professor Level (AICTE Institute), Coordinator
DR.D.Y.PATIL PRATISHTHAN'S CO

Dr. Sunil Luthra
Director & Bureau Head
Training and Learning Bureau, AICTE

Rosy

ATAL/2025/1757116982

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AICTE Training and Learning (ATAL) Academy

Certificate

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Suresh D Mane
Professor Level (AICTE Institute), Coordinator
DR.D.Y.PATIL PRATISHTHAN'S CO

Dr. Sunil Luthra
Director & Bureau Head
Training and Learning Bureau, AICTE

Rosy

12 - FDP completed through others (Swyam, Approved by PB)

FDP Completed through others(Swyam.Approved by Professional Body)

A.Y. 2025-26

AIML Department

Sandeep km.

ALDEL EDUCATION TRUST

ST. JOHN TECHNICAL AND EDUCATIONAL CAMPUS

CERTIFICATE

OF PARTICIPATION

This Certificate is awarded to

Sandeep Dwivedi

of **St. John College of Engineering and Management** for successfully completing Faculty Development Program on ***"Strategic Frameworks and Actionable Insights Essential for Institutional Transformation and Competitive Positioning in the Evolving Educational Landscape"*** on 10th & 11th October 2025 organised by IQAC of SJTC Institutes.

Dr. Suresh Namboothiri *Director & Chief Mentor,* *Espoir Technologies Pvt. Ltd., Pune*	**Dr. Evans Coutinho** *Dean Research, SJTEC*	**Dr. Savita Tauro** *Campus Academic Director*

ST. FRANCIS INSTITUTE OF TECHNOLOGY

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Permanently affiliated to University of Mumbai All eligible UG courses NBA Accredited

CERTIFICATE

OF PARTICIPATION

This certificate is proudly presented to

Mrs. Juily Nachiket Tarade

For her active participation in the national level webinar on 6G XL - MIMO systems, near-field communications, and advanced signal processing.

Shilpa Chaman
IETE Convenor

Dr. Kevin Noronha
HOD EXTC

Dr. Juily T.

e-yantra

Engineering a better tomorrow

ERTS Lab
Department of Computer Science and Engineering
Indian Institute of Technology Bombay,
Powai, Mumbai-400 076.

Certificate of Participation

This is to certify that ***Mrs. Juily Nachiket Tarade*** from *St. John College Of Engineering And Management, Palghar, Maharashtra* has successfully participated in the two-day workshop on "Introduction to Embedded Systems and Robotics" conducted on *27th & 28th November 2025* held at *Indian Institute of Technology Bombay.*

Prof. Shivaram Kalyanakrishnan
Principal Investigator, e-Yantra
Associate Professor
Department of Computer Science and Engineering
Indian Institute of Technology Bombay

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Dr. Juily T.

e-Yantra is a project sponsored by MoE, Government of India, under the National Mission on Education through ICT (NMEICT).

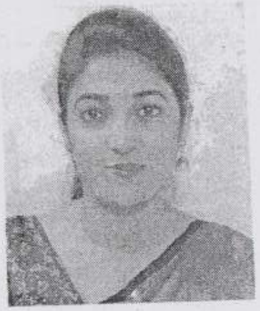
Dr. Juily T.

Elite

NPTEL ONLINE CERTIFICATION

(Funded by the MoE, Govt. of India)

Skill India
कौशल भारत - कुशल भारत



This certificate is awarded to

JUILY NACHIKET TARADE

for successfully completing the course

Responsible & Safe AI Systems

with a consolidated score of **66** %

Online Assignments	22.94/25	Proctored Exam	42.75/75

Total number of candidates certified in this course: **5335**

Kkishore

Prof. Kishore Kothapalli
Professor and Dean (Academics)
IIIT Hyderabad

Jul-Oct 2025

(12 week course)

Prof. Andrew Thangaraj
NPTEL, Coordinator
IIT Madras

International Institute of Information Technology, Hyderabad

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To verify the certificate

No. of credits recommended: 3 or 4

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ST. JOHN INSTITUTE OF PHARMACY AND RESEARCH (AUTONOMOUS)
ST. JOHN COLLEGE OF HUMANITIES AND SCIENCES (AUTONOMOUS)

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CERTIFICATE

This is to certify that

Rosy Pradhan ,

St John College of Engineering and Management

has participated in the **Two Day Workshop**

on **Outcome Based Education and Application of Generative AI for Pedagogical Excellence**,

organised by **St. John Technical and Educational Campus, Palghar, Maharashtra**

in association with **ipsr solutions limited,** from **22 August 2025** to **23 August 2025**

and has successfully completed all the assessments and secured an **A grade**.

Dr. Savita J. Tauro
Campus Academic Director
St. John Technical & Educational
Campus, Palghar

Certificate ID: qhIbfwp7uF

Dr. Mendus Jacob
M.D & C.E.O - ipsr solutions limited
Director Valin Technologies, UK, USA, Canada.
Professor & Director, MCA
Marian College, Kuttikkanam (Autonomous)

Rosy

Trusha.

Certificate No: ICT-5780/25

National Institute of Technical Teachers Training and Research
Chandigarh

MINISTRY OF EDUCATION, GOVERNMENT OF INDIA

Certificate

This is to certify that

MRS TRUSHA SANKHE

ST JOHN COLLEGE OF ENGINEERING MANAGEMENT, PALGHAR MAHARASHTRA

Participated in the AICTE Recognized Faculty Development Programme

on

Climate Resilient Pathways for Sustainable Development

Conducted by

Electrical Engineering Department

from

10/11/2025 to 14/11/2025 (One Week)

at

St. John College of Engineering and Management, Palghar, Maharashtra

NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING & RESEARCH CHANDIGARH

PSyal
Coordinator

Director

ST. JOHN COLLEGE OF ENGINEERING AND MANAGEMENT

Approved by AICTE, Recognised by DTE and Affiliated to the University of Mumbai, MSBTE

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Certificate of Participation

Mrs. Trusha Sankhe

for participating in the **Five-day Online Short Term Training Program (STTP)**, titled **'Intregration of Artificial Intelligence in Industrial Automation for Smart Manufacturing'** held from **23rd to 27th February 2026** organized by

Department of Mechanical Engineering

under the aegis of

Indian Society for Technical Education (ISTE)

Mr. Uday Prajapati **STTP Co-cordinator**	**Mr. Sagar Patil** **STTP Co-cordinator**	**Mr. Vivek S. Narnaware** **STTP Coordinator**	**Dr. Kishor Rambhad** **HoD - Mechanical Engg.**	**Dr. Kamal Shah** **Principal**

Trusha

ST. JOHN COLLEGE OF ENGINEERING AND MANAGEMENT (AUTONOMOUS)
ST. JOHN INSTITUTE OF PHARMACY AND RESEARCH (AUTONOMOUS)
ST. JOHN COLLEGE OF HUMANITIES AND SCIENCES (AUTONOMOUS)

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CERTIFICATE

This is to certify that

Trusha Tejas Sankhe

St. John College of Engineering and Management

has participated in the **Two Day Workshop**

on **Outcome Based Education and Application of Generative AI for Pedagogical Excellence**,

organised by **St. John Technical and Educational Campus, Palghar, Maharashtra**

in association with **ipsr solutions limited,** from **22 August 2025** to **23 August 2025**

and has successfully completed all the assessments and secured an **A grade**.

Dr. Savita J. Tauro
Campus Academic Director
St. John Technical & Educational
Campus, Palghar

Certificate ID: rHPIYenn3f

Dr. Mendus Jacob
M.D & C.E.O - ipsr solutions limited
Director Valin Technologies, UK, USA, Canada.
Professor & Director, MCA
Marian College, Kuttikkanam (Autonomous)

Zagdu Singh Charitable Trust's (Regd.)

THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY

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ISTE approved - Industry Driven One Week Faculty Development Program (FDP)

Certificate of Participation

This is to certify that Dr./Mr./Ms. **Ajay Ramrao Sirsat** From **St. John College of Engineering and Management, Palghar** has Participated in **ISTE approved - Industry Driven One Week Faculty Development Program (FDP)** on **"AI in Practice: Complete Stack From Data To Gen AI"** conducted during **8th December 2025** to **13th December 2025**, organised by the Department of Artificial Intelligence & Data Science (AI&DS) jointly with the Department of Artificial Intelligence & Machine Learning (AI&ML), IIC-TCET, TTC of **Thakur College of Engineering and Technology, Mumbai,** in collaboration with **DataAstraa LLP**.

Dr. Prachi Janrao	Dr. Shiwani Gupta	Mr. Vinay Borhade	Dr. R. R. Sedamkar	Dr. B. K. Mishra
HOD AI&DS	HOD AI&ML	Chief Data Scientist, DataAstraa LLP	Vice-Principal, TCET	Principal, TCET

Ajay nn,

13 - Industry certification

INDUSTRY CERTIFICATION

A.Y. 2025-26

AIML Department

14 - Attended Any Reputed seminar/ conferences outside the institute.

ATTENDED ANY REPUTRD SEMINAR/CONFERENCES OUTSIDE THE INSTITUTE

A.Y. 2025-26

AIML Department

Sandip sir.

e-yantra
Engineering a better tomorrow

ERTS Lab
Department of Computer Science and Engineering
Indian Institute of Technology Bombay,
Powai, Mumbai-400 076.

Certificate of Participation

This is to certify that ***Mr. Sandeep Dwivedi*** from *St. John College Of Engineering And Management, Palghar, Maharashtra* has successfully participated in the two-day workshop on "Introduction to Embedded Systems and Robotics" conducted on *27th & 28th November 2025* held at *Indian Institute of Technology Bombay.*

Prof. Shivaram Kalyanakrishnan
Principal Investigator, e-Yantra
Associate Professor
Department of Computer Science and Engineering
Indian Institute of Technology Bombay

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e-Yantra is a project sponsored by MoE, Government of India, under the National Mission on Education through ICT (NMEICT).

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15 – Number of faculty members worked as resource person for FDP, conf etc.

NUMBER OF THE FACULTY MEMBERS WORKED AS RESOURCE PERSONS FOR FDP,CONFERENCE,SEMINAR Etc....

A.Y. 2025-26

AIML Department

ACDSA ANTALYA BİLİM UNIVERSITY IEEE

Certificate of Reviewing

This is to certify that

Juily Tarade

has served as a Review Committee Member for the International Conference on Artificial Intelligence, Computer, Data Sciences and Applications (ACDSA 2026)

and reviewed 2 (two) papers successfully. We express our gratitude for the time, expertise, and dedication shown toward ensuring high-quality conference proceedings.

Josephine Bernadette Benjamin
University of Santo Tomas, Philippines
ACDSA 2026 Conference Chair
20 November 2025

https://www.acdsa.org - info@acdsa.org

Dr. Juily T.

ASTES

ADVANCES IN SCIENCE, TECHNOLOGY AND ENGINEERING SYSTEMS JOURNAL

CERTIFICATE

OF APPRECIATION

PROUDLY PRESENTED TO

Mrs. JUILY NACHIKET TARADE

for reviewing the article ID 25M-05-035 with title From Global Connectivity to Psychological Fragmentation: The Collapse of Digital Intimacy and the Rise of AI-Induced Crises — Rescue, Suicide, and Murder by Fuzzy-Delphi-TRIZ and X.0 Framework of Regular Issue for Advances in Science, Technology and Engineering Systems Journal.

Reviewer Code: **AJR03293**

Dr. Olivia Johnson
Managing Editor

Dated: **02/06/2025**

Dr. Juily T.

Dr. Juily T.

Session at SPBTC College for I.T officer Pre-Promotion training (30.10.2025 to 1.11.2025)

Sr.No	Subject Name	Faculty Names	Date of Training	Timing	Contact No.	Bank Details
1	Data Structure	Ms.Deepika Nadar	30th October 2025	10.00 to 11.30.a.m	9762370946	Name : Deepika Nadar, Account no: 6272500100426401, IFSC Code: KARB0000627 , Bank Name: Karnataka Bank Ltd., Palghar
2	Database Management Systems	Ms.Aishwarya Rajan Churi, Mrs.Parul Jha	30th October 2025	11.45 a.m -1.15p.m	9890413170	Name : Aishwarya Rajan Churi. Account no: 04280100014348 IFSC Code: BARBOBORDIX Bank Name: Bank of Baroda (BOB),Branch- Bordi
					7219169833	Name:Parul Jha Account no. 0307104000066015 Ifsc code: IBKL0000307 Bank name:Idbi bank ,Palghar.
3	Web Technology	Mrs.Pooja Gharat	30th October 2025	2.00p.m - 3.30p.m	9970737808	Name: Pooja Gharat. Acc.No. 6272500100796201 Bank Name: Karnataka Bank, Branch: Palghar IFSC: KARB0000627
4	Software Engineering	Mr.Ajay Sirsat ,Mrs.Meenal Kate	30th October 2025	3.45p.m -5.15p.m	8188845/ 9267931526	Name: Ajay Sirsat Acc.No. 6272500100054801 Bank Name: Karnataka Bank, Branch: Palghar IFSC: KARB0000627
5	Computer Network	Mrs.Subhasini Shukla	31st October 2025	10.00 a.m -11.30a.m	8652518267	Account No.6272500100021501, IFSC Code-KARB0000627, Bank Name -Karnataka Bank Ltd.,Palghar (East)

6	Computer Network	Mrs.Hiral Patel	31st October 2025	11.45 a.m -1.15p.m	9173020762	Bank Name: Karnataka Bank Branch : PALGHAR Account Number: 9992505015156401 IFSC Code: KARB0000627
7	Computer and Network Security	Mrs.Juily Tarade, Mr. Sandeep Dwivedi	31st October 2025	2.00p.m - 3.30p.m	[illegible]79118693/ 8412848932	Name- Juily tarade Bank name- Axis bank, palghar Ac no.-916010029137960 IFSC code-UTIB0002679
8	Object -Oriented Programming	Dr.Nilesh Deotale	31st October 2025	3.45p.m - 5.15p.m	8779571252	Account No.6272500100740001, IFSC Code-KARB0000627, Bank Name -Karnataka Bank Ltd.,Palghar (East)
9	Operating System	Mrs.Janhavi Sangoi	1st November 2025	10.00a.m to 11.30a.m	7798422444	Name:Janhavi Sangoi Bank Name: Karnataka Bank Branch : PALGHAR Account Number: 0627252400006701 IFSC Code: KARB0000627
10	Data Analytics	Mrs.Rosy Pradhan	1st November 2025	2.00p.m - 3.30p.m	9766160629	Account No. 9992505032332801 IFSC Code-KARB0000627, Bank Name -Karnataka Bank Ltd.,Palghar (East)

Dr. Juily T.

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Certificate of Appreciation

This is to certify that

Prof/Dr./Mr./Ms. Juily Nachiket Tarade

of St. John College of Engineering and Management

has been awarded for his/her remarkable contirbution as a reviewer at **1st International Conference on Smart Technologies and Intelligent Computing (INCSTIC-2025)** organized by School of Computer Science and Engineering, with the technical sponsors by Taylor's & Francis, CRC Press held on **17th - 18 Oct** at Geeta University, Naultha, Panipat.

Dr. Jaskaran Singh
Dean Research, Geeta University
CONVENER & CONFERENCE ORGANIZING CHAIR

Dr. Vikas Singh
Vice Chancellor, Geeta University
GENERAL CHAIR

Rony (Central Bank)

Session at SPBTC College for I.T officer Pre-Promotion training
(30.10.2025 to 1.11.2025)

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					7219169833	Name:Parul Jha Account no. 0307104000066015 Ifsc code: IBKL0000307 Bank name:Idbi bank ,Palghar.
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