SUSTAINABLE DEVELOPMENT GOALS

4. QUALITY EDUCATION

Ensure Inclusive and Equitable Quality Education and Promote Lifelong Learning Opportunities For All

4.1 Ensure Inclusive and Equitable Quality Education and Promote Lifelong Learning Opportunities For All.

In the absence of further action, an estimated 300 million pupils will not have the fundamental literacy and numeracy skills needed for success in life, and an estimated 84 million children and youth will remain out of school by 2030.In addition to free primary and secondary schooling for all boys and girls by 2030, the aim is to provide equal access to affordable vocational training, eliminate gender and wealth disparities, and achieve universal access to quality higher education. Education is the key that will allow many other Sustainable Development Goals (SDGs) to be achieved. When people are able to get quality education they can break from the cycle of poverty. Education helps to reduce inequalities and to reach gender equality. It also empowers people everywhere to live more healthy and sustainable lives. Education is also crucial to fostering tolerance between people and contributes to more peaceful societies. To deliver on Goal 4, education financing must become a national investment priority. Furthermore, measures such as making education free and compulsory, increasing the number of teachers, improving basic school infrastructure and embracing digital transformation are essential.

The SDG4 goal is a pivotal driver for positive change, emphasizing the transformative power of education in fostering a sustainable and equitable world. The objective of SDG 4, which focuses on ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all, is geared towards achieving various targets by 2030. For college-level education specifically, this includes ensuring that all students have access to affordable and quality higher education, vocational training, and opportunities for lifelong learning. This means advocating for policies that promote equal access to education and addressing barriers that marginalize certain groups.

4.2 Policy on Quality Education

The **Chennai Institute of Technology (CIT)** has made a distinct mark in the field of education and research. It imparts and follows an educational system which not only provides for a living but for an improved quality of life.

The various departments are headed by Heads and Teachers with high profile educational qualifications who impart value-based education which aids a person to put into use what he has learnt from the institution and thereby lead a good life.

The teachers not only teach pure academics but also imparts life skills. They understand the needs of different types of students, such as slow learners, some more oriented towards sports and cultural activities, some more interested in research.

The CIT strives to coordinate these students and take them forward as a one big group. It also aims at inclusive education in the sense that students from different economic, social, geographical and cultural differences are admitted in one campus and treated alike.

Every effort has been made by the **CIT** to accommodate people from the local community. The **CIT** partakes in different activities organized by the local community and goes out to spread awareness on various issues related to the development of the local community as a whole.

The various departments conduct awareness campaigns on the necessity of educating the children. A great emphasis is laid on the early years of education, the formative stage of a person's life, which determines his personality at a later stage.

The CIT campus supports the primary, kindergarten and lower primary classes and standard education is imparted to the children to enable them to become better citizens of tomorrow.

The economic growth of a country depends on a well-planned and well-organized class of citizens who by their wise and well-informed financial decisions helps to promote the growth of our country.

In order to make this wise and well-informed decisions, the students should be given a class of education which helps them to not alone analyze the economy and plan accordingly but also pay their taxes regularly. Each student is educated about his duty towards the country and how responsible citizenry would reflect on the growth of the country.

There is no discrimination or inequality in the system of education imparted by us and all the classes of students are given the privileges and preferences which are owed to them under the Constitution and various. other legislations.

CIT tries to build a fair and sustainable world where every person is provided with equal opportunity to realise his potential to the fullest. CIT has a placement cell which enables the students who have successfully completed their courses to find employment.

This provides job security to students as the employers come in through the CIT so their credentials are checked before the students get employed. The Placement Cell consists of a team which thoroughly investigates into the goodwill of the employer.

CIT takes great pride in making the world know that the resources of the CIT can be used even by persons who are not studying in the campus. The facility is open to all irrespective of any discrimination.

Therefore, the CIT envisages promotion of not only its students but whoever is interested in educating themselves. The aim is, precisely, the welfare of the society as a whole. For the same reason, it provides huge access not alone to the library but also to the online courses, video lecture materials and other facilities which a student wants to access.

Any student who is endowed with intellectual ability is promoted and encouraged to navigate his skills and achieve great success.

CIT is well equipped with modern technological devices with its IT enabled and smart classrooms which have LCD projectors, white boards, audio facilities for the speakers and every student has an easy access to computer.

CIT also has computer labs and every library is endowed with adequate computers to enable the students to have access for their research and learning.

CIT also provides for Learning Management System, MOODLE, TCS, etc., the most sophisticated process for teaching learning management. All the departments have been successfully conducting online classes and it is ensured that each student participates effectively. This has been a great success during the pandemic times.

CIT has been organizing events in the public domain by conducting public lectures, various events, educational events and ensure maximum public participation.

CIT also offers vocational training to the public, free of cost and this has enabled many persons to secure jobs and earn their livelihood. Many families are benefitted by this and in this way the CIT ensures that it is always in the service of the community.

The various departments of the CIT have also organized many extension activities beyond the campus which has benefitted the students in the nearby schools, the people of small hamlets in the vicinity of the CIT, the small towns and the city areas which is appreciated by the people who are the beneficiaries of such activities.

CIT is a student friendly campus and each student is important to the institution. For the better benefit of the students, the CIT has founded the Students Grievance Cell so that they can address their concerns. Then an Anti-Ragging Cell is created for the benefit of the students. Another Committee, that is the Internal Complaints Committee was formed relating to the prevention, prohibition and redressal of sexual harassment at workplace to the female employees and students. A Caste Discrimination Control Room is also created to solve the differences arising out of the caste discrimination.

CIT takes pride that it provides access to education to all, those who seek knowledge and wisdom, regardless of their ethnicity, religion, community, gender or disability.

Policy History

Policy created on	22-05-2019
Policy reviewed on	25-11-2022

4.3 Policy on Lifelong Learning Process

The institute promotes lifelong learning opportunities for all the individuals of the society. The institution supports education and information through various information resources which are user friendly. It enhances knowledge and skills through the learning materials offered in the website, and the skill development modules both online and offline. It aims to make learning flexible, easily accessible, through clear, reliable information and advice. CIT has policies, processes and necessary infrastructure for integrating the resources within the institution and ensure free access to the resources through its website. To Provide

and support various stakeholders such as student community, faculty and staff, public, to access the various learning resources and utilize the knowledge to improve quality of lifelong learning. The objectives are to promote lifelong learning practices by accessing relevant, high-quality, evidence based learning resources, integrating information and communication technology.

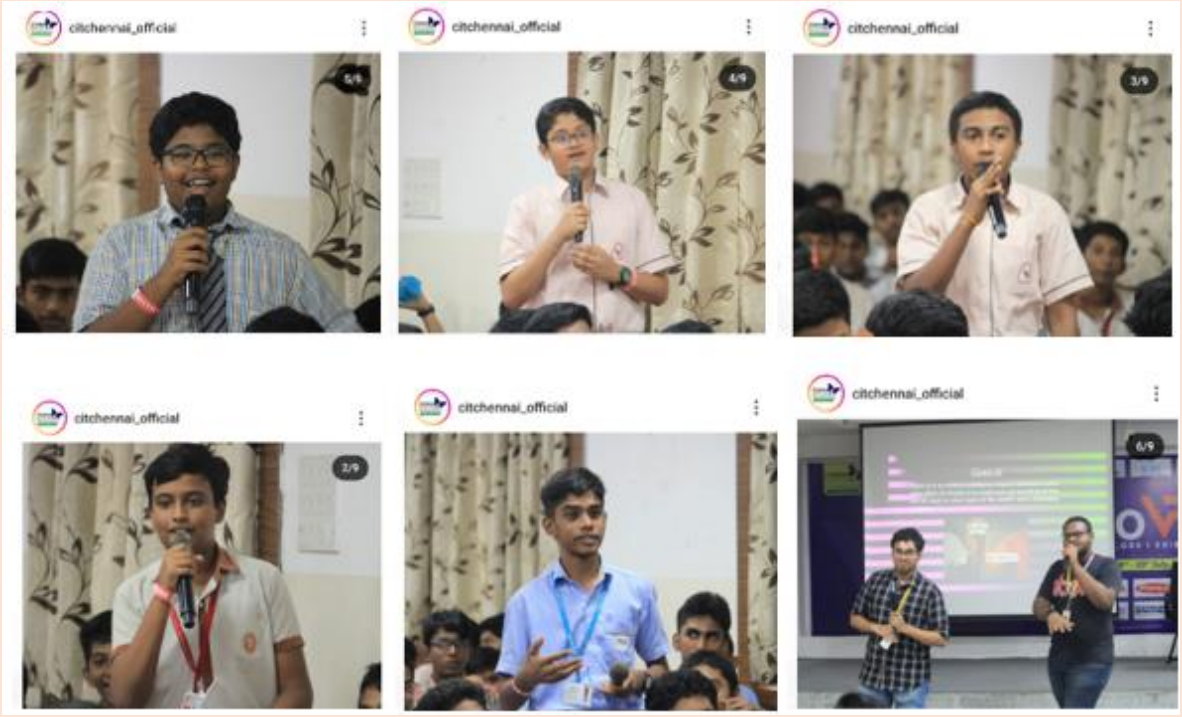
Policy History

Policy created on	22-05-2019
Policy reviewed on	25-11-2022

4.4 Provide access to educational resources for those not studying at the university

Public Access to resources

Chennai Institute of Technology (CIT) resources are freely accessible by the public thrice in a year who are willing to expand their knowledge by visiting centre of excellence laboratories. To keep student mind vibrant various events and activities are conducted. The students from various schools come to deepen their knowledge and technical skills across various engineering fields. Known for its rigorous curriculum and high standards.



Access to School Students

Awareness and Encourage Programme on Education

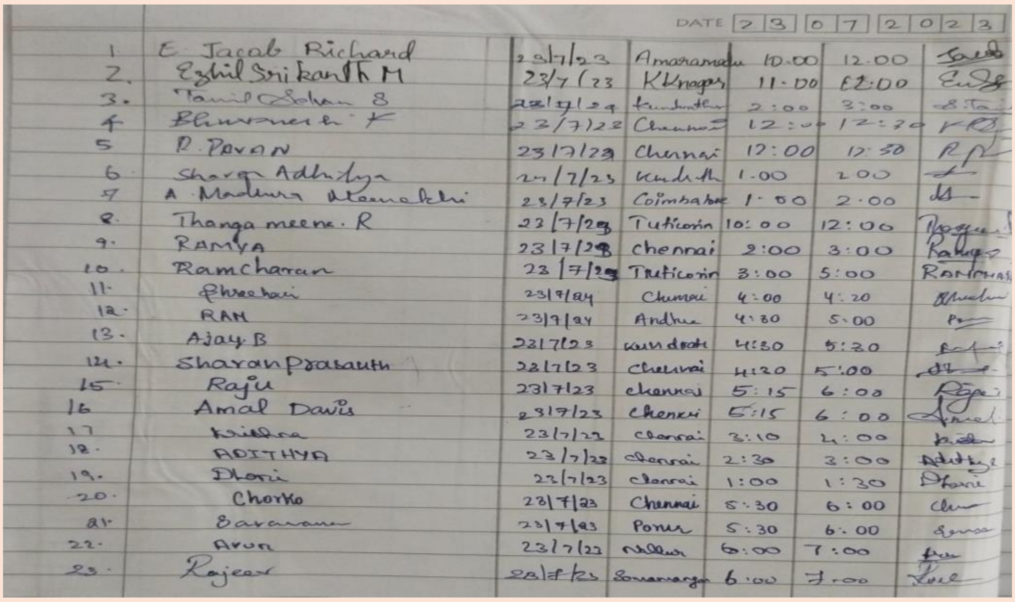
School Students accessing Institute Laboratories

School Students accessing the Institute for the event Innovest – Technical Exhibition

The Chennai Institute of Technology (CIT) library is freely accessible for public, students, faculty, and researchers with a comprehensive collection of resources. The library is accessible from 8.00 AM to 8.00 PM every day. This helps the public to visit the library at It meets international standards, housing over 25,000 books across fields in Literature, Engineering, Technology, Science, and Humanities.

Library Infrastructure

Digital Library



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2.	Ezhil Srikanth M	23/7/23	KKnagar	11.00	12:00	[illegible]
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18.	ADITHYA	23/7/23	Chennai	2:30	3:00	[illegible]
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22.	Arun	23/7/23	[illegible]	6:00	7:00	[illegible]
23.	Rajeev	23/7/23	[illegible]	6:00	7:00	[illegible]

Evidence - Public Access to Library

4.5 Lifelong Learning Measures

A workshop on Entrepreneurship and Innovation as Career opportunity was conducted by CIT Innovation labs as a part of the Self-Reliant Bharat Movement on September 15, 2023 at Chennai Institute of Technology. The event featured prominent speakers, including Mr. M.K. Anand, Mr. R. Ram Kumar, Mr. Arivazhagan Arul, and Mr. S. Shyam Sekar, who shared invaluable insights. From conceptualization to implementation, participants were equipped with essential strategies and encouraged to cultivate an entrepreneurial mindset. The event served as a platform for attendees to ignite their path to success, fostering a spirit of innovation and learning within the academic community.

Workshop on Entrepreneurship and Innovation as Career Option

International Conference On Electrical Engineering & Multidisciplinary Research - ICEEMR 2022 organised by Center for New Energy Research (Solar and Wind), Chennai Institute of Technology on 23rd and 24th June 2022

4.6 Education outreach activities beyond campus

Outreach activities include visiting schools, giving talks at assemblies, discussions with students, or participation in events such as career fairs and science and technology camps. The institution conducts educational and publicity activities outside of campus (school and communities). Students may travel to the community or nearby schools to provide traffic safety knowledge, anti-drug knowledge or art, musical instruments, morality, life education, and other teaching services.

Collaborative Art Installation

We engaged the participants of the rally made for the awareness on water(SDG-6) and land(SDG-15) 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.

Innovation Series in the Institute

The Institute organises Innovative sessions some highlighted here adhereing towards the triggering and making students and faculties think much creative and innovations. CIT was proud to host a session on angel investment and venture capital funding, guiding aspiring entrepreneurs on securing early-stage investments. The Campus welcomed Dr. Fazalur Rahman, who shared insights on funding opportunities, enriching Chennai Institute of Technology's commitment to empowering young innovators. Chennai Institute of Technology held a workshop on entrepreneurship in ultrasound technology, featuring Mr. K.R.M. Niranjan Kumar and Mr. Nasarudheen from KPI Healthcare. CIT was transformed into a space for exploring career opportunities in healthcare innovation, inspiring students toward impactful careers. The Campus at CIT hosted an inspiring IIC seminar with Ms. Vani Pradeep, life transformation author and coach, as chief guest. Encouraging everyone to think, talk, and implement, this session sparked ideas on how to weave innovation into daily life—classic Chennai Institute of Technology style. Through the event against innovative ideas, students and faculties are encouraged to work with various challenges and extend their work towards publications and patents that can be contributing to respective Sustainable Development Goals.

Technical Series in the Institute

CIT teamed up with ACMA for an industrial training on robotics, giving students a chance to dive deep into the world of automation. The Campus was alive with curiosity as future engineers explored the latest robotic innovations, taking Chennai Institute of Technology one step closer to the tech frontier. A day packed with hands-on learning, CIT students got up close with problem-solving robotics at Kuka Industry. It was all about real-world skills as participants tackled robotics challenges head-on, showing why Chennai Institute of Technology is a leader in practical tech

education. CIT held a one-day seminar on IC Design Technology, featuring experts Dr. R.S. Suriavel Rao and Mr. E.T.B. Samuel Jigme Harrison. The Campus was charged with energy as students learned about the latest advancements, solidifying Chennai Institute of Technology's role in cutting-edge tech education. In partnership with Bio Vision Medical Systems, CIT conducted an intense 30-hour training on maintaining and troubleshooting medical devices. The Campus saw future biomedical experts gaining hands-on experience, adding to Chennai Institute of Technology's robust lineup of practical tech training.

4.7 RESEARCH ACTIVITIES

Following are the research projects carried out in the department which has the relevance to SDG 4 goals.

1. ATTENDANCE TRACKING WITH FACIAL RECOGNITION

This project explores the development and implementation of a face recognition attendance system for improved efficiency and accuracy in attendance tracking. The system leverages facial recognition technology, a form of biometric identification, to automatically identify and mark attendance of

individuals. This approach eliminates the need for manual attendance processes, which are susceptible to time consumption and human error. The system functions by capturing facial images upon entry to designated attendance zones. These captured images are then compared against a pre-registered database of authorized individuals. Upon successful recognition, the system marks the individual as present and records the corresponding time stamp within a designated storage mechanism, such as an Excel spreadsheet. The core advantages of this system lie in its ability to streamline the attendance tracking process and enhance data integrity. By automating attendance recording, the system eliminates the time required for manual processes and mitigates the risk of errors associated with them. In conclusion, this face recognition attendance system offers a convenient, reliable, and efficient solution for attendance tracking across various settings. It streamlines processes, minimizes errors, and empowers informed decision-making through detailed attendance reports.

2. DOCUMENT VISUALIZATION

This is a review report on the research performed and a project built- in the field of Information Technology to develop a system We introduce the Document visualization, a new visualization and information retrieval technique aimed at text documents. A word tree is a graphical version of the traditional “keyword-in-context” method, and enables rapid querying and exploration of bodies of text. In this paper we describe the implementation of Google chart word tree from google static into our website. which provides a window onto the ways in which users obtain value from the visualization. In This digital age, managing vast document datasets demands a solution that transcends traditional methods. This document visualization project addresses this imperative need by seamlessly transforming unstructured data into interactive visual representations. Leveraging web technology and visualization techniques, our system enhances document accessibility, allowing users to intuitively explore complex information. This project aspires to redefine how knowledge is extracted, providing a user-centric approach to uncover hidden insights and empower informed decision-making in diverse domains.

3. COLLEGE XPLORER

College Xplorer is a revolutionary mobile application tailored to enhance the student experience within college campuses. Designed to streamline access to essential services, the app digitalizes stationery shops and food stalls, offering students a convenient platform to order food and purchase stationery products with ease. One of the standout features of College Xplorer is its note-sharing facility, which facilitates seamless collaboration between teachers and students. Teachers can create accounts and upload lecture notes and study materials, empowering students to access these resources at their convenience. Furthermore, students can create accounts to post attendance, ensuring accurate and

efficient record-keeping. The integration of stationery shops and food stalls into the app revolutionizes the way students interact with campus amenities. No longer constrained by physical queues or limited opening hours, students can easily browse through a diverse range of products and place orders from anywhere on campus. This not only saves valuable time but also enhances overall convenience and accessibility.

4. ULTIMATE Q& A LARGE LANGUAGE MODEL CHAT APPLICATION

The Ultimate Q&A LLM chat app represents a novel approach to interacting with PDF documents through a chat interface. Leveraging natural language processing and machine learning technologies, this application allows users to query multiple PDFs simultaneously, obtaining relevant information and responses based on the content of the documents. This paper outlines the development, functionality, and potential applications of the Ultimate Q&A LLM chat app, emphasizing its significance in enhancing document interaction and information retrieval.

5. ADAPTIVE LEARNING FOR AUTISTIC CHILDREN: MOOD-BASED MUSIC THERAPY INTEGRATION

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that involves difficulties in social communication. Previous research has demonstrated that these difficulties are apparent in the way ASD children speak, indicating that it may be possible to estimate ASD severity using quantitative features of speech. Here, we extracted a variety of prosodic, acoustic, and conversational features from speech recordings of Hebrew speaking children who completed an Autism Diagnostic Observation Schedule (ADOS) assessment. Sixty features were extracted from the recordings of 72 children and 21 of the features were significantly correlated with the children's ADOS scores. Positive correlations were found with pitch variability and Zero Crossing Rate (ZCR), while negative correlations were found with the speed and number of vocal responses to the clinician, and the overall number of vocalizations. Using these features, we built several Deep Neural Network (DNN) algorithms to estimate ADOS scores and compared their performance with Linear Regression and Support Vector Regression (SVR) models. We found that a Convolutional Neural Network (CNN) yielded the best results. This algorithm predicted ADOS scores with a mean RMSE of 4.65 and a mean correlation of 0.72 with the true ADOS scores when trained and tested on different sub- samples of the available data. Automated algorithms with the ability to predict ASD severity in a reliable and sensitive manner have the potential of revolutionizing early ASD identification, quantification of symptom severity, and assessment of treatment efficacy.

6. STUDENT ATTENDANCE SYSTEM USING FACE RECOGNITION USING MACHINE LEARNING

This Project presents a novel, real-time student attendance system leveraging face recognition technology and machine learning algorithms. Traditional attendance tracking methods in educational institutions are plagued by inefficiencies like manual calling, potential for errors, and administrative burdens. To address these shortcomings, the proposed system automates attendance monitoring through advanced face recognition techniques. By integrating machine learning algorithms, the system continuously improves its accuracy and reliability for optimal performance. The system offers a user-friendly interface and integrates seamlessly with existing infrastructure, promoting convenience for both students and staff. It features automatic attendance marking, real-time data updates, and comprehensive reporting, fostering efficiency and transparency in attendance management. Additionally, its scalability allows for effortless deployment across diverse educational settings. This project aims to revolutionize student attendance management by providing a robust, efficient, and technologically advanced solution tailored to modern educational environments. Furthermore, the system eliminates the need for physical attendance registers or ID cards, mitigating potential fraud. It utilizes deep learning models for robust identification even in challenging lighting conditions, ensuring reliable attendance tracking across various scenarios. Prioritizing data privacy and security, the system implements encryption protocols and access controls to effectively safeguard sensitive student information. By generating comprehensive attendance reports and analytics, the system empowers educational institutions to make informed decisions based on data driven insights into student attendance patterns, further enhancing operational efficiency and strategic planning. Overall, this work signifies a significant advancement in attendance management, offering a seamless, accurate, and secure solution that caters to the evolving needs of modern educational institutions while upholding the integrity and confidentiality of student data.

7. ENHANCED GESTURE CONFERRAL PROCESSING LEVERAGING OPENCV

In recent years, there has been an increase in the use of IoT devices for home automation, shopping malls, and other public places. However, for individuals who are mute or bedridden, accessing these devices can be difficult, especially when they are voice-activated. To address this issue, hand gesture recognition technology has been developed to allow individuals to control these devices through simple hand movements. Image processing and pattern recognition are crucial for accurately detecting these hand gestures, and platforms such as Open CV, Python, PyCharm, and Media Pipe are commonly used in software development to achieve this. This technology has the potential to help people with physical, sensory, or intellectual disabilities to participate fully in all activities in society and enjoy equal opportunities. By using hand gestures to communicate with IoT devices, individuals who are deaf can also benefit from this technology. Ultimately, this technology has the potential to create a human-computer interaction that is accessible to all, making it a valuable addition to the field of assistive technology. Furthermore, hand gesture recognition technology is an excellent example of the potential

of IoT devices to facilitate a more connected and automated world. However, it is important to note that with any new technology, there are also concerns around data privacy and security. As such, it is essential that developers prioritize ethical considerations and robust security protocols when designing these systems. Moreover, hand gesture recognition technology can be further improved through the use of artificial intelligence and machine learning. These technologies can help improve the accuracy of the recognition system and provide a more personalized experience for users. This system is highly reliable and user-friendly, and does not require any physical contact, which makes it highly suitable for disabled people. Furthermore, the development of new sensor technologies can also help increase the reliability and efficiency of the hand gesture recognition system. Overall, the development of hand gesture recognition technology is an exciting and innovative area of research that has the potential to improve the lives of many individuals, particularly those with physical or sensory disabilities. With continued advancements in technology, it can expect to see more sophisticated and accessible hand gesture recognition systems that will help create a more inclusive and accessible society.

8. SUBJECTIVE ANSWER EVALUATION USING MACHINE LEARNING AND NATURAL LANGUAGE PROCESSING

This Project presents an innovative approach for the automated evaluation of subjective answers leveraging the power of machine learning (ML) and natural language processing (NLP) techniques. Traditional methods of assessing subjective responses often rely on manual grading, which can be time-consuming and prone to subjectivity. Our proposed system aims to streamline this process by employing advanced ML algorithms and NLP models to objectively evaluate and score subjective answers. We explore various methodologies for feature extraction, sentiment analysis, semantic understanding, and contextual comprehension to develop a robust evaluation framework. Furthermore, we discuss the integration of these techniques into an end- to-end system capable of handling diverse types of subjective responses. Experimental results demonstrate the effectiveness and efficiency of our approach, showcasing its potential to revolutionize the evaluation of subjective answers in various educational and professional settings.

9. E-LEARNING PLATFORM FOR FULL STACK WEB DEVELOPMENT

This Project details the development of an e-learning platform tailored specifically for full-stack developers. The platform integrates features such as YouTube video tutorials, interactive coding exercises, a playground IDE, and a user contribution interface. A login/sign- up system is also implemented for user authentication and personalized experiences. The report outlines the platform's architecture, functionality, user interaction, and concludes with its potential impact on software development education.

10. ACADEMIC PROGRESS FORECASTING USING MACHINE LEARNING IN PYTHON

This Project proposes a machine learning based approach for forecasting academic progress, aiming to assist educators in identifying students at risk of underperformance. Leveraging data from student demographics, educational background, and classroom engagement metrics, our methodology employs various supervised learning algorithms, including decision trees, random forests, perceptron, logistic regression, and neural networks. We evaluate the performance of these models using real-world student performance data, comparing their accuracy in predicting academic outcomes. The results demonstrate the effectiveness of the proposed approach in accurately forecasting student progress, thereby enabling proactive interventions to support at-risk students and improve overall educational outcomes.

4.8 Research Publications

Following are the Research Publications carried out in the department which has the relevance to SDG 4 goals.

1. Arjun, S., E. Bhuvaneshwari, Sundara Rajulu Navaneethakrishnan, and R. Surendran. "Smart Detection Framework for Rapid Emergency Response." In *2024 2nd International Conference on Sustainable Computing and Smart Systems (ICSCSS)*, pp. 544-548. IEEE, 2024.
2. Chakravarthi, Viswanathan, Arumugam Santhana Santhanavelu, Karthikeyan Palaniappan, and Vijayalakshmi Kuppan. "A novel framework for inspection management system using cloud computing." In *AIP Conference Proceedings*, vol. 2523, no. 1. AIP Publishing, 2023.
3. Saranya, K., and Veeramalai Sankaradass. "Hyper personalization of Educational Content Through Multimodal Deep Learning and Gamification." In *2023 International Conference on Data Science, Agents & Artificial Intelligence (ICDSAAI)*, pp. 1-5. IEEE, 2023.
4. Ramachandran, K. K., Sakshi Sandeep Phatak, Shaik Vaseem Akram, Vijay Patidar, Adusupalle Muni Raju, and R. Ponnusamy. "Integration of machine learning algorithms for E-Learning System course recommendation based on Data Science." In *2023 International Conference on Artificial Intelligence and Smart Communication (AISC)*, pp. 634-638. IEEE, 2023.
5. Ramachandran, K. K., M. Ravichand, Kapil Joshi, Vipul Vekariya, Dimple Saini, and R. Ponnusamy. "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, 2023.

6. Janarthanan, R., P. Partheeban, K. Somasundaram, and P. Navin Elamparithi. *A deep learning approach for prediction of air quality index in a metropolitan city. Sustain Cities Soc 67: 102720*. 2021.
7. Dhanalakshmi, B., R. Dhanagopal, D. Raguraman, and T. Thamdapani. "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, 2020.
8. Dhinakaran, V., P. Partheeban, R. Ramesh, R. Balamurali, and R. Dhanagopal. "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, 2020.
9. Dhinakaran, V., P. Partheeban, D. Raguraman, M. Varsha Shree, and M. Swapna Sai. "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, 2020.
10. Venkatesh, K., S. Parthiban, P. Santhosh Kumar, and CNS Vinoth Kumar. "IoT based Unified approach for Women safety alert using GSM." In *2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV)*, pp. 388-392. IEEE, 2021.