Industrial Ideathon 2025

Department of Industries
Government of NCT of Delhi

DSIIDC
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NSUT

NSUT IIF

Team Name: Square 1

TEAM MEMBERS :-

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Worker Safety Monitoring using Computer Vision

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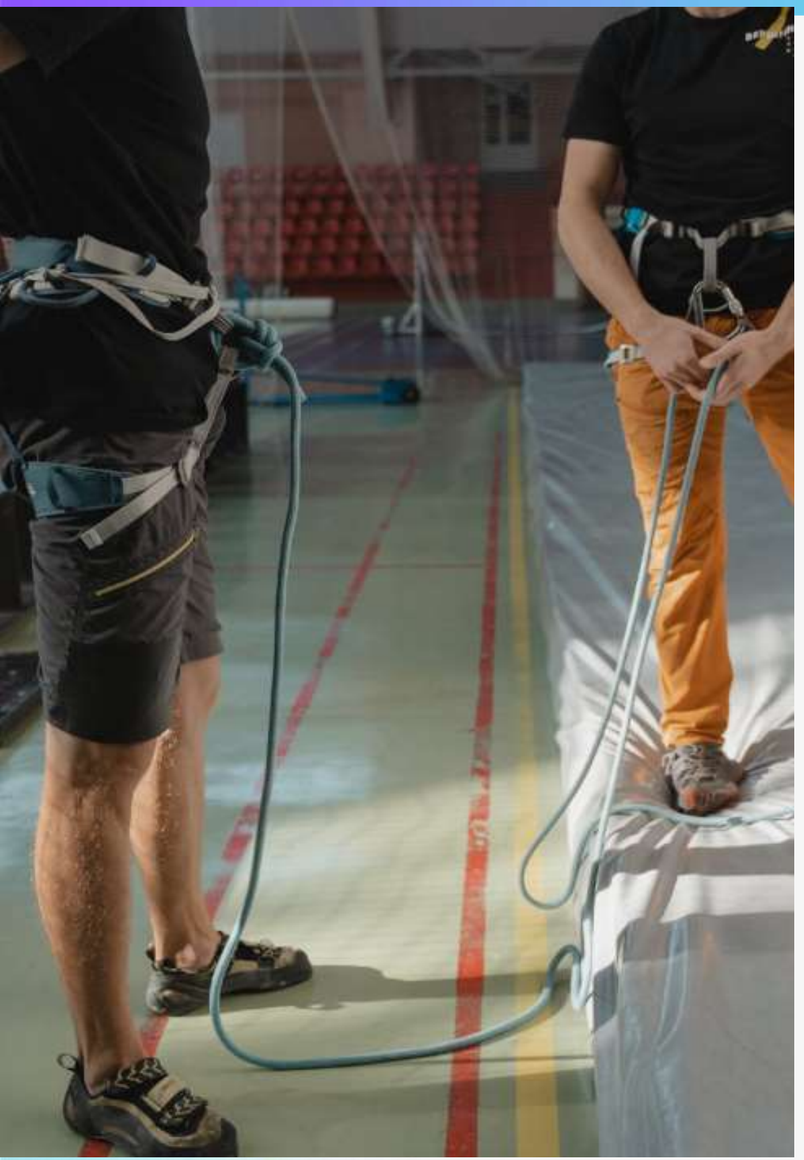

Worker's Safety Monitoring

- The solution involves creating a comprehensive Worker's Safety Monitoring system leveraging computer vision for real-time safety equipment checks.
- This system aims to accurately detect if workers are wearing necessary safety vests and helmets which is vital for safety.
- By monitoring PPE compliance, the system actively contributes to a safer work environment, reducing the likelihood of accidents.
- The implemented technology helps prevent injuries by promptly identifying and addressing potential safety violations on construction sites.

Idea/Solution

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Prototype/Demo

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Safety Program

- A prototype of the Construction Worker's Safety Program demonstrates real-time detection capabilities of PPE equipment on workers.
- The camera accurately identifies whether a person is wearing a helmet or not, showcasing the program's ability to recognize safety compliance.
- The program is available for review, providing a tangible example of how computer vision enhances safety monitoring capabilities efficiently.
- This demonstration illustrates the practical application of machine learning in improving construction site safety through automated monitoring.

Feasibility & Scalability/Future Aspects

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Technology Availability

- The system is built using mature technologies like computer vision, including YOLOv5/YOLOv8, ensuring reliable performance and accuracy.
- Real-time video processing frameworks such as OpenCV enable efficient data handling and immediate analysis of safety compliance effectively.
- The potential use of edge devices like Raspberry Pi or Jetson Nano allows for decentralized processing, enhancing system responsiveness and reducing latency.
- Training the underlying model on domain-specific datasets makes it adaptable to various site conditions, ensuring consistent and accurate detection.

Technologies Used

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Core Tech Stack

- Python 3.x serves as the primary programming language, offering a versatile and robust platform for developing the safety monitoring system.
- PyTorch is used for building and training the computer vision models, leveraging its powerful machine learning capabilities effectively.
- OpenCV is utilized for real-time video processing, enabling efficient analysis of video feeds to detect safety violations promptly.
- YOLOv5, by Ultralytics, provides a state-of-the-art object detection algorithm for accurately identifying workers and safety equipment quickly.