GMIT
it's campuslife

JIS
JIS GROUP
Educational Initiatives

13 Glorious Years of Academic Excellence

AI FOR ATMANIRBHAR BHARAT: EMPOWERING SELF-RELIANT INDIA THROUGH INTELLIGENT TECHNOLOGIES

Dr. Debashree Chakraborty
Dr. Saddam Mollah *Editors*

Learnet Publishing
We value, we create

AI FOR ATMANIRBHAR BHARAT: EMPOWERING SELF-RELIANT INDIA THROUGH INTELLIGENT TECHNOLOGIES

Dr. Debashree Chakraborty

Dr. Saddam Mollah ***Editors***

Published by Learnet Publishing

ISBN No.: 978-81-685619-8-4 (Digital)

Title: AI for Atmanirbhar Bharat: Empowering Self-Reliant India through Intelligent Technologies

Conference: ATMAN-AI 2K26

Date: 9-10 April, 2026

Location: Balarampur, Mouza Beralia, Baruipur, Kolkata: 7000144

We value, we create.

LEARNET PUBLISHING

19/B, Kali Kumar Majumder Road, P.O.-Santoshpur Avenue, P.S.-Survey Park, Kolkata-700075, West Bengal

Contact No./WhatsApp: +91-9836423405

Email IDs: learnetpublishing@gmail.com | info@learnetpub.co.in

Visit us at **www.learnetpub.co.in** and **www.jctmg.in**

About ATMAN-AI : 2K26

The conference serves as a dynamic platform to explore the transformative role of Artificial Intelligence (AI) in advancing the vision of Atma Nirbhar Bharat (Self-Reliant India). It brings together academicians, researchers, industry experts, and policymakers to deliberate on the integration of AI across key sectors such as education, healthcare, agriculture, manufacturing, and governance. Emphasizing interdisciplinary collaboration, the conference encourages the convergence of engineering, social sciences, management, and humanities to address complex national challenges. It also highlights the importance of ethical AI practices, focusing on transparency, accountability, data privacy, and fairness to ensure that technological progress remains inclusive and socially responsible.

In addition, the conference promotes meaningful policy dialogue aimed at strengthening India's AI ecosystem through robust regulatory frameworks and innovation-driven strategies. By aligning discussions with national priorities and developmental goals, it seeks to bridge the gap between research and real-world implementation. The central focus remains on generating practical, scalable, and sustainable solutions that enhance economic resilience and technological independence. Ultimately, the conference aspires to contribute to the creation of a self-reliant, empowered, and globally competitive New India.

About Gargi Memorial Institute of Technology

Gargi Memorial Institute of Technology (GMIT), located in Baruipur, Kolkata, is a private engineering college established in 2011 and affiliated with Maulana Abul Kalam Azad University of Technology (MAKAUT). Approved by AICTE, the institute offers undergraduate B.Tech programs in disciplines such as Computer Science, Electronics and Communication, Electrical, Civil, and Mechanical Engineering. GMIT is known for its focus on quality technical education, industry-oriented training, and skill development through internships and workshops. The college provides modern infrastructure, including well-equipped laboratories, a library, and campus facilities that support both academic and extracurricular growth. With a commitment to nurturing competent professionals, GMIT has been steadily building its reputation in the field of engineering education in West Bengal.

Message from the Desk of Principal, GMIT

It gives me great pleasure to welcome scholars, researchers, industry professionals, and students to the **Two-Day National Conference "ATMAN-AI 2K26: AI for Atmanirbhar Bharat – Empowering Self-Reliant India through Intelligent Technologies."**

Artificial Intelligence today stands at the intersection of innovation, societal transformation, and national development. As India moves steadily toward the vision of *Atmanirbhar Bharat*, intelligent technologies have a vital role in strengthening sectors such as healthcare, agriculture, cybersecurity, and sustainable development. Academic institutions must therefore serve as platforms where ideas, research, and practical solutions converge.

At Gargi Memorial Institute of Technology, we believe that meaningful progress emerges through dialogue between academia, industry, and young innovators. This conference is envisioned as a forum for exchanging knowledge, presenting impactful research, and encouraging collaborative thinking that addresses real-world challenges.

I extend my sincere appreciation to the organizing team, keynote speakers, and contributors whose efforts have made this conference possible. I also warmly welcome all participants and hope that the deliberations over these two days inspire new perspectives, partnerships, and research directions.

I wish the conference every success.

Prof. (Dr.) Somnath Maiti

Principal

Gargi Memorial Institute of Technology
Baruipur, Kolkata, India

Message from the Desk of the Registrar, GMIT

It gives me immense pleasure to extend my warm wishes to the organizers, speakers, participants and all the stakeholders of the *Two Days National Conference on "**AI for Atmanirbhar Bharat: Empowering Self-Reliant India Through Intelligent Technologies.**"* This prestigious academic initiative reflects the visionary spirit of Gargi Memorial Institute of Technology in fostering innovation, research excellence and national development.

The theme of the conference aligns strongly with our nation's aspirations for technological independence and intellectual growth. I am confident that the deliberations, expert sessions and exchange of ideas during this programme will inspire young minds, strengthen interdisciplinary collaboration and contribute significantly to the academic and research ecosystem.

My sincere appreciation goes to the Department of ECE and BSH for organizing this impactful event and to all distinguished speakers for gracing the occasion with their expertise.

I encourage every student, faculty member and research enthusiast to participate wholeheartedly and make the programme a grand success. Your active involvement will not only enhance the quality of engagement but also enrich your own learning experience.

Wishing the conference great success and looking forward to its fruitful outcomes.

Dr. Nibedita Mukhopadhyay Banik

Registrar

Gargi Memorial Institute of Technology
Baruipur, Kolkata, India

Message from the Desk of Convenor, ATMAN-AI2K26

It gives me immense pleasure to welcome all researchers, academicians, industry professionals, and students to **ATMAN-AI 2K26**, the National Conference on *"AI for Atma Nirbhar Bharat: Empowering Self-Reliant India through Intelligent Technologies,"* organized by **Gargi Memorial Institute of Technology (GMIT), Kolkata**. Artificial Intelligence is rapidly transforming every sector of society, from healthcare and agriculture to sustainable development and cybersecurity. As India moves towards the vision of **Atma Nirbhar Bharat**, the role of intelligent technologies becomes increasingly significant in enabling innovation, efficiency, and inclusive growth. This conference aims to provide a vibrant platform where ideas, research findings, and technological innovations can be shared and discussed among experts from academia and industry. ATMAN-AI 2K26 brings together distinguished keynote speakers, researchers, and enthusiastic students to deliberate on emerging challenges and opportunities in AI-driven solutions. The conference will facilitate meaningful discussions on how artificial intelligence can contribute to national development while addressing real-world societal needs. I sincerely hope that this conference will encourage knowledge exchange, foster interdisciplinary collaborations, and inspire innovative research that contributes to a self-reliant and technologically empowered India. I extend my heartfelt gratitude to all the keynote speakers, authors, reviewers, organizing committee members, and participants whose support and contributions have made this conference possible.

I wish all participants a fruitful and intellectually enriching experience at **ATMAN-AI 2K26**.

With warm regards,

Prof. Bipasha Chakrabarti Banik

Convenor, ATMAN-AI2K26

Gargi Memorial Institute of Technology
Kolkata, India

Organizing Committee

"Artificial Intelligence is a toddler with the library of Alexandria in its head."

Prof. Bipasha Chakrabarti Banik

Convenor, ATMAN-AI2K26

Gargi Memorial Institute of Technology
Kolkata, India

"AI is the first tool we've ever built that looks back at us."

Dr. Saddam Mollah

Co-Convenor, ATMAN-AI2K26

Gargi Memorial Institute of Technology
Kolkata, India

"The 'A' in AI stands for Augmented not, just Artificial"

Dr. Debashree Chakraborty

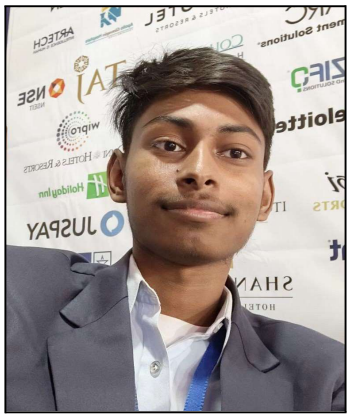
Secretary, ATMAN-AI2K26
Gargi Memorial Institute of Technology
Kolkata, India

"AI is a mirror. It shows us who we are, for better or worse."

Prof. Sampa Das

Joint Secretary, ATMAN-AI2K26
Gargi Memorial Institute of Technology
Kolkata, India

Student Committee



Soumen Pore
Student Volunteer
ATMAN AI 2K26

Sayan Paul
Student Volunteer
ATMAN AI 2K26

Debraj Pradhan
Student Volunteer
ATMAN AI 2K26

Sania Islam
Student Volunteer,
ATMAN AI-2K26

Adityalal Das
Student Volunteer,
ATMAN AI-2K26

Yeaas Miraj Mistry
Student Volunteer,
ATMAN AI-2K26

Ankan Mukherjee
Student Volunteer,
ATMAN AI-2K26

Irfan Islam
Student Volunteer
ATMAN AI-2K26

MOMENTS OF ATMAN AI-2K26


CORE INNOVATION: AGENTIC AI PIPELINE
Why Agentic AI?
Traditional AI vs. Agentic AI


Methodology


CERTIFICATE

Technical Sponsors

Aspinotech Infosolutions
Empowering Innovation

JQL

Publishing Partner

Learnet Publishing
We value, we create

Index

	Spam Classification	Banik, Prof. Sampa Chandra Das, Jit Dutta	
11	Active Suspension System Using LQR Control	Prof. Sampa Chandra Das, Prof. Ashis De, Sayak Debnath	11
12	Hyperspectral Image Compression Using Autoencoder-based Self-developed Model: HASS-AE	Prof. Barun Mazumdar, Dr. Saddam Mollah, Dibyajit Das	12
13	IoT-Based Farming Robot for Smart Agriculture	Prof. Sampa Chandra Das, Dr. Saddam Mollah, Sandip Karmakar	13
14	Automated Surveillance Tree Bot for Wildlife Protection	Dr. Susmita Das, Alin Sen, Arkasnata Bandyopadhyay, Rupsha Das, Avirup Mukherjee, Prashun Shaw	14
15	Automated Medicine Vending Device with Intelligent System Integration	Dr. Susmita Das, Ardhendu Biswas, Abhishek Kumar, Adarsh Kumar Jha	15
16	Human Mood Detection System with Cognitive Computing	Dr. Susmita Das, Ankit Kar, Hritabrata Ghosh, Aniruddha Mitra, Priyanshu Das, Ayitri Dhar	16
17	Clustering-Based Analysis of Diabetic Patient Data for Disease Progression Prediction	Dr. Mithu Dey, Swastika Banerjee, Uday Kumar Singha, Soumyadeep Hore	17
18	AI-Based Air Quality Monitoring System Using ESP32, MQ135 Gas Sensor, DHT11, and LCD	Mr Barun Mazumdar, Prof. Bipasha Chakrabarti Banik, Rajaul Ansary, Partha Palmal, Arnab Maity	18
19	IoT-Based Footstep Power Generation	Prof. Barun Mazumdar, Dr. Debashree Chakraborty, Bijaya Mondal	19
20	IoT-Based Weather Monitoring System	Prof. Bipasha Chakrabarti Banik, Prof. Banrun Mazumdar, Deblina Mandal	20
21	AI-Based Smart Vehicle Speed Control System Using RFID, GPS, and Arduino	Prof. Asish De, Piyanshu Makhal, Subham Nandi, Sanjay Gope	21
22	Sanjeevani- Smart Patient Monitoring & Alert System	Prof. Barun Mazumdar, Dr. Debashree Chakraboty, Ankita Chaterjee	22
23	Human-Following Robot Using Arduino Uno	Prof. Ashis De, Prof. Sampa Das, Arnab Banerjee	23
24	Trespasser Tracker Flying	Dr. Susmita Das, Ankit Kar,	24

Sowing the Seeds of Intelligence: A Framework for AI-Driven Precision Agriculture in Rural Sustainable Development

Marcelline Salome Gomes[1]

Department of Business Administration, Narula Institute of Technology, JIS Group

ABSTRACT:

The standard agricultural sector is going through a critical digital revolution in the face of global food security issues and climate change. Rural economies have a rare chance to "Reimagine Management" of natural resources through data-driven decision-making by incorporating artificial intelligence (AI), the Internet of Things (IoT), and satellite imaging into precision agriculture. This study examines the technological and socioeconomic viability of integrating AI in rural agricultural clusters. Specifically, it assesses how digital fertilization, AI-driven irrigation, and predictive analytics might reduce financial risks and enhance soil health. The study finds important obstacles including the digital gap and inadequate infrastructure by using a mixed-methods approach that combines agritech white papers, sustainability reports, and socioeconomic surveys. Major findings demonstrate that AI promotes rural resilience; pilot data shows that intelligent irrigation matches productivity with global sustainability goals, while AI-integrated insect detection can cut crop loss by 25%. In order to guarantee that technology developments continue to be accessible and egalitarian, the study ultimately promotes a "Triple Helix" collaborative model that unites community cooperatives, corporate innovation, and government policy.

Keywords: *Predictive analytics, sustainable yield, rural development, precision agriculture, AI in farming, and agritech governance*

IoT-Based Remote Healthcare Monitoring: A Review of Real-Time Telemetry Systems

Prof. Sampa Chanda Das[1], Prof. Barun Mazumdar[2], Suman Gayen[3], Adarsh kumar Sah[4], Avra Mondal[5]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

Healthcare emergencies frequently occur outside clinical environments, underscoring the critical need for continuous monitoring of patients managing chronic cardiovascular or respiratory conditions. As traditional healthcare models reliant on routine hospital visits and manual diagnostics become increasingly impractical for proactive management, the integration of Internet of Things (IoT) technology offers a transformative solution. This review evaluates the architectural and functional advancements of IoT-based healthcare networks, utilizing the Smart Health Guardian system as a comprehensive model for real-time remote telemetry. We examine the continuous acquisition of vital physiological metrics—such as electrocardiogram (ECG) data, heart rate, blood oxygen saturation (SpO_2), and body temperature—through integrated smart wearable devices. Furthermore, the article explores the subsequent automated transmission of this telemetry data to cloud databases for continuous visualization on accessible web dashboards. Critical system capabilities are also analyzed, including automated medical report generation, seamless remote accessibility for healthcare providers, and automated emergency protocols that feature live location sharing during acute outdoor physiological anomalies. Ultimately, this review highlights how synthesizing IoT connectivity with continuous vital monitoring significantly enhances patient safety, facilitates early diagnostic intervention, and provides a robust, scalable infrastructure for modern remote patient care.

Keywords: *Internet of Things (IoT), remote patient monitoring, wearable devices, continuous telemetry, vital signs, cloud healthcare, emergency protocols.*

Agriguard: A Multimodal Gemini-powered AI System For Precision Agriculture And Unmixing-aware Crop Health Analysis

Prof. Bipasha Chakabarti Banik[1], Dr. Debashree Chakraborty[2], Soumen Pore[3]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

Precision agriculture needs systems that can grow and think for crop health management to happen on time. The systems we have now do not do a good job of putting together all the information from different sources and understanding the context. This paper talks about AgriGuard, which is a smart system that uses the Gemini model to look at crop health and give advice. The system puts together a lot of kinds of information, like pictures from the ground, pictures from drones and satellites, things farmers type and say, and weather information based on where the farm is. The system is able to combine all this information in a way that makes it good at finding diseases, pests, and stress in the environment. AgriGuard also uses ideas from integrated pest management to give advice that's good for the environment, trying to stop problems before they start and using fewer chemicals. When we tested AgriGuard, we found that it was better at finding problems, making decisions, and using pesticides, which shows that using smart systems that understand the context can be very helpful for precision agriculture. Precision agriculture is what AgriGuard is all about. It can really make a difference in how we take care of crops.

Keywords: *Precision agriculture, multimodal artificial intelligence, crop disease detection, integrated pest management, Gemini AI, remote sensing, decision support systems.*

AI-Based Weather Forecasting for Farmers

Dr. Debashree Chakraborty[1], Dr. Saddam Mollah[2], Argha Banerjee[3]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700

ABSTRACT:

Weather plays a vital role in agricultural productivity, as farmers rely on accurate weather information to make important decisions related to crop cultivation, irrigation, pest control, and harvesting. However, traditional weather forecasting methods often lack the accuracy and localized predictions required for effective farm-level decision-making. These limitations can lead to crop damage, reduced yields, and economic losses for farmers. With the advancement of technology, artificial intelligence (AI) has emerged as a powerful tool for improving weather forecasting systems. This research paper explores the use of AI in developing advanced forecasting models specifically designed for agricultural applications. By using machine learning algorithms along with satellite data, Internet of Things (IoT) sensors and historical climate records, AI-based systems can analyze complex weather patterns and generate more accurate predictions. AI-powered forecasting systems are capable of providing real-time and hyper-local weather information that helps farmers plan irrigation schedules, planting periods, pest management strategies, and harvesting times more effectively. These improvements not only help increase crop productivity but also reduce risks associated with unpredictable weather conditions.

Therefore, the integration of artificial intelligence in weather forecasting has the potential to significantly enhance agricultural decision-making, improve farming efficiency, and support sustainable agricultural practices.

Keywords: *Artificial intelligence, weather forecasting, machine learning, hyper-local forecasting, IoT sensors, agricultural decision-making, sustainable agriculture*

Design of Bionic Eye with Synthetic Vision and AI Assistance

Dr. Susmita Das[1], Ankit Kar[2], Hritabrata Ghosh[3], Aniruddha Mitra[4], Priyanshu Das[5], Ayitri Dhar[6]

Narula Institute of Technology, 81, Nilgunj Road,
Agarpara Kolkata - 700109, West Bengal, India

ABSTRACT:

The human eye is irreplaceable in its complexity and functionality. People often suffer with vision loss due to various reasons. Every time it is not possible to find an eye donor, but with advancements in nanotechnology, synthetic biology, neural interfacing, and material science, a possibility is there of complete artificial replacement of a damaged or non-functional eye. Here a futuristic concept is presented of a fully functional, biologically integrated bionic eye that not only act as the human eye in structure and capability but also restores sight to those with irreversible vision loss. The concept envisions a self-powered, smart bionic eye with built-in image processing, retinal emulation, and seamless communication with the optic nerve and brain. The synthetic vision of bionic eye will be able to provide the human vision to the blind persons with retinal damage.

Keywords: *Bio-Synthetic Vision, Optic Nerve Interface, Neural Integration, Eye Replacement.*

Fake News Detection Using Machine Learning

Prof. Barun Majumdar[1], Prof. Bipasha Chakrabarti Banik[2], Partha Chakraborty[3], Rakesh Maity[4], Subhadip Paul[5]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

The rapid growth of social media and online news platforms has significantly increased the spread of misinformation and fake news, which can mislead the public, influence opinions, and create social and political instability. Detecting fake news manually is difficult due to the enormous amount of content generated every day. Therefore, automated systems based on Machine Learning (ML) and Natural Language Processing (NLP) have become essential tools to identify and classify fake news efficiently. This study focuses on developing a machine learning-based approach to detect fake news by analyzing textual patterns and linguistic features in news articles. The proposed system uses supervised machine learning algorithms such as Logistic Regression and Support Vector Machines (SVM) to classify news articles as either real or fake. In the preprocessing stage, the news dataset undergoes several Natural Language Processing techniques, including text cleaning, tokenization, stop-word removal, stemming, and lemmatization, to convert raw textual data into a structured format. After preprocessing, TF-IDF (Term Frequency–Inverse Document Frequency) vectorization is applied to transform textual information into numerical feature vectors that machine learning models can process effectively. The models are trained and tested on labeled datasets containing both genuine and fake news articles. During the training phase, the algorithms learn distinguishing linguistic patterns, word distributions, and contextual indicators commonly present in fake news content. Performance evaluation is conducted using standard metrics such as accuracy, precision, recall, and F1-score to assess the effectiveness of each model. Experimental results indicate that machine learning models can achieve high classification accuracy, demonstrating their capability to detect fake news reliably. The proposed approach contributes to reducing the spread of misinformation byenabling automated identification of unreliable news sources. Such systems can assistsocial media platforms, news organizations, and fact-checking agencies in filtering misleading content and promoting trustworthy information. In the future, integrating deep learning techniques and real-time data analysis could further improve the performance and scalability of fake news detection systems.

Keywords: *ML, NLP, SVM, TF-IDF*

Smart Agriculture Monitoring System using IoT and AI

Prof. Asish De[1], Dr. Debashree Chakraborty[2], Tufan Bera[3]
Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:
Agriculture plays an important role in the economy and food production. However, farmers often face problems such as irregular weather, improper irrigation, and lack of real-time information about soil and crop conditions. The Smart Agriculture Monitoring System using IoT and AI is designed to solve these problems by using modern technology to improve farming efficiency and productivity. This system uses different sensors such as soil moisture, temperature, and humidity sensors to collect important data from the farm. These sensors are connected through the Internet of Things (IoT), which allows the data to be sent to a cloud platform or mobile application for monitoring in real time. Farmers can easily check the condition of their fields from anywhere using their smartphones. Artificial Intelligence (AI) is used to analyze the collected data and provide smart recommendations. The AI system can help in predicting irrigation needs, detecting unusual environmental conditions, and supporting better decision-making for crop management. As a result, farmers can use water and other resources more efficiently. The proposed system helps in reducing manual effort, saving water, and increasing crop productivity. It also supports sustainable farming practices by providing accurate and timely information. Therefore, the Smart Agriculture Monitoring System using IoT and AI can be a useful solution for modern agriculture and smart farming.

Keywords: *Smart agriculture, Internet of Things (IoT), artificial intelligence (AI), real-time monitoring, smart irrigation, crop management, sustainable farming*

From Diagnosis to Intervention: A Dual Machine Learning and Agentic AI Approach to Pediatric Malnutrition

Mandril Sircir[1], Ankita Kanjilal[2], Sounak Sarkar[3], Arkaprabha Chakraborty[4], Roopkatha Majumdar[5], Sanjoy Bhattacharjee[6]

Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex, 540 Dum Dum Road, Surermath, Kolkata - 700074.

ABSTRACT:

Pediatric malnutrition—a condition where children lack sufficient nutrition for optimal growth and development—remains a major global public health challenge, particularly in rural and low-resource areas. Traditional AI-based healthcare systems focus primarily on predictive diagnosis and often stop at binary classification, offering little actionable support for clinical intervention. This paper introduces a dual-tier framework that combines the precision of deterministic machine learning with the advanced reasoning capabilities of agentic AI. The system first analyzes key health indicators, including age, anthropometric data, and hygiene factors, to determine a child's baseline nutritional status. These metrics are subsequently evaluated against international pediatric growth standards to ensure strict clinical reliability. Based on this analysis, the system generates accessible explanations and prescribes affordable, hyper-local dietary interventions tailored to a family's daily budget, regional agricultural availability, and cultural preferences. Crucially, the system features a self-auditing mechanism to enforce safety precautions regarding food preparation and age-appropriate consumption. By integrating predictive analysis with culturally empathetic dietary interventions, this proposed approach provides an actionable framework designed to support parents, community health workers, and rural clinics in delivering effective early nutritional care.

Keywords: *Pediatric Malnutrition, Machine Learning, Agentic AI, Decision Tree, LangGraph, Dietary Recommendation, WHO Standards, Multi-Agent System*

Design and Implementation of an AI-Assisted, Arduino-Based Autonomous Firefighting Rover

Prof. Barun Mazumdar[1], Dr. Saddam Mollah[2], Sanjiv Kumar Patel[3]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

This paper presents the design and development of an AI-assisted automatic fire-extinguisher car using Arduino technology. The proposed system aims to detect and extinguish small fires in hazardous or inaccessible areas without direct human intervention. The robot integrates an IR flame sensor for fire detection, a motor driver for movement control, and a water pump mechanism to suppress flames. Once the flame sensor detects a fire source, the microcontroller processes the signal and directs the robotic car toward the flame. The system then activates the pump to spray water and extinguish the fire automatically.

Artificial intelligence concepts are incorporated to enhance the robot's decision-making capability, allowing it to respond quickly and efficiently to fire signals and adjust its movement toward the detected source. The integration of sensors, control algorithms, and automated actuation improves reliability and response time compared to manual firefighting methods in small-scale environments.

This project demonstrates a low-cost, efficient, and intelligent fire-response system that can help reduce risks in laboratories, homes, and industrial settings. The proposed model highlights the potential of combining embedded systems with AI techniques to develop smart safety solutions for real-time fire detection and suppression.

Keywords: *Artificial intelligence, firefighting robot, Arduino, fire detection, embedded systems, IR flame sensor, smart safety solutions*

Deep Learning Base Email Spam Classification

Prof. Bipasha Chakrabarti Banik[1], Prof. Sampa Chandra Das[2], Jit Dutta[3]
Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:
Email spam remains a significant challenge in digital communication, posing security risks and reducing user productivity. Traditional machine-learning approaches rely heavily on manual feature extraction and often struggle to generalize in the presence of evolving spam techniques. This work presents a deep learning–based email spam classification model that automatically learns semantic and contextual features from raw email text. The proposed system employs a neural architecture—such as Long Short-Term Memory (LSTM), Convolutional Neural Networks (CNN), or Bidirectional LSTM—to extract high-level textual representations and perform binary classification between spam and legitimate (ham) messages. A pre-processing pipeline including tokenization, sequence padding, and word embeddings (e.g., Word2Vec or GloVe) is implemented to convert email content into dense vector representations. The model is trained and evaluated on a benchmark dataset, demonstrating superior accuracy, precision, recall, and F1-score compared to traditional logistic regression and Naïve Bayes classifiers. Experimental results show that deep learning significantly enhances the detection of complex and previously unseen spam patterns. This research highlights the effectiveness of neural networks in email filtering and provides a scalable, automated solution for modern spam detection systems.

Keywords: *Email spam classification, deep learning, Long Short-Term Memory (LSTM), word embeddings, text classification, spam detection*

Active Suspension System Using LQR Control

Prof. Sampa Chandra Das[1], Prof. Ashis De[2], Sayak Debnath[3]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

Vehicle ride comfort and road handling are major concerns in modern transportation systems. Traditional passive suspension systems are limited in their ability to adapt to varying road conditions. This project would present the modeling, simulation, and control of an Active Suspension System using an LQR (Linear Quadratic Regulator) controller. A quarter-car model will be used to represent the vehicle dynamics. The control objective is to minimize vehicle body vibrations while maintaining tyreroad contact. MATLAB/Simulink would be used for system modelling and controller design. Simulation results show that the active suspension system significantly improves ride comfort compared to passive suspension. Although suspension is a mechanical system, the control, sensing, and actuation are completely electronics. This project demonstrates the application of control systems, signal processing, and embedded concepts, making it highly relevant to Electronics and Communication Engineering.

Keywords: *Active suspension system, Linear Quadratic Regulator (LQR), quarter-car model, control systems, MATLAB/Simulink, ride comfort, vehicle dynamics*

Hyperspectral Image Compression Using Autoencoder-based Self-developed Model: HASS-AE

Prof. Barun Mazumdar[1], Dr. Saddam Mollah[2], Dibyajit Das[3]
Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:
Hyperspectral imaging plays an important role in remote sensing because it captures detailed spectral and spatial information about Earth surfaces. However, the extremely large size of hyperspectral data creates challenges for storage, transmission, and onboard processing in practical systems. To address this issue, this work introduces AS2-AE, an adaptive spectral–spatial autoencoder designed for efficient hyperspectral image compression while retaining information relevant to spectral unmixing. Instead of compressing pre-estimated abundance maps or focusing only on reconstruction quality, the proposed framework learns compact representations directly from raw hyperspectral cubes. A spectral–spatial attention mechanism is incorporated within the encoder to highlight informative features before compression, while the latent bottleneck is structured to preserve spectral patterns associated with material signatures. This allows the model to reduce data dimensionality without significantly degrading spectral characteristics required for sub sequent analysis. The effectiveness of the method is evaluated on several benchmark hyperspectral datasets. Experimental results demonstrate that the proposed approach achieves substantially higher compression ratios than conventional and recent learning based techniques while maintaining competitive reconstruction accuracy and low spectral distortion. These findings suggest that AS2-AE provides a practical and scalable solution for hyperspectral data compression in scientific analysis as well as resource-constrained remote sensing platforms.

Keywords: *HSI compression, spectral spatial autoencoder, unmixing, abundance representation, reconstruction error, CR, mean spectral angle distance.*

IoT-Based Farming Robot for Smart Agriculture

Prof. Sampa Chandra Das[1], Dr. Saddam Mollah[2], Sandip Karmakar[3]
Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:
The IoT-based farming robot is a smart agricultural system developed to improve farming efficiency through automation and modern technology. This project integrates Internet of Things (IoT) and robotic systems to monitor and manage agricultural activities effectively. The collected data is transmitted through IoT platforms, allowing farmers to monitor field conditions remotely using smartphones or computers.

The farming robot can perform multiple tasks such as automatic irrigation, crop monitoring, pesticide spraying, and weed detection, reducing the need for human labor. It helps farmers make data-driven decisions for better crop management and improved productivity.

The system also promotes efficient use of water, fertilizers, and pesticides, which helps in reducing resource wastage and environmental impact. By implementing smart technologies, this project supports the concept of precision agriculture and sustainable farming practices. Overall, the IoT-based farming robot provides a cost-effective, intelligent, and automated solution that can transform traditional farming into a more productive and technology-driven agricultural system.

Keywords: *Internet of Things (IoT), farming robot, precision agriculture, agricultural automation, smart agricultural system, crop monitoring, sustainable farming*

Automated Surveillance Tree Bot for Wildlife Protection

Dr. Susmita Das[1], Alin Sen[2], Arkasnata Bandyopadhyay[3], Rupsha Das[4], Avirup Mukherjee[5], Prashun Shaw[6]

Narula Institute of Technology, 81, Nilgunj Road, Agarpara Kolkata - 700109, West Bengal, India

ABSTRACT:

Human-animal conflict has emerged as a major economic and social challenge across several regions in India. Accidental encounters between humans and wild animals, especially in designated elephant corridors, frequently result in property damage, injuries, and fatalities.Existing surveillance method rely heavily on manual monitoring or fixed camera system which are limited by terrain constraints, weather conditions, and lack of mobility. The proposed Automated Surveillance Tree-Bot System, based on swarm robotics and advanced sensing technologies, aims to address these challenges by enabling real-time wildlife monitoring, predictive movement analysis, and early alert generation, thereby reducing human–animal conflicts and supporting wildlife conservation efforts. Here LiDAR sensor is used to monitor the ambience and one self-defence mechanism is also applied.

Keywords: *Swarm Robotics, LiDAR Sensor, Wildlife Monitoring, Elephant Corridor, Autonomous Robot.*

Automated Medicine Vending Device with Intelligent System Integration

Dr. Susmita Das[1], Ardhendu Biswas[2], Abhishek Kumar[3], Adarsh Kumar Jha[4]

Narula Institute of Technology, 81, Nilgunj Road, Agarpara
Kolkata - 700109, West Bengal, India

ABSTRACT:

Managing medications correctly is essential for maintaining health, but many people struggle with remembering doses, especially those with chronic illnesses or memory issues, forgetting doses, accidental overdosing, difficulty tracking multiple medications, and lack of support for elderly or disabled users. In today's fast-paced world, many elderly parents live alone while their children are away due to work and some individuals often forget to take their medication on time. Ensuring timely medication intake is crucial for maintaining good health, and the Aushadhi Mitra is designed to help individuals manage their medication schedules independently. Here the utilization of sensors with IoT is explored for the automated operation of medicine vending for the elderly care which is performing as the robotic solution also.

Keywords: *Swarm Robotics, LiDAR Sensor, Wildlife Monitoring, Elephant Corridor, Autonomous Robot.*

Human Mood Detection System with Cognitive Computing

Dr. Susmita Das[1], Ankit Kar[2], Hritabrata Ghosh[3], Aniruddha Mitra[4], Priyanshu Das[5], Ayitri Dhar[6]

Narula Institute of Technology, 81, Nilgunj Road, Agarpara
Kolkata - 700109, West Bengal, India

ABSTRACT:

My Moodie, a real-time mood detection system which is designed to operate using brainwave signals collected from a wearable head cap on human beings. The application detects neural activity patterns associated with emotions such as happiness, stressed, anxious, and neutral etc. in real time or from the recorded data. These brainwave signals are continuously recorded and stored in a backend database from which the connected application retrieves data for real-time emotion analysis. The system then classifies the detected emotions, generates mood profiles, delivers personalized recommendations to improve well-being. This research paper presents the method of design, ethical concerns, and best practices for implementing brainwave-based emotion detection. It also identifies gaps in data transparency, fair evaluation, reproducibility and ethical governance while suggesting methodologies, research directions to strengthen system integrity.

Keywords: *Brainwave, Emotion, Mood, Digital Wellness*

Clustering-Based Analysis of Diabetic Patient Data for Disease Progression Prediction

Dr. Mithu Dey[1], Swastika Banerjee[2], Uday Kumar Singha[3], Soumyadeep Hore[4]

Asansol Engineering College, Asansol-713305, West Bengal, India.

ABSTRACT:

Diabetes mellitus is a complex and chronic metabolic disorder characterized by diverse physiological patterns among patients, making early diagnosis and disease progression analysis challenging. Traditional predictive models primarily emphasize classification accuracy, often overlooking underlying heterogeneity and progression dynamics. This study proposes a clustering- based analytical framework to uncover hidden structures in diabetic patient data using the Pima Indians Diabetes Dataset. Unsupervised machine learning techniques, including K-Means, Agglomerative Hierarchical Clustering, and DBSCAN, are applied to group patients based on intrinsic similarities without relying on predefined outcome labels. Data preprocessing methods such as median imputation, Z-score normalization, and Principal Component Analysis (PCA) are employed to enhance data quality and visualization. Additionally, cluster validation techniques are used to assess the quality and separability of clusters. The results reveal meaningful patient groupings strongly associated with varying levels of disease severity and progression patterns. This approach improves patient stratification, supports early risk identification, and enhances understanding of disease progression. The study highlights the importance of unsupervised learning in healthcare analytics and its potential to support personalized treatment strategies and informed clinical decision-making.

Keywords: *Diabetes Mellitus, Clustering Analysis, Unsupervised Learning, Healthcare Data Analytics, Disease Progression, Patient Stratification, K-Means Clustering, DBSCAN, Hierarchical Clustering, Pima Indians Diabetes Dataset.*

AI-Based Air Quality Monitoring System Using ESP32, MQ135 Gas Sensor, DHT11, and LCD

Mr Barun Mazumdar[1], Prof. Bipasha Chakrabarti Banik[2], Rajaul Ansary[3], Partha Palmal[4], Arnab Maity[5]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

Air pollution has become a major environmental issue affecting human health and the ecosystem. Continuous monitoring of air quality is necessary to detect harmful gases and maintain a healthy environment. This project presents an AI-based air quality monitoring system that measures air pollution levels along with temperature and humidity in real time.

The system is built using the ESP32, which acts as the main controller. The MQ135 Gas Sensor is used to detect harmful gases such as carbon dioxide (CO2), ammonia (NH3), smoke, and other pollutants present in the air. The DHT11 measures environmental parameters like temperature and humidity. The collected data is processed by the ESP32 and displayed on an LCD Display.

Artificial Intelligence or data analysis techniques can be applied to the collected sensor data to analyse pollution patterns and predict air quality levels. The system provides real-time monitoring and alerts when pollution levels exceed safe limits. This low-cost and efficient monitoring system can be used in homes, industries, and smart city applications to improve environmental awareness and public health. Overall, the proposed system offers a simple, reliable, and intelligent solution for monitoring and analysing air quality using modern IoT and AI technologies.

Keywords: *Air quality monitoring, Internet of Things (IoT), artificial intelligence (AI), ESP32, real-time monitoring, environmental sensors, smart city*

IoT-Based Footstep Power Generation

Prof. Barun Mazumdar[1], Dr. Debashree Chakraborty[2], Bijaya Mondal[3]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

The IoT-based footstep power generation system is an innovative and eco-friendly solution that converts mechanical energy from human footsteps into electrical energy. This system uses sensors such as piezoelectric plates installed beneath walking surfaces like floors, pavements, or stairs. When a person steps on these surfaces, mechanical pressure is generated, which is converted into electrical energy and stored in batteries for later use.

The integration of Internet of Things (IoT) technology enhances the efficiency and monitoring capability of the system. IoT devices and sensors collect real-time data on the number of footsteps, energy generated, and system performance. This data can be transmitted to a cloud platform, allowing users to monitor and analyze energy production remotely through mobile or web applications.

This system is especially useful in crowded places such as railway stations, malls, and public walkways where a large number of people move daily. It promotes renewable energy usage, reduces dependency on conventional power sources, and supports sustainable development. Overall, the project demonstrates how smart technology and human activity can be combined to generate clean energy efficiently.

Keywords: *Internet of Things (IoT), footstep power generation, piezoelectric sensors, renewable energy, real-time monitoring, energy harvesting, sustainable development*

IoT-Based Weather MonItorIng system

Prof. Bipasha Chakrabarti Banik[1], Prof. Banrun Mazumdar[2], Deblina Mandal[3]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

An Internet of Things (IoT)-based weather monitoring system is a smart solution designed to measure, collect, and analyze environmental parameters in real time using interconnected devices. The system typically consists of sensors, a microcontroller (such as Arduino or NodeMCU), and a cloud platform for data storage and visualization.

The main objective of this system is to monitor weather conditions such as temperature, humidity, atmospheric pressure, rainfall, and air quality continuously. Sensors like DHT11/DHT22 (for temperature and humidity), rain sensors are used to gather data from the environment. This data is processed by the microcontroller and transmitted over the internet using Wi-Fi or other communication technologies.

The collected data is then uploaded to cloud platforms or mobile applications, where users can access it remotely in real time. The system can also generate alerts in case of extreme weather conditions, making it useful for agriculture, disaster management, and environmental monitoring.

The IoT-based weather monitoring system is cost-effective, energy-efficient, and provides accurate and continuous data without human intervention. It helps in better decision-making and forecasting, thereby improving productivity and safety in various sectors.

Keywords: *Internet of Things (IoT), weather monitoring system, real-time monitoring, environmental sensors, microcontroller, cloud platform, disaster management*

AI-Based Smart Vehicle Speed Control System Using RFID, GPS, and Arduino

Prof. Asish De[1], Piyanshu Makhal[2], Subham Nandi[3], Sanjay Gope[4]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

In today's fast-moving world, transportation has become quicker, but road safety remains a serious concern. Overspeeding is one of the major causes of road accidents, especially in sensitive areas like schools, hospitals, and construction zones. To address this problem, this project proposes an AI-based smart vehicle speed control system using RFID, GPS, and an Arduino-based embedded platform.

In this system, RFID tags are installed at the entry and exit points of speed-restricted zones. An RFID reader mounted inside the vehicle detects these tags and sends the data to the Arduino controller. Based on the detected location, the system automatically reduces the vehicle's speed by controlling the motor through a motor driver using Pulse Width Modulation (PWM).

To improve reliability, a GPS module is integrated to continuously track the vehicle's position. With the help of AI-assisted geofencing, the system can identify restricted zones even if the RFID tag is missed due to high vehicle speed or signal limitations. The AI component can also analyze location data and adapt speed control more intelligently.

This combined use of RFID, GPS, and AI technology creates a smart and efficient system for automatic vehicle speed regulation, helping to improve road safety and reduce accidents in critical zones.

Keywords: *Internet of Things (IoT), weather monitoring system, real-time monitoring, environmental sensors, microcontroller, cloud platform, disaster management*

Sanjeevani- Smart Patient Monitoring & Alert System

Prof. Barun Mazumdar[1], Dr. Debashree Chakraboty[2], Ankita Chaterjee[3]
Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:
"Sanjeevani" is a simple and reliable smart healthcare system created to continuously monitor patients and provide instant emergency alerts, making it ideal for home care, elderly support, small clinics, and rural settings in India. Named after the mythical life-saving herb, it serves as a caring guardian that watches over the patient day and night.
The system has two connected parts. A small wearable unit worn on the wrist checks body temperature, detects falls through movement, and includes an SOS button for urgent help. This data is sent wirelessly to the main monitoring unit near the bed.
The main unit receives the wearable information and also monitors saline bottle level, bed presence, and room air quality. Key details show on a small color screen, with a status light turning green for normal and red for alerts. A buzzer sounds loudly during serious conditions like falls, SOS press, low saline, patient out of bed, or poor air. A red emergency stop button allows caregivers to silence the alarm after attending to the patient.
A basic web page lets family or doctors view live readings on any phone or laptop connected to the same WiFi. Built with affordable, locally available parts, "Sanjeevani" offers continuous monitoring, quick alerts, easy alarm reset, and simple remote checking. It helps catch issues early, reduces constant manual watching, and supports safer, more peaceful patient care in everyday Indian homes and healthcare places.

Keywords: *Smart healthcare, continuous patient monitoring, wearable devices, fall detection, emergency alert system, remote monitoring, elderly care*

Human-Following Robot Using Arduino Uno

Prof. Ashis De[1], Prof. Sampa Das[2], Arnab Banerjee[3]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

Human-following robots are increasingly used in service robotics, surveillance, and assistive technologies. This paper presents the design and implementation of a human-following robotic system capable of detecting and tracking a person in real time. The proposed system is developed using the Arduino embedded controller integrated with ultrasonic distance sensors and motor driver modules to enable autonomous navigation.

The robot continuously measures the distance between itself and a moving human using ultrasonic sensors and adjusts its direction and speed accordingly. Based on the sensor readings, the controller processes the data and commands the motors to move forward, stop, or change direction to maintain a safe following distance. This enables the robot to track human motion effectively within indoor environments.

The system architecture is designed to be simple, low-cost, and energy-efficient while maintaining reliable performance. Experimental testing demonstrates that the robot can successfully detect and follow a human subject while avoiding obstacles within a limited range. The proposed human-following robot can be applied in various domains such as personal assistance, smart home systems, hospital support services, and automated delivery platforms. The development of such autonomous robotic systems contributes to the advancement of intelligent human–robot interaction and practical service robotics.

Keywords: *Human-following robot, autonomous navigation, Arduino, ultrasonic sensors, real-time tracking, human-robot interaction, service robotics*

Trespasser Tracker Flying Security Pilot

Dr. Susmita Das[1], Ankit Kar[2], Hritabrata Ghosh[3], Aniruddha Mitra[4], Priyanshu Das[5], Ayitri Dhar[6]

Narula Institute of Technology, 81, Nilgunj Road, Agarpara Kolkata—700109, West Bengal

ABSTRACT:

Master drone autonomously surveys an area using GPS navigation, capturing real-time videos and images, while maintaining obstacle avoidance to track the path of the surveillance. Mid-flight, it deploys a slave drone, which independently surveys a designated region. Both drones transmit telemetry and video data to the Ground Control Station (GCS) for real-time monitoring. The master drone can act as a relay for the slave drone's communication if needed. Once the mission is complete, both drones return to their home positions. This system allows for efficient, dual-drone surveying, increasing coverage and enhancing security operations. A "Trespasser Tracker Flying Security Pilot" using ML could be an advanced security system that leverages autonomous drones or flying vehicles equipped with machine learning algorithms to identify, track, and respond to trespassers or intruders. Master will forward the messages to central controller which is situated in nearby control office to control all necessary communication via devices.

Keywords: *Trespasser, GCS, ML, Security.*

Artificial Intelligence (AI) for Sustainable Development in MSMEs: A Literature Review

Somnath Chakraborty[1], Samika Ray[2]

Department of Business Administration, Narula Institute of Technology

ABSTRACT:

MSMEs, or micro, small, and medium-sized enterprises, constitute a significant part of India's economy. Particularly in the contemporary digital era, when MSME actors must comprehend fast emerging technology, MSME actors frequently struggle with the sustainability of their operations in terms of both innovation and competitiveness. Artificial Intelligence (AI) can help with many elements of daily living in the present technology progress. AI can assist MSME actors grow their enterprises by helping them make decisions and participate in the financial system, which eventually enhances business sustainability and boosts economic growth more generally. However, MSMEs in India have not made extensive use of AI. This study's research methodology is a literature review, which is an analysis or synopsis of other studies on the application of AI for financial inclusion and company sustainability in the MSME sector. An overview of AI's advantages and difficulties for MSME players is provided in this paper, along with its effects on boosting economic growth and enhancing corporate sustainability.

This study uses a literature review methodology, gathering and analyzing data from 34 relevant publications that were published between 2019 and 2024. AI has the potential to improve productivity and resource utilization, according to data, but there are still significant obstacles to overcome, such as implementation costs and inadequate technical infrastructure. Adoption of AI can maintain operational sustainability by improving supply chain efficiency and reducing negative environmental impacts.The findings of the study do in fact call for long-term research on the long-term impacts of AI on MSMEs and certain industries. Therefore, a theoretical justification for methods that will concentrate on AIs in the context of sustainable development is presented in this paper.

Keywords: *MSMEs, Artificial Intelligence (AI), Literature Review, sustainability.*

IoT-Based Virtual Doctor Robot

Prof. Ashis De[1], Dr. Debashree Chakraborti[2], Sangita Giri[3]

Gargi Memorial Institute of Technology, Baruipur, Kolkata - 700 144

ABSTRACT:

The IoT-based Virtual Doctor Robot is an advanced healthcare system designed to provide remote medical support and real-time patient monitoring using modern technologies. It is developed using components such as DC motors, gearboxes, Wi-Fi module, robotic base frame, wheels, shafts, and electronic elements like resistors, capacitors, diodes, and transistors, along with proper wiring and supporting structures. These components ensure smooth movement, stable structure, and efficient communication of the robot.

The robot uses IoT technology to connect with cloud platforms, enabling doctors to monitor patients, access medical data, and communicate from distant locations. It can be controlled remotely and can display patient reports, vital information, and video consultations through an integrated interface.

Artificial Intelligence (AI) further enhances the system by analyzing patient symptoms, providing basic diagnosis support, and suggesting initial treatments or precautions. AI can also help in decision-making, alert generation, and improving response time in emergencies. This combination of IoT and AI makes the system more intelligent, efficient, and user-friendly.

Overall, the IoT Virtual Doctor Robot aims to improve healthcare accessibility, reduce the need for physical visits, and provide quick medical assistance, especially in rural or emergency situations, by integrating robotics, IoT, and AI into a single smart solution.

Keywords: *Internet of Things (IoT), virtual doctor robot, artificial intelligence (AI), remote patient monitoring, healthcare robotics, telemedicine, smart healthcare.*

About the ATMAN-AI 2K26 Conference

The conference serves as a dynamic platform to explore the transformative role of Artificial Intelligence (AI) in advancing the vision of Atma Nirbhar Bharat (Self-Reliant India). It brings together academicians, researchers, industry experts, and policymakers to deliberate on the integration of AI across key sectors such as education, healthcare, agriculture, manufacturing, and governance. Emphasizing interdisciplinary collaboration, the conference encourages the convergence of engineering, social sciences, management, and humanities to address complex national challenges. It also highlights the importance of ethical AI practices, focusing on transparency, accountability, data privacy, and fairness to ensure that technological progress remains inclusive and socially responsible.

In addition, the conference promotes meaningful policy dialogue aimed at strengthening India's AI ecosystem through robust regulatory frameworks and innovation-driven strategies. By aligning discussions with national priorities and developmental goals, it seeks to bridge the gap between research and real-world implementation. The central focus remains on generating practical, scalable, and sustainable solutions that enhance economic resilience and technological independence. Ultimately, the conference aspires to contribute to the creation of a self-reliant, empowered, and globally competitive New India.

About the Gargi Memorial Institute of Technology (GMIT)

Gargi Memorial Institute of Technology (GMIT), located in Baruipur, Kolkata, is a private engineering college established in 2011 and affiliated with Maulana Abul Kalam Azad University of Technology (MAKAUT). Approved by AICTE, the institute offers undergraduate B.Tech programs in disciplines such as Computer Science, Electronics and Communication, Electrical, Civil, and Mechanical Engineering. GMIT is known for its focus on quality technical education, industry-oriented training, and skill development through internships and workshops. The college provides modern infrastructure, including well-equipped laboratories, a library, and campus facilities that support both academic and extracurricular growth. With a commitment to nurturing competent professionals, GMIT has been steadily building its reputation in the field of engineering education in West Bengal.

Published by:
LEARNET PUBLISHING
19/b, Kali Kumar Majumder Road,
P.O.-Santoshpur Avenue, P.S.- Survey Park,
Kolkata-700075, West Bengal
Email: learnetpublishing@gmail.com
Website: www.learnrtpub.co.in
www.jctmg.in

ISBN 978-81-685619-8-4