Universal Engineering College
Department of computer science and engineering

GIGA CHRONICLES 23-24

Vision.

Empower universally equipped computational technocrats having innovative entrepreneurial skills with holistic values.

Mission.

- **With well experienced faculty members and excellent infrastructure, provide way to equip universally acclaimed computational technocrats.**
- **With institute industry interaction, develop apt skill in entrepreneurship innovativeness.**
- **Provide value based education to meet the technical and computational needs of the society**

Program Specific Outcomes.

PSO1: Ability to provide refined solutions based on expert knowledge in evolutionary change in computing environment and entrepreneur practises to the various needs of the society.

PSO2: Impart skills to solve problems in the area of computer programming and appraise environmental and social issues with ethical sustainable solutions .

PSO3: Disseminate wider knowledge of various latest domains to analyse and determine research gaps and hence provide solutions by new ideas and innovations.

Program Educational Objectives.

- **PEO1: Inculcate ability to analyse the computer science and engineering problems by assimilating technical knowledge .**
- **PEO2: To groom the students to be adaptable to the ever changing technological challenges and career opportunities.**
- **PEO3: To make students proficient in fundamental knowledge and engross them in pursuing higher education and research oriented activities.**

MEET OUR TEAM

Jissmol Jose
Asst.pro CSE

Sreema E R
Asst.pro CSE

Devika Madhu
S8 CSE

Akshaya
Unnikrishnan
S4 CSE

We would like to express gratitude to all those who have contributed to the production of this year's magazine. Without your support, this would not have been possible. We would like to thank our editorial team for their hard work and dedication in bringing together this wonderful publication. We also extend our appreciation to Our,
Principal Dr. Jose K. Jacob,
Dr. Nitha C Velayudhan, H.O.D (CSE), magazine incharges Ms. Jissmol jose and Ms. Sreema E R, who have contributed their valuable insights and expertise. We are grateful to our staffs and students, who have submitted their articles, artwork, and photographs, which have added color and vibrancy to this magazine.
"GIGA CHRONICLES" (2023-24).

Shabana K S
S6 CSE

Priyanaka K P
S2 CSE

MESSAGE FROM HEAD OF THE DEPARTMENT

Dear Students, Faculty, and Readers,

As we embark on the academic year 2023-2024, I am filled with pride and optimism for the future of our Computer Science and Engineering department. The past year has been a testament to the resilience, innovation, and dedication of our students, faculty, and staff.

In 2023, we witnessed remarkable advancements in technology and the crucial role that computer science plays in addressing global challenges. Our department has continued to lead the way, with groundbreaking research and innovative projects in artificial intelligence, machine learning, cybersecurity, and data science. These efforts have not only garnered recognition but have also contributed significantly to the broader scientific community.

Our faculty members have gone above and beyond to ensure that our students receive the highest quality education, adapting to new teaching methods and providing unwavering support. Their commitment to nurturing young minds and fostering a culture of curiosity and creativity is truly commendable.

To our students, your perseverance and enthusiasm are the driving forces behind our success. As you navigate the ever-evolving landscape of computer science, I encourage you to embrace every challenge as an opportunity to learn and grow. Your passion and hard work will undoubtedly shape the future of technology.This magazine is a celebration of our collective achievements and a showcase of the incredible talent within our department. It highlights the technical brilliance, collaborative spirit, and innovative mindset that define Universal Engineering College.
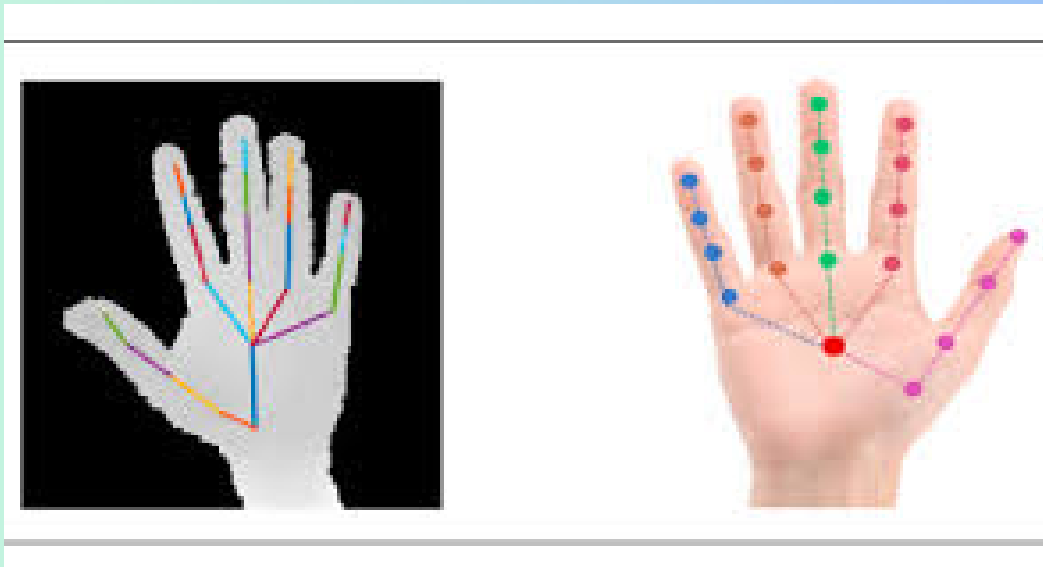
I extend my heartfelt gratitude to everyone who contributed to this magazine and to those who have supported our department's journey. Your efforts are invaluable and greatly appreciated.

Let us continue to inspire, innovate, and excel as we move forward into another exciting academic year.

CONTENTS

VISION-BASED HAND GESTURE RECOGNITION USING DEEP LEARNING FOR THE INTREPRETATION OF SIGN LANGUAGE

Hand gestures have been the key component of communication since the beginning of an era. The hand gestures are the foundation of sign language, which is a visual form of communication. In this paper, a deep learning based convolutional neural network (CNN) model is specifically designed for the recognition of gesture-based sign language. This model has a compact representation that achieves better classification accuracy with a fewer number of model parameters over the other existing architectures of CNN. In order to evaluate the efficacy of this model, VGG-11 and VGG-16 have also been trained and tested in this work. To evaluate the performance,2 datasets have been considered.

SREERAM I S

S8 CSE

DIFFERENCE-BASED MUTATION OPERATION FOR NEUROEVOLUTION OF AUGMENTED TOPOLOGIES

NEAT stands for NeuroEvolution of Augmenting Topologies, and it is an evolutionary algorithm used for evolving artificial neural networks. NEAT is designed to evolve both the weights and structures of neural networks. Unlike traditional neural network evolution approaches, NEAT allows the evolution of the network's architecture itself. This means that the algorithm can add or remove neurons and connections during the evolution process. Mutation is an operation that introduces small random changes to the individuals in a population. The purpose of mutation is to explore new possibilities in the search space and prevent the algorithm from getting stuck in local optima.

ABHAY UNNIKRISHNAN

S6 CSE

Revolutionizing Football Management: Data-Driven Approach with Random Forest Regressor

In the context of football management, depending solely on subjective evaluations and expert opinions can create significant challenges in player selection and strategic planning, potentially resulting in less-than-ideal outcomes. Relying solely on human judgment can result in errors and inefficiencies, limiting teams from reaching their full potential. Managers face challenges in making objective tactical decisions and assessing player suitability accurately. This highlights the necessity for a data driven paradigm shift in football management. Utilizing the Random Forest Regressor, an advanced analytical method offers a systematic and fact-based approach to decision making.

ANJANA K DAS

S8 CSE

REAL-TIME VIOLENCE DETECTION USING AUDIO AND VIDEO

A novel technique for real-time violence recognition in surveillance film was developed in response to the pressing need for more security and safety measures for the public. Our approach uses deep learning algorithms to deliver an exhaustive analysis by combining the modalities of video and audio. Firstly, we use a cutting-edge object recognition model named YOLOv4 to accurately detect objects in significant video frames, like people and weapons. Next, we employ a MobileNetV2 that has undergone prior training for feature extraction and categorization. excels at extracting spatial features from viewed objects and modeling temporal dependencies and sequential patterns—both of which are critical for detecting violence. By combining video and audio analysis, our approach achieves increased accuracy and robustness.

E M Athul

S2 CSE

AI ENABLED ROBOT FOR DATA COLLECTION IN UNREACHABLE & EXTREME ENVIRONMENTS

This article outlines a groundbreaking approach to gathering data in hazardous or inaccessible environments through the utilization of innovative robotics. These robots are specifically designed to navigate and collect vital information from areas too dangerous or remote for human exploration, enabling unprecedented research opportunities. Central to this advancement is the integration of artificial intelligence (AI) support within drones, endowed with human recognition capabilities. By analyzing live drone footage using advanced pattern recognition techniques like YOLO , these drones achieve high precision, real-time human detection. Equipped with an array of sensors, including cameras and GPS tracking systems, these autonomous robots are poised to revolutionize data collection and analysis in challenging environments. The proposed drone system represents a state-of-the-art solution to object detection challenges in harsh settings.

APARNA SHAJU

S8 CSE

SIGNSENSEI-A Web based learning platform for sign language

The hand gesture is the most widely utilized nonverbal communication technique In sign language . Sign language includes certain grammar rules and guidelines for optimal expression . It is exceedingly difficult for a non deaf person to teach the deaf and dump people these norms and grammars .Therefore , the website we're working on will serve as a platform for learning sign language for those who struggle with speech or hearing issues .The system will include machine learning models that can recognize a broad range of sign language gestures from many cultures and languages in order to assure high accuracy and adaptability . The models are going to be trained using large datasets of annotation. Large datasets of annotated sign language motions will be used to train the models so they can understand the subtle differences between each gesture's meaning.

PRAVANV SHAJI

**S2 CSE**

Style Up:A Virtual Try-On System

STYLE UP, an innovative framework for virtual clothing try-on, revolutionizes fashion exploration by seamlessly integrating advanced technologies such as Generative Adversarial Networks (GANs) and semantic segmentation. In addition to its core functionalities, STYLE UP introduces novel modules aimed at enriching the user experience. The Virtual Wardrobe empowers users to effortlessly organize and explore their personal clothing collections within the virtual environment. The Outfit Generation module utilizes advanced algorithms to curate personalized outfits tailored to specific occasions, formality levels, and seasonal trends. Furthermore, the History Management module archives past try-on sessions, facilitating informed decision-making and style evolution. In

DEVIKA MADHU

S8 CSE

Augmented Neat Algorithm For Enhanced Cognitive Interaction (NEAT-X)
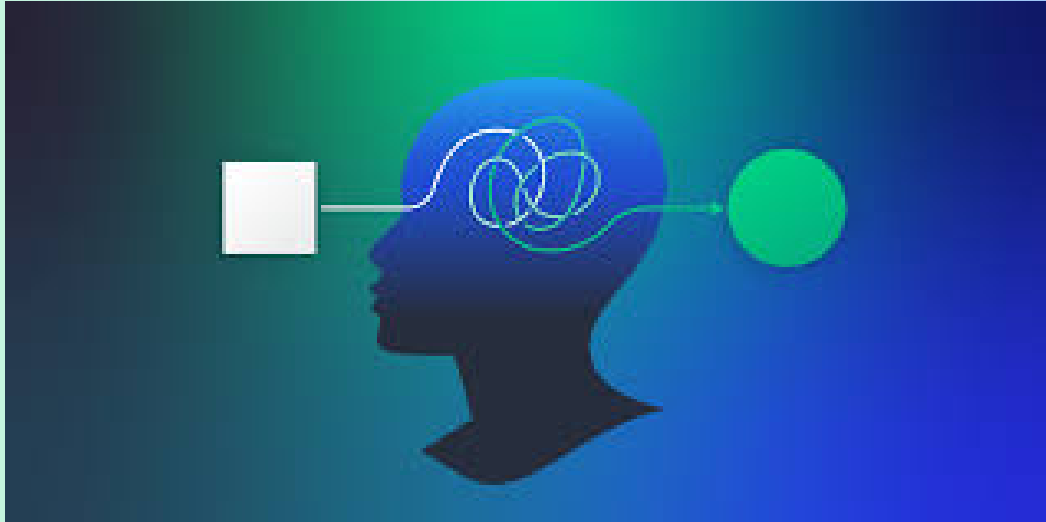
Artificial neural networks (ANNs) are utilised in a variety of practical applications, from pattern recognition to controlling robots. Neuroevolution (NE), which involves the artificial evolution of neural networks through the use of genetic algorithms, has demonstrated significant potential in tackling complicated reinforcement learning tasks. This paper provides a comprehensive overview of the leading methods for evolving artificial neural networks, called Neuro Evolution of Augmenting Topologies(NEAT). NEAT excels in evolving neural networks with diverse structures but faces scalability challenges, especially with extensive networks or high-dimensional input spaces. As the complexity of the problem increases, the search space expands exponentially, hindering NEAT's exploration effectiveness. After performing mutation, we identify the best mutations, and similar substructures are discovered and added to the mutation list. The improved version of NEAT algorithm requires less computational resources and will give optimized solution.

MOHAMED JASAM ABDULSALAM

S6 CSE

Virtual Air Canvas

This creative method of utilizing open-source frameworks to create gesture-controlled white board devices is impressive. The device tracks and interprets finger movements collected by a camera to allow users to engage with a virtual whiteboard. The implementation includes effective data processing, hand landmark estimate, and real-time hand detection by utilizing computer vision algorithms. By providing a modern form of communication and going beyond regular typing and writing habits, the system seeks to expand beyond traditional writing methods and create new opportunities for connection. The system contributes to the changing field of human-computer interaction by offering an alternate mode of communication, which improves people's quality of life overall. It also demonstrates the versatility of gesture-controlled systems in terms of enhancing communication accessibility.

RITHIKA

S2 CSE

DIFFERENCE-BASED MUTATION OPERATION FOR NEUROEVOLUTION OF AUGMENTED TOPOLOGIES
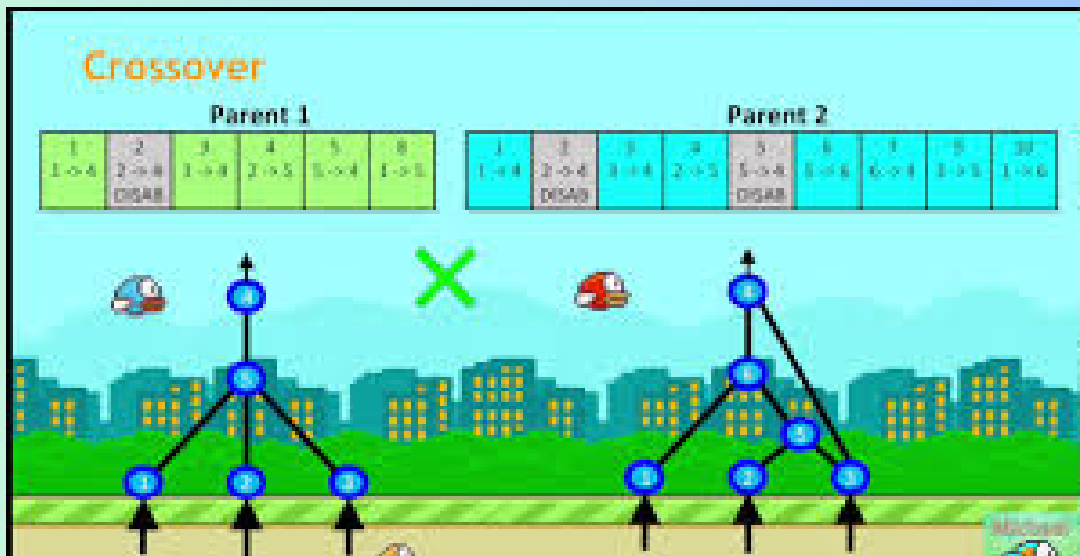

NEAT stands for NeuroEvolution of Augmenting Topologies, and it is an evolutionary algorithm used for evolving artificial neural networks. NEAT is designed to evolve both the weights and structures of neural networks. Unlike traditional neural network evolution approaches, NEAT allows the evolution of the network's architecture itself. This means that the algorithm can add or remove neurons and connections during the evolution process. The purpose of mutation is to explore new possibilities in the search space and prevent the algorithm from getting stuck in local optima. Mutations primarily occur in two ways: creating new connections between nodes and introducing new nodes between connections. This papper introduce a new mutation method, termed Difference-Based Mutation (DBM) has been introduced. The difference is determined according to the innovation numbers assigned to eachnode and connection, allowing tracking the changes.

SHABANA K S

S6 CSE

ORGANOID INTELLIGENCE (OI): THE NEW FRONTIER IN BIOCOMPUTING AND INTELLIGENCE-IN-A-DISH
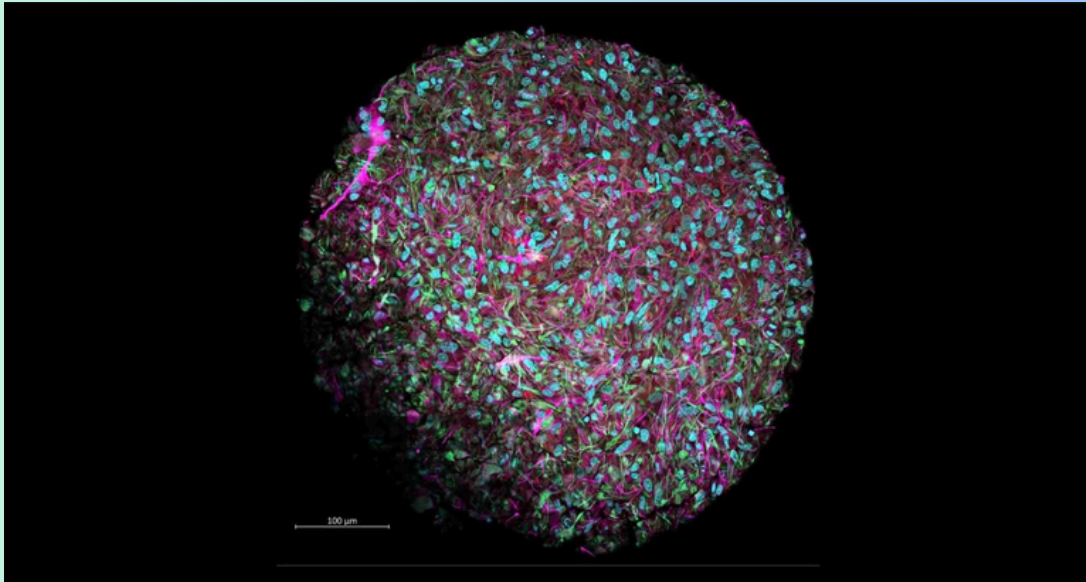

Organoid Intelligence (OI) is an incredibly dynamic and promising field that mintegrates cutting-edge advancements in biotechnology, neuroscience, and artificial intelligence to craft living, self-organizing systems replicating the complexity and functionality of human organs. This comprehensive overview delves into the current state of OI research, encompassing the diverse methods employed in generating and manipulating organoids.The exploration extends to the computational tools and

algorithms vital for analyzing and interpreting the intricate behavior of organoids.The potential applications of OI span across numerous fields, such as medicine, engineering, and neuroscience. This transformative technology holds the promise of reshaping our understanding of human biology and cognition.The paper doesn't shy away from addressing the ethical and societal implications associated with OI.

NIHAL ANIL

s8 cse

MULTI-VIEW FACE RECOGNITION USING DEEP NEURAL NETWORK
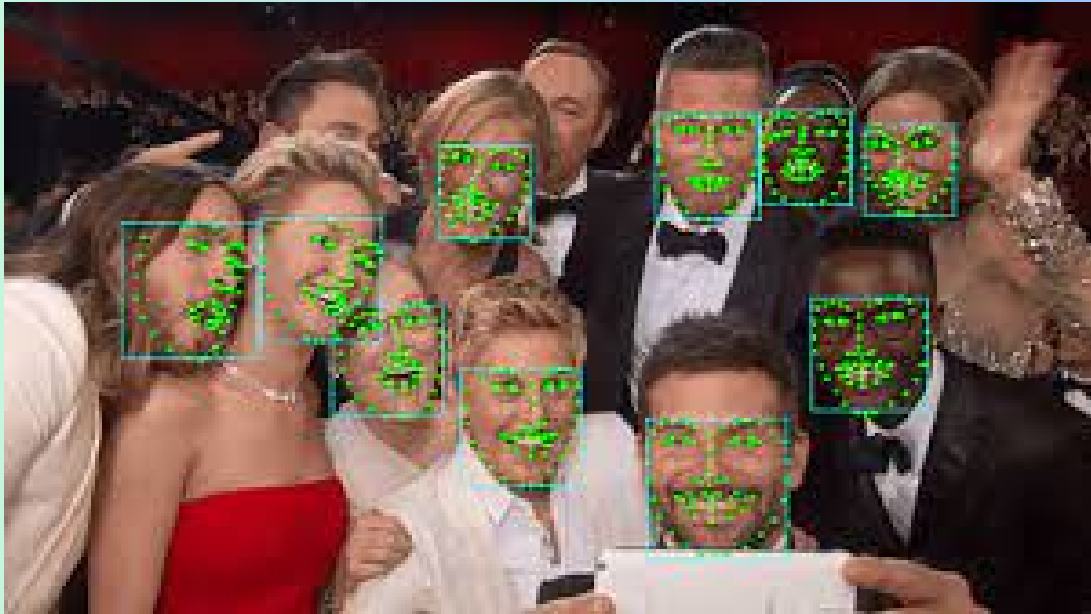
Face recognition has been widely used in modern intelligent systems, such as smart video surveilance, online payment, and intelligent access control system. Existing face recognition algorithms are prone to be attacked by various face presentation attacks, such as printed paper, video replay, and silicone masks. To optimally handle the aforementioned problems, we formulate a novel deep architecture to increase the accuracy of multi-view human face recognition. In particular, in the first place, a novel deep neural network is built for deeply encoding the face regions, where a novel face alignment algorithm is employed to localize the key points inside faces. Subsequently, we utilize the well-known PCA for reducing the dimensionality of the deep features and simultaneously, removing the redundant and contaminated visual features.

MEGHA K P

s4 cse

OBJECT DETECTION-BASED SYSTEM FOR TRAFFIC SIGNS ON DRONE-CAPTURED IMAGES

The construction industry is on the path to digital transformation. One of the main challenges in this process is inspecting, assessing, and maintaining civil infrastructures and construction elements. However, Artificial Intelligence (AI) and Unmanned Aerial Vehicles (UAVs) can support the tedious and time-consuming work inspection processes. This article presents an innovative object detection-based system which enables the detection and geo referencing of different traffic signs from RGB images captured by a drone's onboard camera, thus improving the realization of road element inventories in civil infrastructures. The computer vision component follows the typical methodology for a deep-learning-based SW: dataset creation, election and training of the most accurate object detection model, and testing.

NEERAJ K R

s6 cse

FitQuest: Gamify Your Workout

Our proposal is to bring physical body movements to navigate the present gaming navigation control system.The body movements will be tracked and will be analysed by a camera. According to the body movement by the player the games character can be controlled by his actions. We use Computer vision technology to understand the body motions.One of the greatest strengths of physical navigation control system is that it seems to increase the motivation and engagement in physical activity.

ALLEN SEBASTIAN

s8 cse