Student names:

1. Karthik Manjunath Hadagali (**Student ID:** 2119146)
2. Umme Athiya (**Student ID: 2180542**)

Title of the project:

Construction Site Safety: Real-Time Detection of Personal Protective Equipment Using YOLO Model.

Description of the project:

This project aims to enhance safety protocols on construction sites by deploying a YOLOv8 model to detect individuals wearing helmets, jackets, and protective eyeglasses. By utilizing real-time video feeds, the system will automatically recognize and flag any personnel not adhering to safety gear requirements, thus enabling immediate corrective action. The implementation of this AI-driven monitoring system will not only ensure compliance with safety regulations but also significantly reduce the risk of injuries. This initiative is part of a broader effort to integrate advanced technology solutions into construction site management to promote a safer working environment.

Proposed Methodology and Techniques:

For this project, the proposed methodology begins with collecting and annotating a dataset of images from construction sites, highlighting individuals wearing helmets, jackets, and protective eyeglasses. These annotated images will be used to train the YOLOv8 model, leveraging its capabilities for high-speed object detection with high accuracy. We will further refine the model's performance through techniques such as data augmentation and transfer learning to enhance its ability to generalize across different construction environments. Finally, the trained model will be integrated into a real-time video surveillance system, where it will continuously monitor and analyze the footage to ensure that all personnel are properly equipped with the necessary safety gear.

References:

1. Safety Helmet Detection Using YOLO V8. Authors: Krunal Patel, Vrajesh Patel, Vikrant Prajapati, Darshak Chauhan, Adil Haji, Sheshang Degadwala. Conference2023 3rd International Conference on Pervasive Computing and Social Networking (ICPCSN).
2. A Smart System for Personal Protective Equipment Detection in Industrial Environments Based on Deep Learning. Authors: Gionatan Gallo, Francesco Di Rienzo, Pietro Ducange, Vincenzo Ferrari, Alessandro Tognetti, Carlo Vallati. Conference: 2021 IEEE International Conference on Smart Computing (SMARTCOMP).

Tentative Schedule:

Week 5: May 1 - May 7, 2024

- **Project Kickoff:** Initial team meeting to review project scope and objectives.
- **Dataset Collection:** Begin collection of images and videos from construction sites.
- **Preliminary Data Annotation:** Start the manual process of annotating images for helmets, jackets, and protective eyeglasses.

Week 6: May 8 - May 14, 2024

- **Data Annotation Continuation:** Continue with the data annotation process.
- **Initial Model Training:** Start training the YOLOv8 model on the initially annotated dataset.
- **Set up Development Environment:** Ensure all hardware and software requirements are met for model training and deployment.

Week 7: May 15 - May 21, 2024

- **Model Evaluation and Optimization:** Begin the first round of model testing and make necessary adjustments based on initial results.
- **Data Augmentation:** Implement data augmentation techniques to improve model robustness.
- **Ongoing Training:** Continue training the model with augmented data.

Week 8: May 22 - May 28, 2024

- **Advanced Model Training:** Refine the model using advanced techniques like transfer learning.
- **Performance Evaluation:** Assess model performance comprehensively against new test data.
- **Integration Testing:** Start testing the model integration with the video surveillance system.

Week 9: May 29 - June 1, 2024

- **Final Adjustments and Testing:** Make final adjustments to the model based on the latest test results.
- **Project Review:** Conduct a thorough project review with all stakeholders to evaluate the deployment readiness.
- **Documentation and Reporting:** Finalize all documentation, including a detailed project report and future recommendations.