SUSTAINABLE DEVELOPMENT GOALS

15. LIFE ON LAND

Protect, Restore And Promote Sustainable Use Of Terrestrial Ecosystems, Sustainably Manage Forests, Combat Desertification, Halt And Reverse Land Degradation, And Halt Biodiversity Loss

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss

Goal 15 is about conserving life on land. Its goals are to resist desertification, preserve and restore terrestrial ecosystems, manage forests sustainably, stop and reverse land degradation, and stop biodiversity loss. Earth's ecosystems support a variety of cultural, spiritual, and economic values and are essential to the continuation of human life. They also account for more than half of the world's GDP. However, pollution, biodiversity loss, and climate change are the three crises the world is currently confronting. At least 100 million hectares of productive and healthy land were degraded year between 2015 and 2019, affecting the lives of 1.3 billion people. Nearly 90% of deforestation is directly caused by agricultural expansion. Our food chains are directly affected by this, and between 2000 and 2018, the harvesting of oil palm was responsible for 7% of worldwide deforestation. Particularly for poor nations and the tropics, regional and international initiatives are crucial to maintaining forest ecosystems and their social, economic, and environmental roles. To accomplish Goal 15, we must change how humans interact with nature and acknowledge that it is the foundation of all life on Earth. Goal 15 has additional momentum thanks to the newly agreed Kunming-Montreal Global Biodiversity Framework, which outlines 23 targets to be met by 2030 and four outcome-oriented goals to be accomplished by 2050.

15.1 Policy for Sustainable use, conservation and restoration of land

Objectives:

- To Encourage sustainable land-use methods in forestry, agriculture, and urban areas that promote livelihoods and food security while preserving the health of ecosystems.
- To Use sustainable land management (SLM) techniques to put policies in place that will stop soil erosion, desertification, and deforestation, especially in areas that are already at risk.
- To improve biodiversity and ecological services, preserve natural habitats, stop fragmentation, and rebuild damaged ecosystems, such as forests, wetlands, grasslands, and deserts.
- To Increase the ability of land-based systems to adapt to climate change by using natural solutions like rewilding, agroforestry, and afforestation.
- To Assure vulnerable and marginalized groups, such as women, local communities, and indigenous peoples, of fair land tenure and access rights.

To achieve these objectives, the United Nations says that a fundamental shift in humanity's relationship with nature is necessary. This includes taking action to address the root causes of crises and recognizing the value of nature.

Policy for Strategic Pillars and Actions:

- Utilizing technology to maximize land use, cut waste, and boost output without harming the environment.
- Initiative to increase the number of trees planted in degraded areas, emphasizing native species that enhance ecosystem services and promote biodiversity.
- To support the creation of new protected areas and corridors to safeguard biodiversity hotspots and migratory routes.
- Promotion towards endangered species and important habitats, such as forests, grasslands, and wetlands, is a top priority.
- Empowering local communities, particularly indigenous peoples, to manage forests sustainably and equitably.
- Encouragement of the use of natural solutions to adapt to and mitigate climate change, such as reclaiming wetlands for flood control and carbon sequestration.
- Encouraging initiatives that use sustainable management and restoration to increase carbon reserves in soils and forests.
- Land should be used and managed in ways that provide economic, social, and environmental benefits, without compromising the ability of future generations to meet their needs.
- Land-use and management strategies should integrate ecological principles, recognizing the interdependence of ecosystems, biodiversity, and human activities.
- Recognizing that landscapes are interconnected systems, and promote integrated approaches that consider the full scope of land, water, and biodiversity linkages.

This policy provides a comprehensive framework for the sustainable use, conservation, and restoration of land, aimed at fulfilling the commitments of SDG 15, to protect, restore, and promote the sustainable use of terrestrial ecosystems. By implementing this policy, we aim to build a resilient, biodiverse, and sustainable land management system that benefits both people and the planet, ensuring a prosperous future.

Policy History

Policy created on	07-06-2021
Policy reviewed on	23-03-2022

15.2 Sustainable Land Ecosystems through Education

The Chennai Institute of Technology has recently taken the following specific steps in these directions,

The event Greening the Future (Tree Plantation Camp) took place on 03/06/2023 at the Chennai Institute of Technology. 150 students participated in the tree plantation camp, aiming to promote environmental sustainability. The event focused on raising awareness about the importance of trees in combating climate change and encouraging students to actively contribute to creating a greener future.

The Go Green Cyclothon was held on 26/01/2022 at the Chennai Institute of Technology. A total of 150 students participated in the event. The Cyclothon aimed to promote environmental sustainability by encouraging eco-friendly transportation, raise awareness about the importance of reducing carbon emissions, and inspire students to adopt greener lifestyles. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

One Day Workshop on Applications of Hybrid Energy Dryer in association with Indian Concrete Institute and IEEE Students Chapter supported by Department of Science and Technology, Government of India on 20th December 2023 were conducted to aware preserving energy to make life on Land sustainable.

CIT commitment towards being an ECO-centric campus - a manifestation of that being 300kW Roof Top Solar Power Plant installed, which is equivalent to 20,000+ trees planted, 380+ tons of CO_2 reduction.

15.3 Supporting land ecosystems through action

Vermicomposting Unit:

Vermicomposting is an organic process that uses earthworms to create compost. Composting using worms is another name for vermicomposting. The process of vermicomposting is thought to be an environmentally beneficial way to turn organic wastes into compost that may be used as fertilizer. Several worm species are used in the vermicomposting process, however the most common ones include red wigglers, white worms, and other earthworms. This compost has been used for the significant amount of vegetation cultivated with the institute's hydroponics farm adhering to food policies.

In-house Vermicompost Unit

Hydrophonics

Organic farming has been involved in CIT campus with only organic fertilizers from vermicomposting units. Organically grown Vegetables are cultivated in the Institute. Eco club is initiated with the view of promoting research and development in green engineering concepts and energy conservation activities in and around the campus. The club has also stepped in creating awareness among the students by turning them technically sound on new and renewable energies.

The institution planned for debate about the role of contemporary society in environmental preservation was triggered by the theme "Today's Generation: Protecting the Environment or Degrading It?" Proponents contended that today's youth are more engaged and aware than ever before, supporting eco-friendly technologies, campaigning for climate policies, and encouraging sustainable practices. However, detractors drew attention to the ongoing increases in waste, consumption, and carbon emissions, implying that many behaviours continue to worsen the environment despite awareness. Finally, the conversation emphasized the necessity of more effective systemic reform and shared accountability.

Action towards Maintain and Extend current ecosystems Biodiversity

CIT stepped out activities for a bird watch to be a part of annual bird census near forest open area along with Forest Range Officers 11 March 2023. These activities engage both student members of the eco-club and students from different faculties. Activities pertaining to the preservation and abundance of biodiversity are in line with awareness-raising and educational initiatives.

Ecofriendly Pedestrain Path in campus

The campus pathways are ecofriendly with seperators between the roads and pedestrian paths. The pathways are provided with lamps throughout for ease in night time. Ramps are provided in parallel to conventional access at all entry points. Major pathways are designed with paverblocks such that the water percolation to the ground recharges normally.

Ecofriendly Pedestrian path Facilities in Campus

Usage of Bicycle

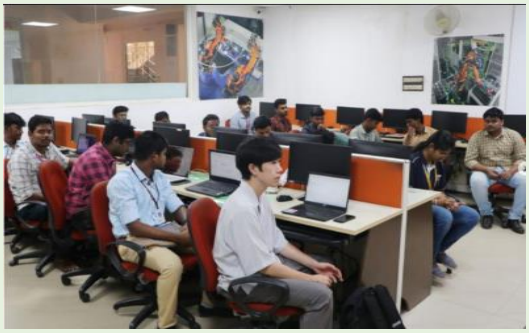
A number of transportation-related initiatives have been introduced by the institution. These programs aim to encourage more sustainable campus environments, lessen dependency on private vehicles, and promote alternate forms of transportation.

Free to rent bicycle on campus

Increase the percentage of paperless office

To minimize paper waste and promote digital solutions, our college has launched a paper reduction initiative that encourages the use of electronic resources and sustainable materials. This program aligns with our broader goal of fostering a more environmentally conscious and resource-efficient campus.

Paperless Registration



Digital Notes

Paperless Meeting

Paperless Labs

Avoiding Usage Of Single Use Plastics

Initiation to support a cleaner, greener campus, our college has rolled out a comprehensive program to significantly reduce plastic waste. This includes initiatives such as eliminating single-use plastics, promoting reusable alternatives, and increasing recycling efforts to minimize plastic pollution and foster a more sustainable campus environment.

Promoting "No Plastic" in campus

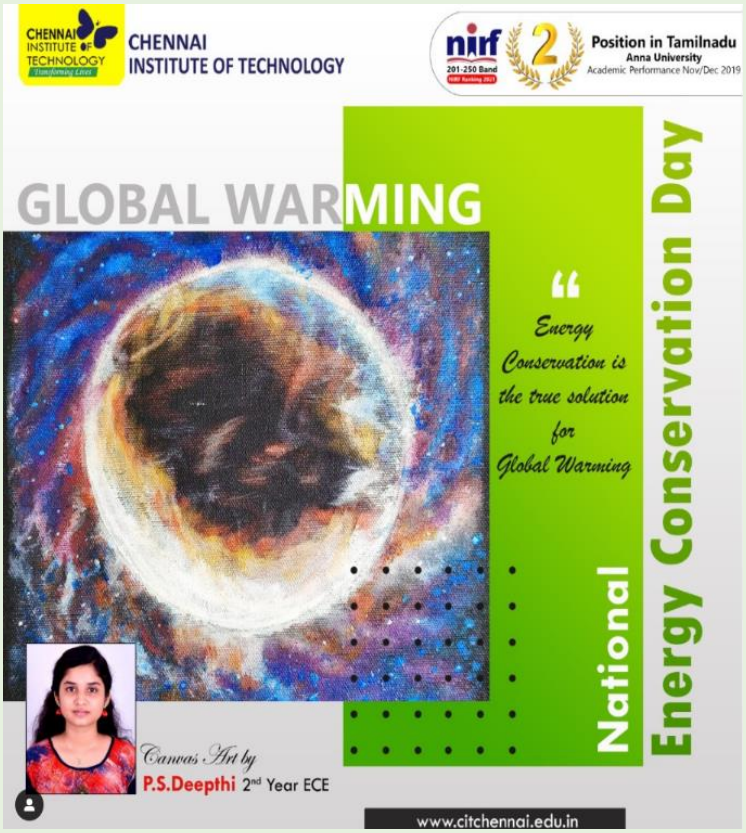
To provide a thorough introduction to a range of Hybrid Energy subjects, a workshop was held that included hands-on workshops on each idea along with an appropriate balance of theory and practice.

A campaign was conducted to adopt Trees with Mahindra Finance on 16th September 2022.

Chennai Institute of Technology organised Summer School on Applications of Geospatial Technologies - Smart City Traffic and Transportation Planning (Level 2 - Advanced) jointly

organised by the National Resources Data Management System, Department of Science and Technology, Government of India.

National Energy Conservation Day was decorated by the art of students on Global Warming.



Community Awareness in Puthuper on 11.02.2023

A Rally on "A MARCH FOR MINDS AND WATER", Over 50 students and faculty members took part in the rally, showing solidarity towards the cause. The participants carried banners and slogans emphasizing the importance of Water conservation and preservation. The rally began from CIT and proceeded to Puthuper Village attracting attention and sparking conversations about the importance of water management and literacy towards it.

Post-Rally Activities:

Tree-Planting Ceremony: Following the rally, participants gathered in the campus garden for a symbolic tree-planting ceremony. As part of our ongoing green initiatives, we planted three saplings in the institute's garden. These saplings not only represent our dedication to SDG-15 but also symbolize the growth and nurturing of knowledge(SDG4), reflecting our commitment.

Collaborative Art Installation: After the tree planting, we engaged the participants in a creative activity. A large chart was displayed at the playground entrance gate, where each participant made their handprints on the chart. We then drew branches extending from a central trunk, and the thumbprints of participants acted as leaves, transforming the handprints into a

beautiful, symbolic tree. This artwork now stands as a reminder of our collective efforts toward sustainability and education.

15.4 Land Sensitive Waste Disposal

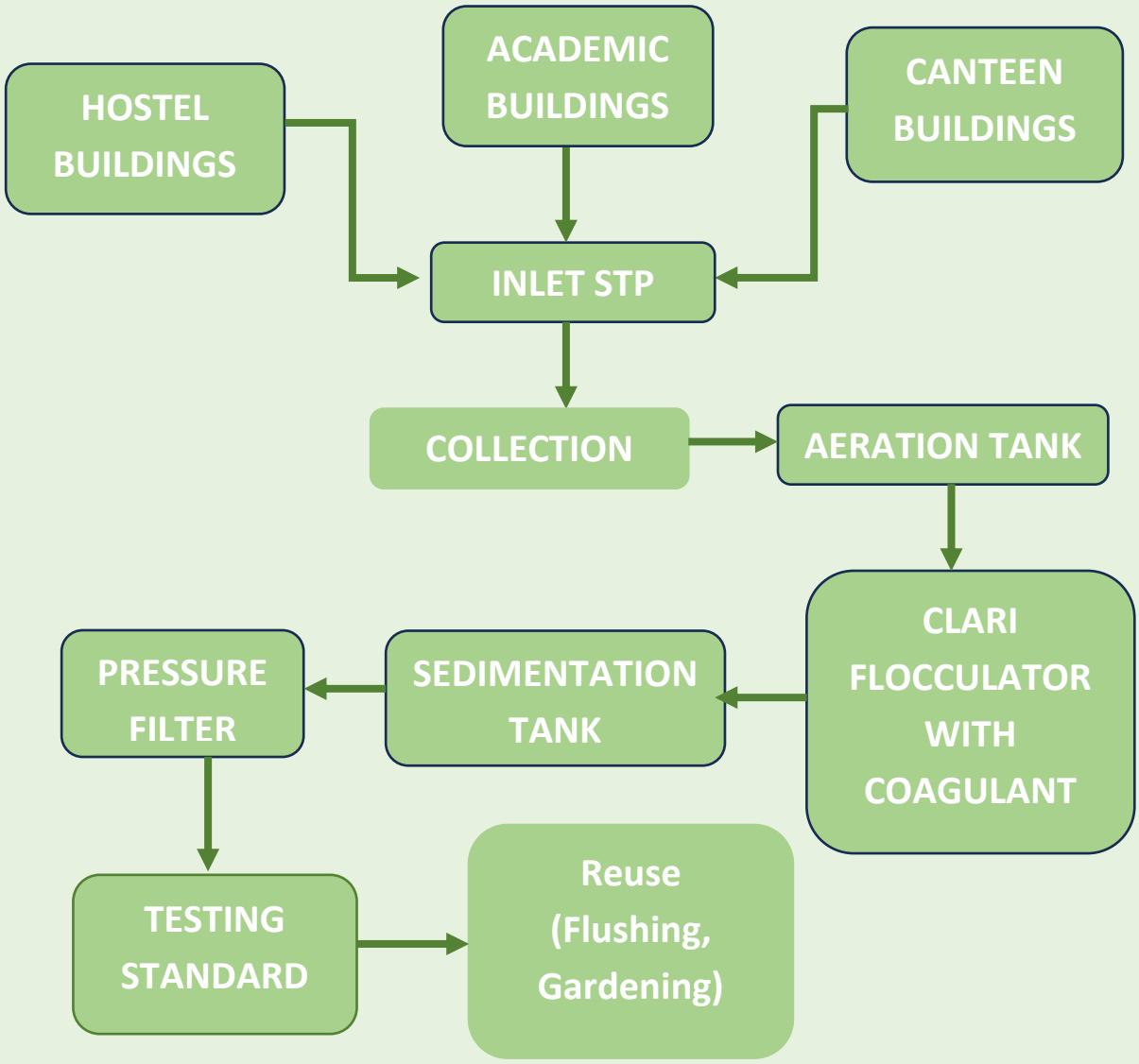
Water Discharge Guidelines And Standards

Water supply in the institute is been managed and supplied from four bore well sources to meet the daily demands. This supplies to input to purified for drinking water. The person in-charge monitors and manages the operations to ensure efficient and adequate supply of water around the campus. The water consumption and reuse standards adheres to the water reuse policy in the institute.

Waste Water Treatment Plant

The Chennai Institute of Technology is mindful of the need to conserve society and water for the safety of the environment. The plant comprises 1 unit of capacity 1,25000litres and 2 units of 75,000litres. Initially, the excess water is stored in the storage tank and aired in the aeration tank. After the aeration process, the coagulant is flocculated and sent to the sedimentation tank. And then the water is filtered by pressure and sent to the distribution tank. Water is used for gardening and irrigation of plants. The Institution is dedicated to sustainability and environmental conservation, and one of the key initiatives in this regard is our Water Recycling Program. This program is designed to reduce water consumption, minimize waste, and promote

the efficient use of water resources across our campus. Several steps are involved in wastewater treatment to eliminate impurities and enhance water quality.



Flow Chart -Process of Collection, Treatment and Reuse

To stabilize wastewater flow, screening, grit removal, and flow equalization are used in preliminary treatment to remove big solids and debris. Through sedimentation and the removal of floating material, first treatment eliminates a sizable number of solids and organic matter; however, dissolved particles are not addressed. Secondary treatment reduces BOD by 85–95% by using biological processes like as oxidation ponds, trickling filters, and the

activated sludge process to break down organic materials. Through filtration, chemical coagulation, nutrient removal (phosphorus and nitrogen), and disinfection with chlorine, UV radiation, or ozone to get rid of any lingering pathogens, tertiary (advanced) treatment further enhances the quality of the water.

Pressure Filter Units

Aerators

Filter Feed , Clarrifier and Sludge drying Beds

Water Re-use Measurement

Sewage treatment tank capacity = 275,000 litres/day

Volume of water consumption: 129,261,000 litres/year;

Per day water inlet to STP plant: 271,748 litres;

Water sample Tested for Standard(pH)

Chennai Institute of Technology prioritizes environmental sustainability by actively monitoring water quality to control pollution within our campus. To achieve this, we utilize advanced equipment such as a digital auto-ranging conductivity meter with a magnetic stirrer and a digital pH meter with a magnetic stirrer. The digital pH meter provides precise measurements of the water's acidity or alkalinity, which is critical in assessing the overall water quality. By regularly checking these parameters, we can swiftly identify any anomalies or signs of pollution, allowing us to take preventive measures. This proactive approach helps in maintaining a healthy environment and mitigating water pollution on our campus.

Water sample tested in Laboratory

15.5 Policy on Plastic Waste Reduction

Objective:

By encouraging sustainable waste management techniques, reducing plastic usage, and encouraging environmental stewardship among students, employees, and the local community, we can lessen plastic waste on college campuses and help achieve Sustainable Development Goal (SDG) 15: Life on Land.

Key Areas of Action:

Reducing or eliminating the use of single-use plastics in campus cafeterias, stores, and canteens, including straws, bags, cutlery, and bottles.

Promoting and encouraging towards use of reusable products (such as coffee cups, and water bottles) to campus stores and cafeterias.

Promoting plastic-free practices, by creating "Plastic-Free Zones" in busy places like classrooms, libraries, and public access areas.

Setting up separate bins such that the segregation handled in place against plastics disposal.

Conducting awareness and campaigns against plastic usage, pollution and its impact.

Monitoring for this progress aligned with SDG 15 with the local community.

Policy History

Policy created on	13-08-2021
Policy reviewed on	18-05-2023

15.6 Policy on hazardous waste disposal

Key Areas of Action:

Managing the e-waste (computers, toner cartridges etc) is handled through the aligned channels.

The institute processes waste from laboratory consumables safely disposed as chemical waste.

The institute monitors that the Medical waste from the clinical dispensary in the campus will be disposed regularly such that they are not contaminating the landscape.

Automotive or maintenance waste (oils, lubricants) from the transport facility or industry oriented CoE's to be segregated and disposed separately.

The wastes are segregated and labeled in accordance with the implementation of these policies are monitored complying with safety standards and regulations. Encouraging towards audit and awareness campaigns of disposal methods with tied agencies to handle the same.

Policy History

Policy created on	13-08-2021
Policy reviewed on	18-05-2023

Environmental Conservation Awareness for the Use Of Natural Resources in a Sustainable Way

The Institute has measures in place to lessen the overall quantity of garbage generated by staff offices. Papers, plastics, glassware, and metals are among the recyclables that are separated at the source. The recycling companies receive the separated garbage while all organic and green garbage is composted on campus. The land and ecosystem are protected by minimizing environmental pollution through these operations. These outcomes are produced by the staff, instructors, and students to increase awareness and advance the ecologically conscious agenda before the campus. They have a practical awareness of how the National Biodiversity Authority, the Pollution Control Board, and other environmental-related authorities operate, and they recognize and value the changes and reforms occurring on a global scale to protect the environment. Marine pollution and water contamination Environmental Protection, Forests and Wild Life, Biodiversity & Wetlands, Air Pollution, Noise Pollution & Climate Change, current environmental issues, good governance and the environment are now covered in the

Environmental law. Numerous seminars, symposiums, and talks have been held to raise awareness of preserving the environment.

Solid Waste Management:

On the Institute campus, about 18 metric tons of solid waste are produced, primarily from dried leaves. Waste is divided into two categories: biodegradable and plastic. Biodegradable waste is converted to compost by a natural process. After that, the fertilizer is made available to the local population so they can utilize the farmland. Teachers are urged to reuse the single-sided paper they use for writing and printing in each lesson. Paper trash is all recycled. The Institute and India Tobacco Company Limited (ITC Ltd.) have inked a Memorandum of Understanding. Waste paper is first gathered and made into sheets. The sheets are rendered and then sent in large packets to the ITC every day. A comparatively small portion of the generated plastic garbage is routinely sent to the provider. Two approved scrap agents are used to treat and dispose of metal and wood waste for further processing.

Separate Garbage Bins around the campus for Waste Collection

E-waste management:

Minister of State (Independent Charge) for Environment, Forestry and Climate Change said that the E-Waste Management Standards have been stricter and reflect the government's commitment to environmental governance. The rules would put the producers under the Expanded Producer Obligation (EPR) with the goals. Producers have been made liable for storing and exchanging e-waste. The majority of customers must gather the products and hand them over to the approved recyclers. The Ministry stresses that different producers should have a specific Producer Accountability Organization (PAO) to ensure that e-waste is processed and

disposed of in an environmentally sound manner. The Ministry noted that the role of state governments has also been developed to ensure the safety, health and skills development of workers engaged in dismantling and recycling operations. Knowledge is developed among students regarding the management of e-waste. E-waste from the laboratories is appropriately gathered and given to the certified recycler, reused whenever possible, donated and sold as much as possible. Non-working machines, displays, and printers are destroyed and scrapped on a systematic basis. Any pieces that are suitable for other systems are set aside for potential use. The E-waste garbage box has been deposited and the e-waste materials are collected and disposed of by recycling vendors. Pursuant to the new regulations, it has been instructed that biodegradable waste should be handled, treated and disposed of as far as possible inside the premises by a compost or bio-meth nation and that residual waste should be disposed of by a waste collector or entity as regulated by the local authority. CIT also launched a full bio-waste management scheme by building a bio-gas generation facility on campus to represent the nation on energy saving grounds. An awareness-raising initiative, in collaboration with local governments, NGOs and students, has been organized to push for better adoption of these waste management tools. Tools need to work on making solid waste management a people's campaign by discussing challenges, complaints and management of solid waste to residents and grassroots.

15.6 Research Activities Contributed:

1. PLANT DISEASE DETECTION USING DEEP LEARNING

The agriculture field has a high impact on our lives. Agriculture is the most important sector of our Economy. Proper management leads to a profit in agricultural products. Farmers do not have expertise in leaf disease so they produce less production. Plant leaf disease detection is important because profit and loss depend on production. CNN is the solution for leaf disease detection and classification. The main aim of this research is to detect the apple, grape, corn, potato and tomato plants leaf diseases. Plant leaf diseases are monitoring of large fields of crops disease detection, and thus automatically detected some feature of diseases as per that provide medical treatment. The proposed Deep CNN model has been compared with popular transfer learning approaches such as VGG16. Plant leaf disease detection is the one of the required research topics as it may prove beneficial in monitoring large fields of crops, and thus automatically detect the symptoms of diseases as soon as they appear on plant leaves. In this project, we focus on providing a quick and effective solution to every farmer who is affected with crop-damaging pests. The recent expansion of deep learning methods has found its application in plant disease prediction, offering a robust tool with high accurate results. The

aim to build a plant disease-predicting model using deep learning and deploy it on a website. This model can predict a plant's disease by seeing its image. And we also provide treatment methods to cure that disease.

2. PET ADOPTION SYSTEM

The pet adoption system is a web-based platform that connects pet lovers with adoptable pets. The system simplifies the process of pet adoption by providing a user-friendly interface that enables pet owners to create listings for their pets and potential adopters to search for pets by breed, age, gender, and location. The systemaims to increase the number of pet adoptions by making it easier for pet lovers to find adoptable pets and providing a secure platform for pet owners to post adoption listings. The pet adoption system is designed to provide a comprehensive solution to the challenges associated with pet adoption. The system not only enables pet owners topost adoption listings but also provides users with valuable information on pet care, training, and nutrition. The system aims to educate users on the responsibilities ofpet ownership and promote responsible pet ownership. In this project report, we will provide a detailed overview of the pet adoption system, including its features, functionalities, design, and development process. Wewill also discuss the challenges and limitations of the system and provide recommendations for future development.

3. ORCHARD MANAGEMENT IN OPEN FIELDS WITH DEEP LEARNING-BASED FRUIT MONITORING

Mango is an important agricultural produce with high export value as it is being consumed internationally. This work presents a method for detection and counting of mangoes in RGB images for further yield estimation. The RGB images are acquired in open field conditions from a mango orchard in the pre-harvest stage. The proposed method uses, deep convolutional neural network-based architecture for mango detection using semantic segmentation. Further, mango objects are detected in the semantic segmented output using contour based connected object detection. Results are analysed using the precision, recall, F1 parameters derived from contingency matrix. Results demonstrate the robustness of detection for a multitude of factors such as scale, occlusion, distance and illumination conditions, characteristic to open field conditions. Further mango fruit size also determined for the estimation of fruit maturation and size distribution, for further decision making to harvest and marketing. To detect fruit, cascade detection with histogram of oriented gradients (HOG) feature is applied. Finally, fruit lineal dimensions were calculated using the RGB-D depth information, fruit image size and the thin lens formula. We believe this work represents the first practical implementation of machine vision fruit sizing in field, with practicality gauged in terms of cost and simplicity of operation.

4. MANGO LEAF DISEASE PREDICTION

The Convolutional Neural Network CNN works by obtaining a picture and designating it with some weightage supported by the various objects of the image, to distinguish them from one another. CNN needs little or no pre-processing information as compared to different deep learning algorithms. Early diagnosis and correct identification of mango plant disease prediction will manage the unfolding of the diseases Mango leaf diseases damage mango

quality and yield. This research uses deep learning to automatically identify leaf diseases in different mango plant kinds. The planned work is Associated with the Nursing correct identification approach for the mango plant disease prediction exploitation of the Convolutional Neural Network. It includes generating comfortable method pathological pictures Associate in nursing coming up with a model and a design of the Convolutional Neural Network to discover mango leaf diseases. The image augmentation method is employed to extend the number of images.

5. CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

Construction and demolition (C&D) waste contributes significantly to environmental contamination, making the construction industry a major source of trash generation worldwide. This project investigates ways to minimize, recycle, and reuse materials in order to solve the pressing need for efficient C&D waste management solutions. The study's main objectives are to evaluate the amount of C&D waste generated today, find sustainable disposal methods, and advance the ideas of the circular economy in the building industry. A thorough analysis of waste categories, disposal procedures, and the effects of construction and demolition waste on the environment is part of the project. It also looks at methods and regulations that help reduce waste, like recycling materials, reusing parts in new building, and developing biodegradable materials. This project intends to create useful guidelines and suggest best practices for effective waste handling by carrying out case studies and interacting with local stakeholders. The project's goal is to provide a framework that municipalities and construction companies may use to lessen the environmental impact of building and demolition trash. The results are intended to support sustainable building methods that are in line with international environmental goals, encourage resource efficiency, and reduce greenhouse gas emissions.

6. GROUNDWATER QUALITY ANALYSIS USING MACHINE LEARNING WITH REAL-TIME DATA

Particularly in areas where groundwater is a major supply of water, groundwater quality is crucial for maintaining ecosystems, agriculture, and human health. In order to provide timely insights and predictive skills for groundwater management, this project will use machine learning (ML) approaches to analyze real-time groundwater quality data. The study's main objectives are to identify contaminants, evaluate trends in water quality, and forecast the likelihood of future pollution. As part of the study, real-time groundwater data will be gathered, including dissolved oxygen, turbidity, pH, nitrate levels, and other pertinent indicators. Using machine learning algorithms, this data will be processed to identify patterns and anomalies that signify quality fluctuations. In order to forecast water quality outcomes based on past data patterns and seasonal fluctuations, important techniques such as supervised learning, classification, and regression models will be used. A model that can precisely categorize groundwater quality levels and identify possible contamination events before they happen is one of the expected outcomes. This approach aims to support policymakers, environmental agencies, and communities by providing actionable data for early intervention.

By integrating real-time data with advanced ML techniques, this project seeks to establish a proactive framework for groundwater monitoring, contributing to the sustainable management and conservation of this critical resource.

15.7 Research Publications Contributed:

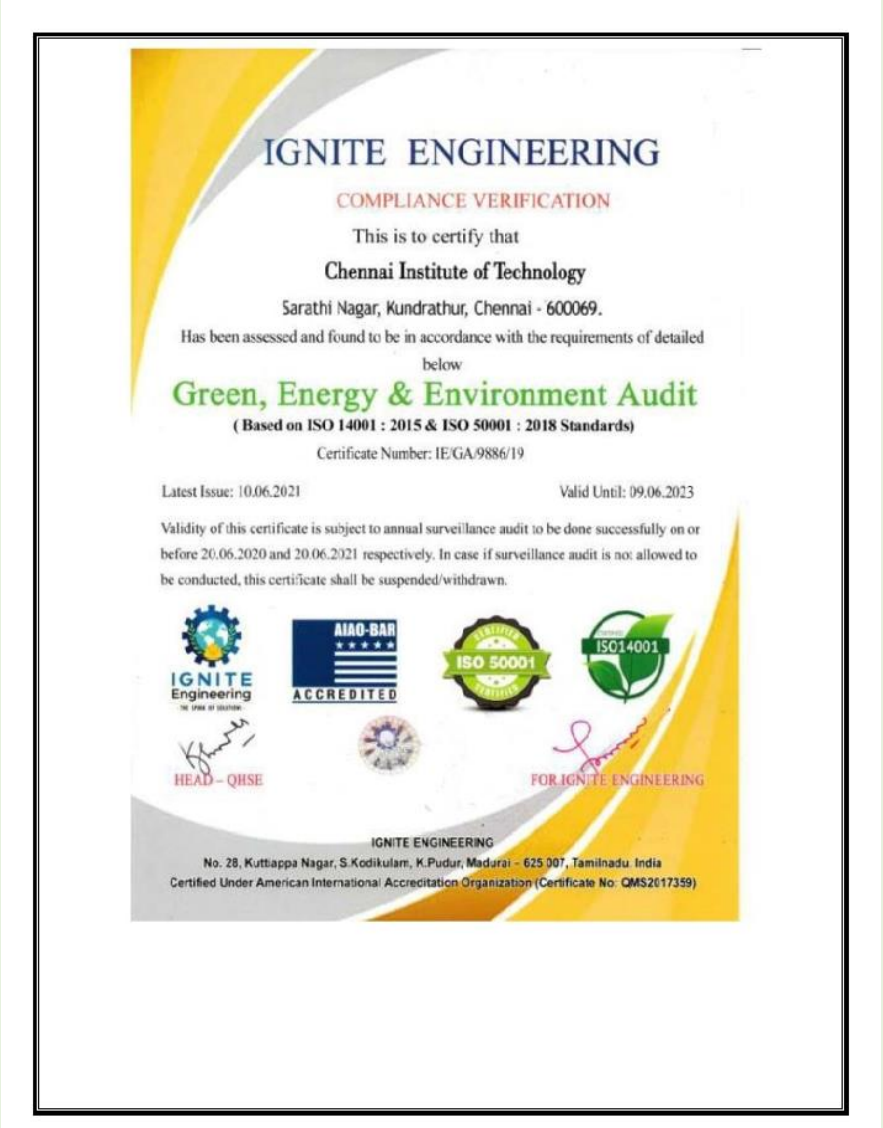
1. Karmakar, S., Kumbhakar, R., Garai, S., Parastesh, F., Jafari, S., & Pal, N. (2024). Complex Dynamics of a Discrete-Time Food Chain Model. International Journal of Bifurcation and Chaos, 34(06), 2450078.
2. Chakravarthi, V., Santhanavelu, A. S., Palaniappan, K., & Kuppan, V. (2023, January). A novel framework for inspection management system using cloud computing. In AIP Conference Proceedings (Vol. 2523, No. 1). AIP Publishing.
3. Saranya, K., & Sankaradass, V. (2023, December). Hyperpersonalization of Educational Content Through Multimodal Deep Learning and Gamification. In 2023 International Conference on Data Science, Agents & Artificial Intelligence (ICDSAAI) (pp. 1-5). IEEE.
4. K. K. Ramachandran, S. S. Phatak, S. V. Akram, V. Patidar, A. M. Raju and R. Ponnusamy, "Integration of Machine Learning Algorithms for E-Learning System Course Recommendation Based on Data Science," 2023 International Conference on Artificial Intelligence and Smart Communication (AISC), Greater Noida, India, 2023, pp. 634-638, doi: 10.1109/AISC56616.2023.10085048.
5. Ramachandran, K. K., Ravichand, M., Joshi, K., Vekariya, V., Saini, D., & Ponnusamy, R. (2023, January). Investigation of the educational performance on the revolutionary philosophical electoral online learning platform centred on Deep learning. In 2023 International Conference on Artificial Intelligence and Smart Communication (AISC) (pp. 639-642). IEEE.
6. Janarthanan, R., Partheeban, P., Somasundaram, K., & Elamparithi, P. N. (2021). A deep learning approach for prediction of air quality index in a metropolitan city. Sustainable Cities and Society, 67, 102720.
7. Dhanalakshmi, B., Dhanagopal, R., Raguraman, D., & Thamdapani, T. (2020, December). Improving cognitive learning of children with dyspraxia using selection-based mid-air gestures in athynos game. In 2020 3rd International Conference on Intelligent Sustainable Systems (ICISS) (pp. 231-237). IEEE.
8. Dhinakaran, V., Partheeban, P., Ramesh, R., Balamurali, R., & Dhanagopal, R. (2020, March). Behavior and characteristic changes of generation z engineering students. In 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS) (pp. 1434-1437). IEEE.
9. Dhinakaran, V., Partheeban, P., Raguraman, D., Shree, M. V., & Sai, M. S. (2020, March). Powering Sustainable Development Through the Integration of Teaching and Research in Engineering Education. In 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS) (pp. 1400-1402). IEEE.

15.8 Patent's Contributed:

S. No	Application No	Title
1	202341000033 A	EVALUATION OF URBAN ENVIRONMENTAL STUDY SPATIALLY
2	202341073484 A	BEYOND BIN: TRANSFORMING WASTE INTO USABLE ENERGY

15.9 Green, Energy and Environment Audit Certification

Chennai Institute of technology has been assessed and found to be in accordance with the requirements of green, energy and environment audit.



IGNITE ENGINEERING

COMPLIANCE VERIFICATION

This is to certify that

Chennai Institute of Technology

Sarathi Nagar, Kundrathur, Chennai - 600069.

Has been assessed and found to be in accordance with the requirements of detailed below

Green, Energy & Environment Audit

(Based on ISO 14001 : 2015 & ISO 50001 : 2018 Standards)

Certificate Number: IE/GA/9886/19

Latest Issue: 10.06.2021 Valid Until: 09.06.2023

Validity of this certificate is subject to annual surveillance audit to be done successfully on or before 20.06.2020 and 20.06.2021 respectively. In case if surveillance audit is not allowed to be conducted, this certificate shall be suspended/withdrawn.

IGNITE Engineering

AIAO-BAR ACCREDITED

ISO 50001

ISO14001

HEAD – QHSE

FOR IGNITE ENGINEERING

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Certified Under American International Accreditation Organization (Certificate No: QMS2017359)