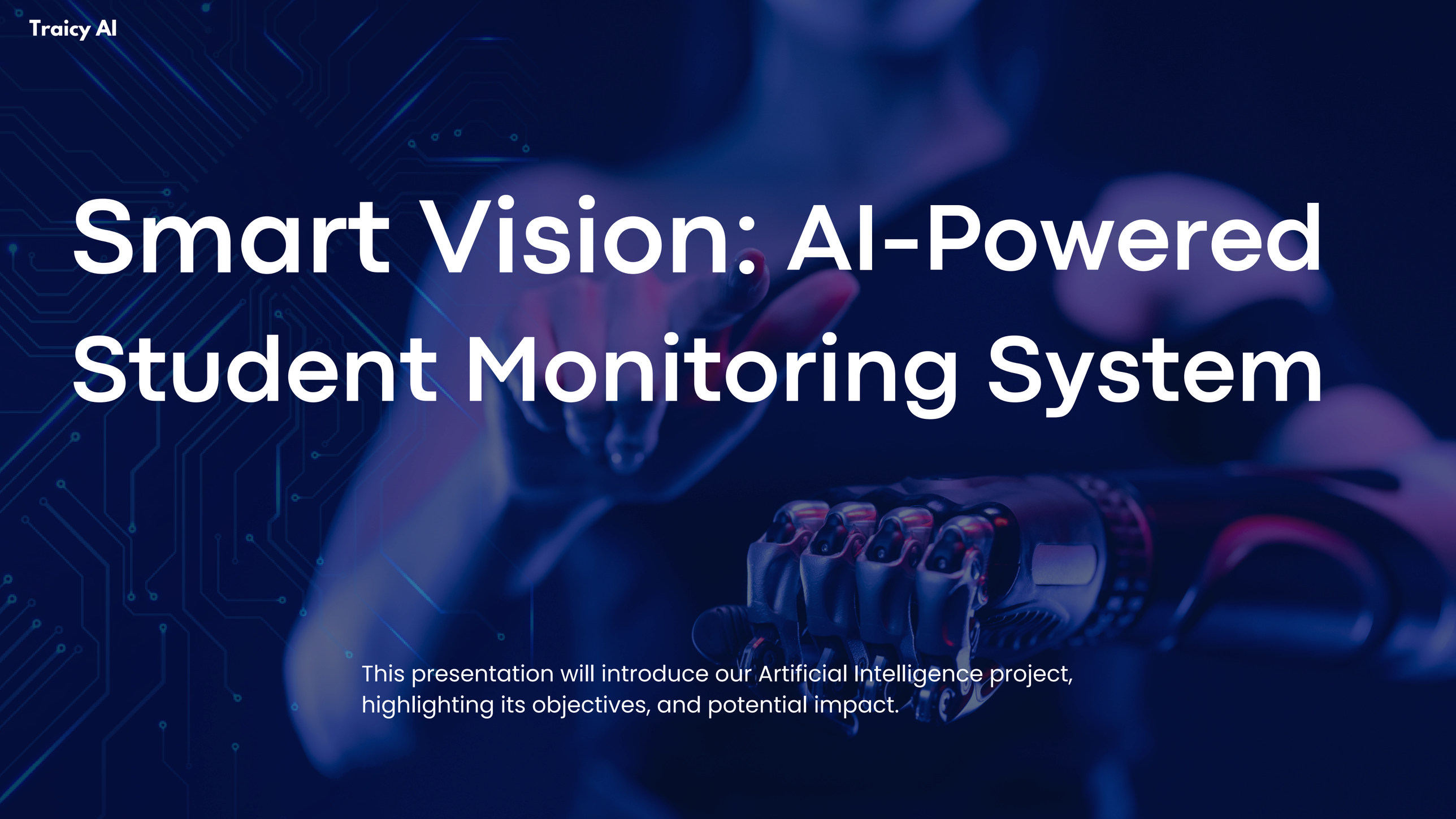
Traicy AI

Smart Vision: AI-Powered Student Monitoring System



This presentation will introduce our Artificial Intelligence project, highlighting its objectives, and potential impact.

Project Overview

This project develops an AI-powered student monitoring and attendance system based on a deep learning vision model.

A fixed camera works like a digital eye,continuously observing student presence and movement within the department.

The system automatically generates attendance data and connects it with a centralized LMS platform.

The LMS manages attendance, fees, fines, marks, aptitude tests, online examinations, events, and academic activities.

“The camera acts as an eye, and deep learning acts as the brain of the department.”

Problem Statement

Student attendance in departments is still handled manually, which makes the process slow, error-prone, and inconsistent.

Faculty members cannot monitor student movement continuously, leading to missing attendance, class bunking, and students roaming in corridors.

Although the department focuses on AI and advanced technologies, its attendance and monitoring system remains ordinary and outdated.

This creates a strong need to upgrade the department structure using an intelligent and automated approach.

Model Selection

YOLO-N (Nano) Features:

YOLO-N (Nano) is ultra-lightweight with ~3.2M parameters for fast real-time detection. It suits edge devices and simple scenarios with efficient multi-scale processing.

YOLO-S (Small) Features:

YOLO-S (Small) offers better accuracy via skip connections and strong feature extraction. It handles crowded objects well with balanced speed.

Dataset Recommendations

- YOLO-N (Nano): 1000 images, ~1000 instances.
- YOLO-S (Small): 2000–4000 images, ~2000–4000 instances.

Model Training and Evaluation

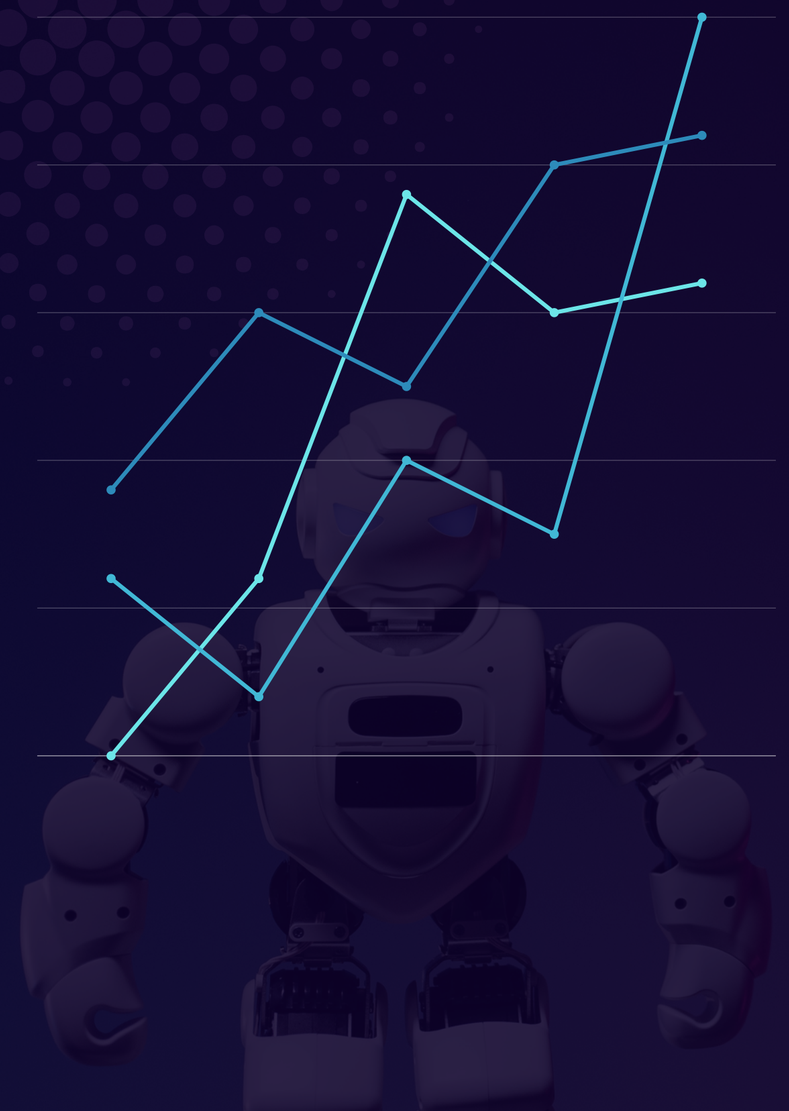
Student roaming footage is collected from the department area during regular academic hours.The video data is converted into image frames, and low-quality or irrelevant frames are removed.Relevant frames are cleaned and annotated using bounding boxes, focusing only on student movement.

The annotated data is used to train the deep learning model, allowing it to learn department-specific visual patterns.

Model performance is evaluated on unseen data, and results are compared with pretrained model performance.The custom-trained model performs significantly better, as it adapts to real-world department conditions.

Why Custom Training Improves Performance

- Pretrained models are trained on general datasets, which do not represent local department environments.
- Custom training allows the model to learn real student behavior, camera angles, lighting conditions, and movement patterns.
- This results in higher accuracy, lower false detection, and more reliable performance in deployment.



Website Integration LMS System

The system is integrated with a web-based LMS platform, which acts as a centralized academic management system.

It manages attendance records, fees and fines, marks, aptitude tests, online exams, and event participation.

All monitoring data is stored and visualized through the LMS, enabling efficient, transparent, and smart department management.

Project Impact

- Upgrades the department into a smart, AI-driven environment
- Provides accurate attendance tracking
- Monitors student presence all the time
- Helps identify students bunking or missing classes
- Reduces manual work for faculty and staff

Future Directions

- AI voice system to announce interval end
- Attendance start and end announced automatically via voice
- Morning and evening motivational quotes played in voice
- Upgrade LMS website for better functionality
- Improve model accuracy for more reliable monitoring


Thank You!