



ProtoIT

THE OFFICIAL STUDENT TECH MAGAZINE

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Ideas
Into
Impact*

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GROW



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new perspectives
and trends



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your skills
to achieve
excellence



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in technology
and shape
the future



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Tomorrow.

EXPLORING IDEAS. BUILDING SOLUTIONS. CREATING IMPACT.



Institute Vision

To become a globally recognized institution that develops professionals with integrity who excel in their chosen domain making a positive impact in industry, research, business and society



Institute Mission

- To provide the ambience necessary to achieve professional and technological excellence at the global level.
- To undertake collaborative research that fosters new ideas for sustainable development.
- To instill in our graduates ethical values and empathy for the needs of society.

Department Vision

“To become a globally recognized centre of excellence in the field of Information Technology, providing technology excellence that advances learning, teaching, research to produce budding IT professionals, researchers, innovators and entrepreneurs.”

Department Mission

- Produce graduates with the best knowledge and practical skills by imparting innovative skills, research aptitude, ethics, and social responsibility.
- To create ambience of academic excellence through state of the art infrastructure and learner centric pedagogy leading to employability, and research.
- Imbibe and in still in them the required qualities to become leaders who can make positive contribution to the society.
- Enhance the student’s knowledge in the latest technologies by organizing and participating in technical programs
- Interact and work closely with industries and research organizations to accomplish technology transfer
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Automated Waste Segregation Using AI-Enabled Robotic Arm & IoT Sensors

ABSTRACT

This project presents an automated system for waste segregation utilizing a combination of AI, computer vision, and robotics. The proposed system employs the YOLOv8 object detection model, which efficiently classifies multiple types of dry waste, including paper, plastic, metal, and glass, in real time. Integrating this model with a 5-degree-of-freedom robotic arm, the system performs targeted waste segregation by directing different waste types into designated bins. This approach not only enhances segregation accuracy but also automates a process traditionally reliant on human labour, thus reducing health risks and improving operational efficiency in waste processing environments.

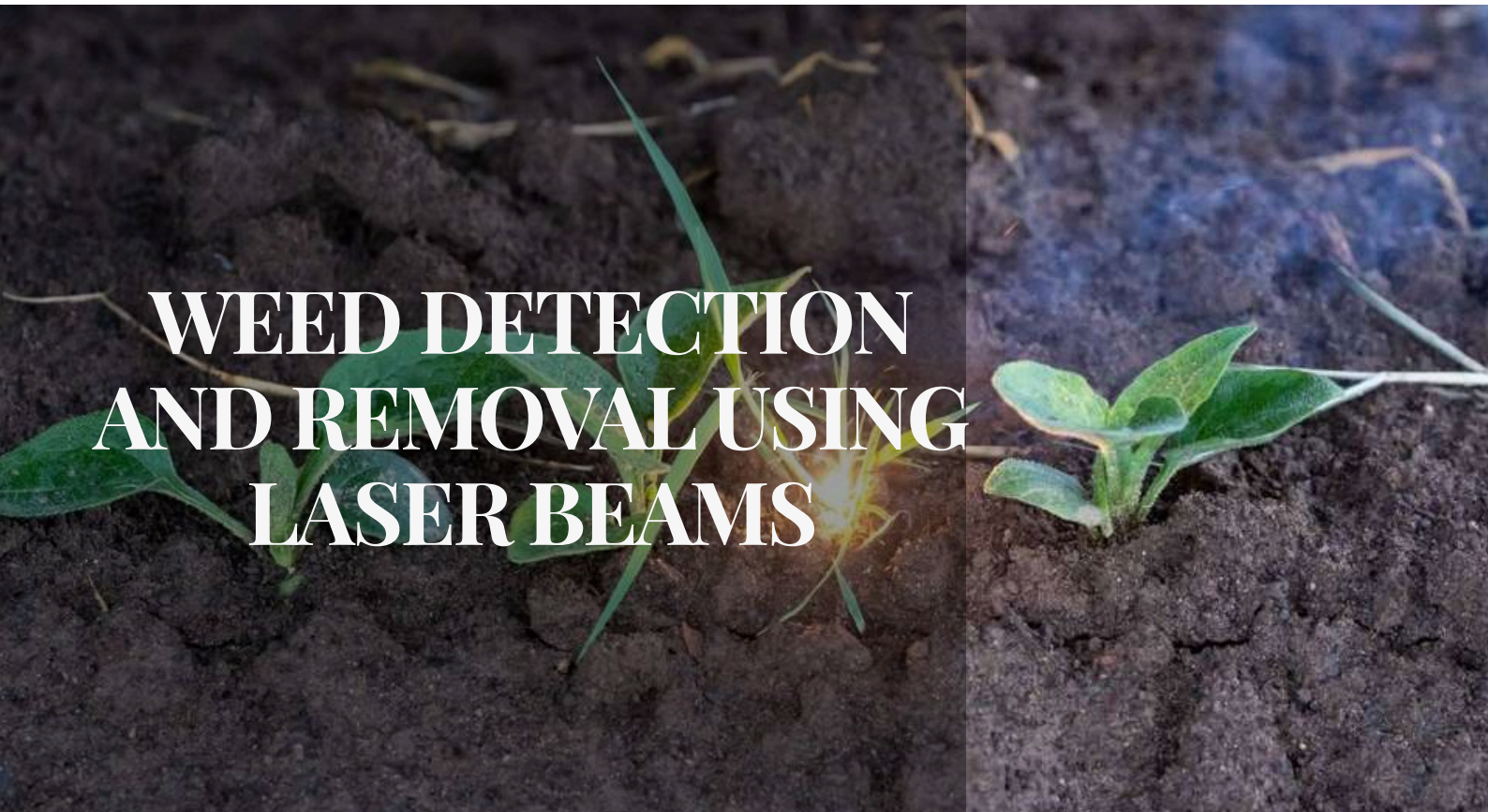
The system's architecture features a Raspberry Pi that processes live video streams from an external camera, identifying waste items within the frame. The YOLOv8 model, trained on a comprehensive dataset, accurately classifies waste categories and transmits commands to an Arduino microcontroller that controls the robotic arm. The robotic arm, equipped with precise servo motors, then physically sorts the waste items according to their classifications. During experimental testing, the system demonstrated an average classification accuracy of 80% in a controlled environment, with plastic and glass achieving the highest precision. The incorporation of both hardware and software components ensures an optimized balance between computational power and physical manoeuvrability, making this system a practical and scalable solution for modern waste management challenges.

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Introducing an innovative laser-based weed detection and removal system designed to revolutionize sustainable agriculture. Using high-quality imaging, the system accurately distinguishes between weeds and crops in real-time, allowing for precise targeting and removal of only unwanted weeds. High-resolution cameras and sensors capture detailed, real-time images of the field, which are processed by advanced machine learning algorithms to identify weeds with high accuracy. This enables the system to differentiate crops from weeds, ensuring that only the weeds are targeted.

Once identified, calibrated laser beams are deployed to target and disrupt the cellular structure of the weeds, effectively destroying them without causing harm to nearby crops. This laser-based approach eliminates the need for traditional weed management practices that often degrade soil quality, such as heavy herbicide use or soil-disturbing mechanical weeding. By focusing on weed elimination at a cellular level, the system leaves the soil structure intact, preserving soil health and supporting long-term sustainability in agriculture.

In addition to promoting environmental benefits, this system significantly lowers weed management costs by reducing the need for manual labor and minimizing dependency on herbicides. Farmers can thus manage weed growth more efficiently,

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ACCELERATED DRUG DISCOVERY USING DEEP LEARNING

ABSTRACT

The process of drug discovery is traditionally time-consuming, expensive, and prone to failure, especially in late-stage development. This project presents a deep learning-based approach to accelerate drug discovery through drug-target interaction (DTI) prediction, facilitating drug repurposing. The system integrates multiple deep learning models, including Convolutional Neural Networks (CNNs) for molecular image analysis, Recurrent Neural Networks (RNNs) for protein sequence processing, and Graph Neural Networks (GNNs) for molecular graph analysis. By leveraging datasets from ChEMBL, the system processes drug structures, protein sequences, and interaction labels to enhance predictive accuracy. A Django-based backend is used to integrate trained models and provide APIs for real-time predictions, while an SQLite database manages user data and results. The web-based interface allows researchers to upload datasets, select models, and visualize predictions interactively. This platform aims to improve the efficiency of identifying potential drug candidates, ultimately accelerating the drug discovery pipeline.

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Gamified Speech Therapy App for Children: An Innovative Approach to Enhancing Speech Development

ABSTRACT

The "Gamified Speech Therapy App for Children" project introduces an innovative, engaging approach to speech therapy using gamification techniques. Tailored specifically for children, this app transforms traditional therapy into a fun, interactive experience that addresses the common issues of low engagement and motivation in young users. Core features include a variety of interactive games targeting essential areas like articulation, vocabulary, and fluency, all supported by real-time pronunciation feedback powered by speech recognition technology. The app's reward system and data-driven personalization foster consistent practice, while detailed progress tracking helps parents and therapists monitor and adjust therapy plans to meet each child's unique needs. By combining entertainment with targeted exercises and actionable feedback, this app aims to enhance speech outcomes and make therapy a more enjoyable, supportive experience for children.

Keywords:

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INTELLIGENT RIVER POLLUTION MONITORING

ABSTRACT

An IoT-based Smart Water Quality Monitoring System enables real-time monitoring of key water parameters such as pH, turbidity, and temperature using low-power sensors and wireless communication technologies. The collected data is transmitted to a cloud platform for secure storage, analysis, and visualization through user-friendly dashboards, while real-time alerts are generated when parameters exceed safe limits. Compared to traditional manual monitoring methods, the system is cost-effective, scalable, and suitable for continuous operation in large or remote areas. Its applications include environmental monitoring, water treatment plants, industrial wastewater management, and agriculture. By providing timely insights and rapid response capabilities, the system helps ensure water safety, prevent waterborne diseases, support regulatory compliance, and promote sustainable water resource management.

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WildTrackAI – Computer Vision To Animal Footprint Classification and Injury Detection



ABSTRACT

WildTrack AI is an advanced deep-learning system designed for wildlife monitoring, focusing on animal footprint classification and injury detection. It utilizes three powerful models—Custom CNN, Inception, and VGG16—to accurately classify footprints, while YOLOv8 is employed for real-time injury detection. The system features an interactive web application built with React.js, providing a user-friendly interface for input and result visualization, while a Django-based backend manages data processing and model interactions, communicating with the frontend via REST APIs. To ensure high accuracy and reliability, the system incorporates extensive data preprocessing, augmentation techniques, and thorough performance evaluations, making it a valuable tool for conservation and research. The integration of deep-learning models allows it to analyze footprints with precision, distinguishing between species and detecting potential injuries with minimal human intervention. Additionally, the platform supports scalable deployment, enabling researchers and conservationists to utilize it in diverse environments, from protected reserves to real-world field applications. Its efficient architecture ensures seamless data flow, enabling real-time monitoring and aiding in the protection of endangered species.

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AMPLIFYING RESTAURANT MANAGEMENT WITH USE OF AI: INNOVATIONS USING STAFF SCHEDULING AND PROFESSIONAL INVENTORY MANAGEMENT

ABSTRACT

Artificial intelligence (AI) offers significant advantages for restaurant management, particularly in staff scheduling and inventory management. By analyzing large datasets that include historical sales, customer behavior, local events, and seasonal patterns, AI can accurately predict future demand. This enables restaurant managers to adjust staff schedules to match expected customer traffic, reducing labor costs while ensuring that service quality remains high.

AI also transforms inventory management by tracking real-time ingredient usage and predicting future needs more precisely. This helps restaurants minimize food waste, cut down on storage costs, and maintain consistent menu quality. Since AI systems learn and adapt over time, they continue to refine scheduling and inventory strategies based on ongoing trends and operational feedback, making the process more efficient and responsive to change.

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EPILEPTIC SEIZURE PREDICTION SYSTEM WITH MACHINE LEARNING BASED ANOMALY DETECTION OF HEART RATE VARIABILITY



ABSTRACT

This project focuses on developing an Epileptic Seizure Detection System that uses machine learning-based anomaly detection of Heart Rate Variability (HRV) for real-time seizure prediction. The system employs a MAX30105 sensor to continuously monitor heart rate and oxygen levels, capturing physiological changes that may occur before a seizure. The collected data is processed by an ESP8266 microcontroller and transmitted wirelessly to a central monitoring system. A Support Vector Machine (SVM) model analyzes the HRV data to identify subtle patterns and anomalies associated with impending seizures. By detecting early warning signs, the system can provide timely alerts to patients and caregivers, enabling preventive actions that enhance safety, reduce the risk of injury, and improve the quality of life for individuals living with epilepsy.

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