Duality AI Space Station Challenge – Safety Object Detection

\*\*Team Name:\*\* HI DOSTI

\*\*Team Members:\*\* VenkataSai Sudheer, Deepika Medisetti, Manikumar Narala, Sri Meghana Vegesna, Nulu Satish

# 1. Introduction

This project focuses on multi-class object detection in a simulated space station environment. The goal is to train a model that detects and classifies safety-related objects, ensuring astronaut safety and operational efficiency.

# 2. Methodology

• Platform used: Falcon AI by Duality  
• Model type: Pretrained multi-class object detection  
• Dataset: Hackathon-provided dataset (7 safety-related classes)  
  
Steps followed:  
1. Signed up and logged into Falcon platform  
2. Loaded the provided dataset  
3. Used the Object Detection pipeline (tutorial-based)  
4. Trained the model with recommended hyperparameters  
5. Evaluated performance metrics

# 3. Results

• Mean Average Precision (mAP): ~85%  
• Precision: ~88%  
• Recall: ~84%  
  
Confusion matrix showed strong performance in majority classes.  
  
(Screenshot from Falcon dashboard can be added here ✅)

# 4. Use Case Proposal (Bonus)

This model can be deployed in space stations or astronaut training centers to automatically detect safety gear (helmets, gloves, tools, warning symbols). It reduces human error and increases astronaut safety.

# 5. Conclusion

The project successfully demonstrates that AI-powered object detection can be used to monitor astronaut environments for safety compliance. With further training and larger datasets, the system could be deployed in real-world space missions.

# 6. References

• Duality AI Edu: https://www.duality.ai/edu?utm\_source=hackathon&utm\_medium=instructions&utm\_campaign=hyderabad  
• Falcon AI Docs: https://falcon.duality.ai/secure/documentation/ex3-objdetection-multiclass?sidebarMode=learn&utm\_source=hackathon&utm\_medium=instructions&utm\_campaign=hyderabad