

# RAPID Internship 2024

## SAFETY MONITORING AT CONSTRUCTION SITE



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## **Background of the research problem highlighting the knowledge gap :**

Considering the varied nature and occurrence of accidents happening on the construction sites most of the earlier research has focused only on detection of the PPEs , sparks and inflammable materials whereas we have taken our research a step further by including not just object detection but also calculating the distance using Euclidean distance like in the fire hazard model and also establishing danger zones around HEMMs in order to create a safer and dynamic working environment on a construction site

## **Problem Statement and Objective of research :**

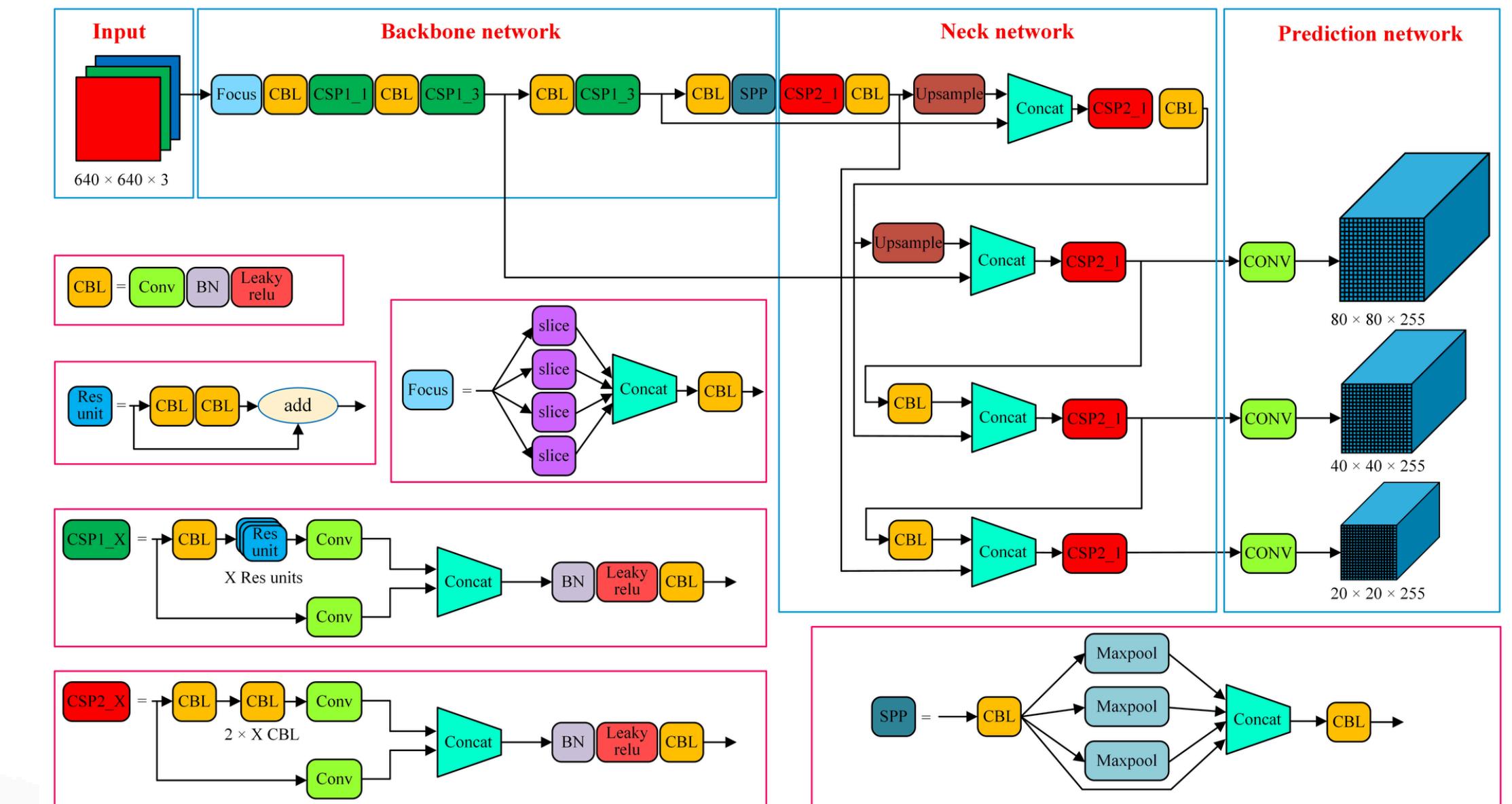
In recent studies, over 60% of construction site accidents were due to workers not wearing safety equipment and the creation of unsafe environments such as the presence of inflammable objects near active sources of fire and people coming in close proximity to HEMMs. . This project employs object detection and image processing using the YOLO model to monitor compliance with safety protocols in real-time.

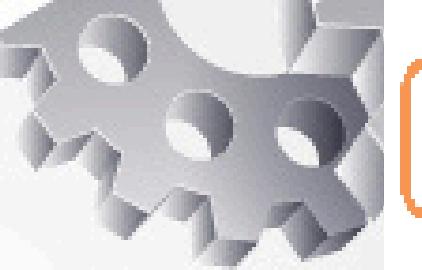
Implementing this system aims to reduce such non-compliance incidents. Achieving this goal involves developing an AI model using computer vision and deep learning for continuous, automated surveillance across the construction site

# Experimental methodology/ Algorithm used:

## YOLOv5:

A state of the art Object  
Detection Algorithm offered  
by Ultralytics



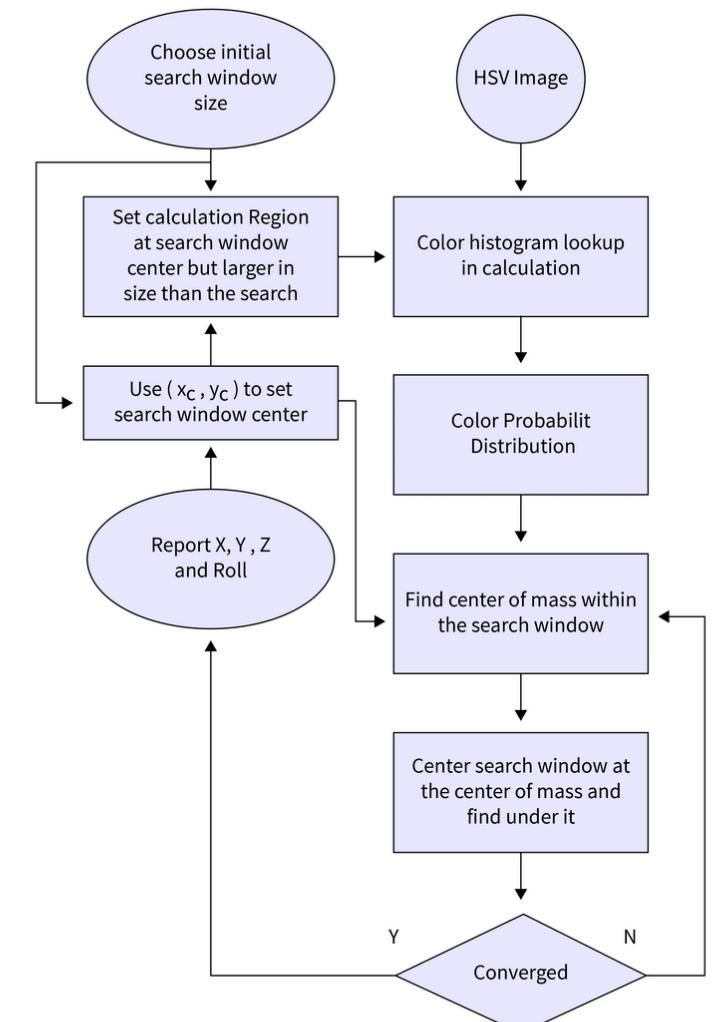


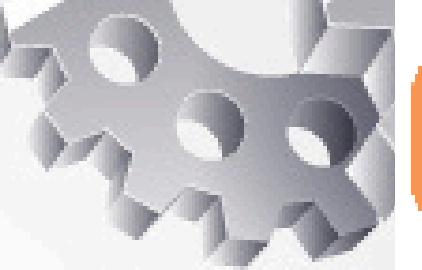
## Experimental methodology/ Algorithm used:

Euclidean Distance :

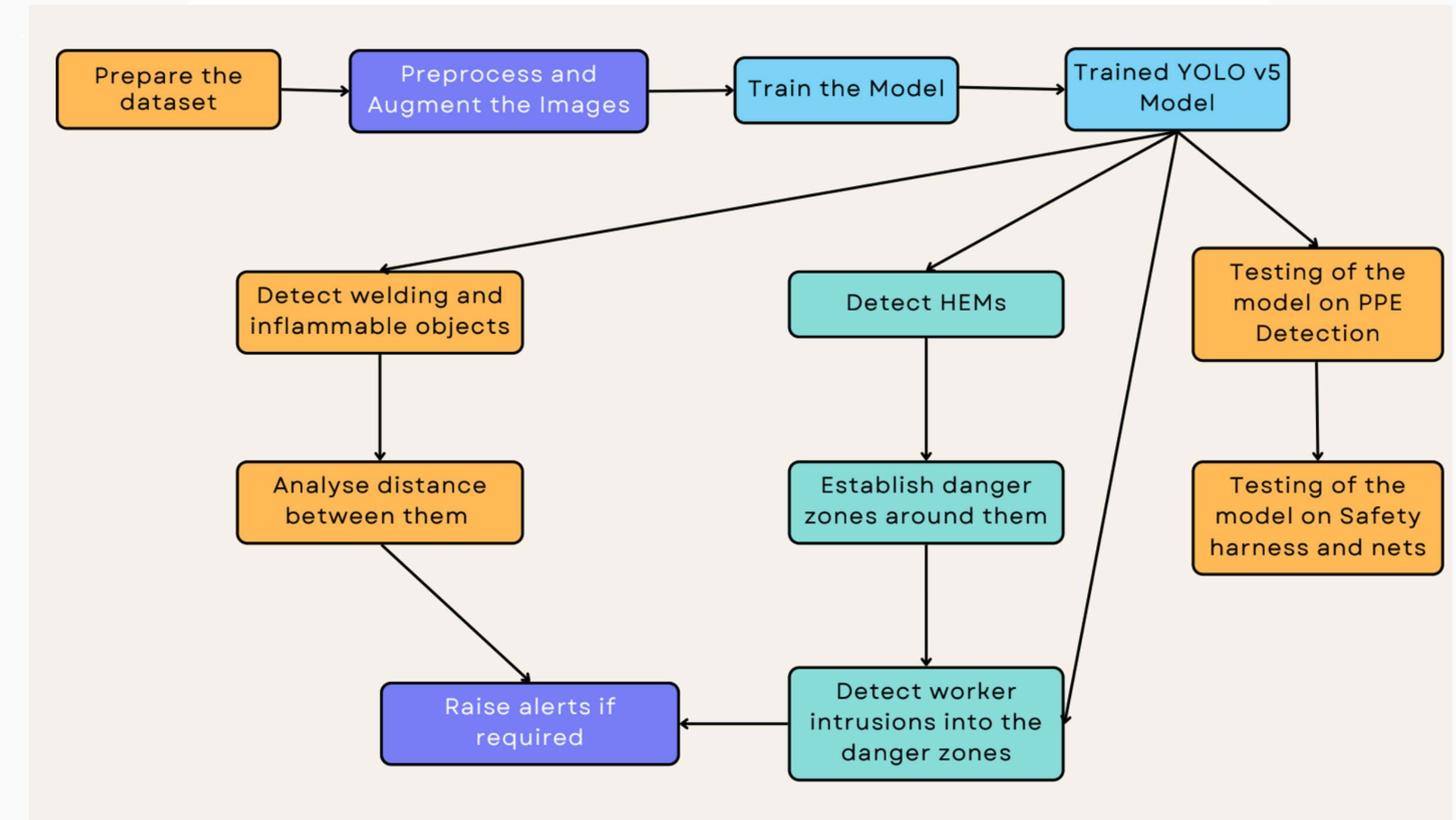
$$\text{Euclidean}(A, B) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

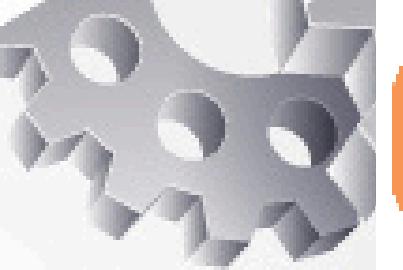
CSRT Motion Tracker :



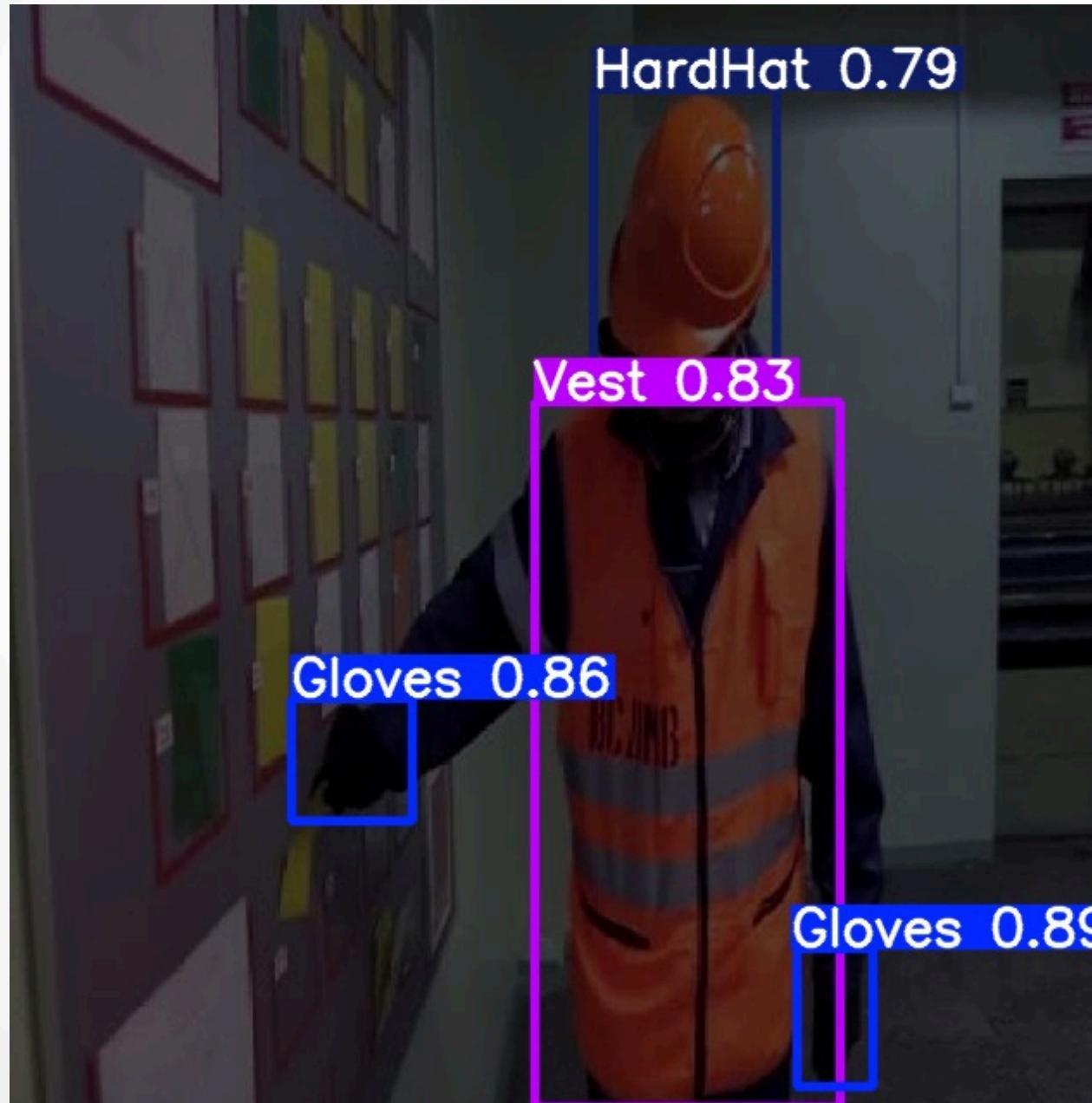


## Working prototype of the problem:



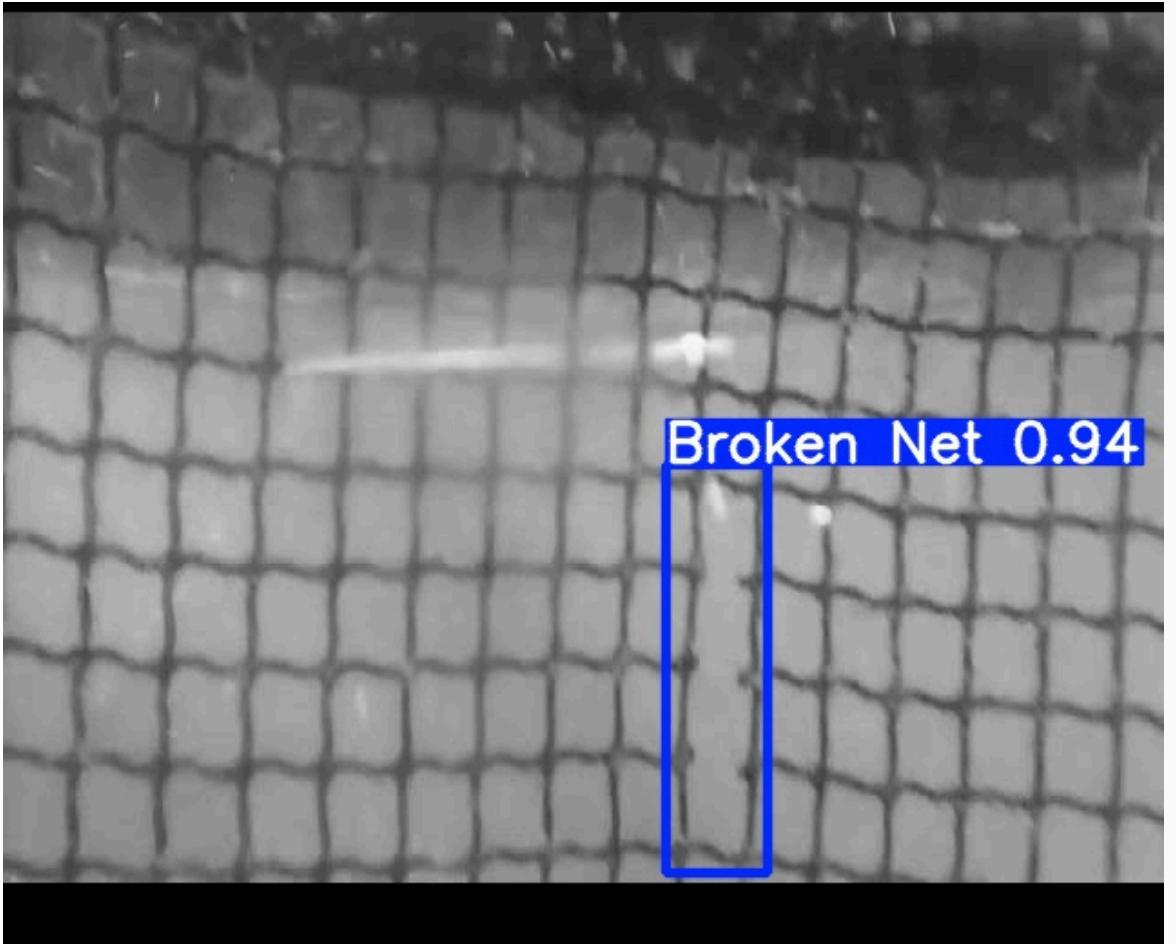
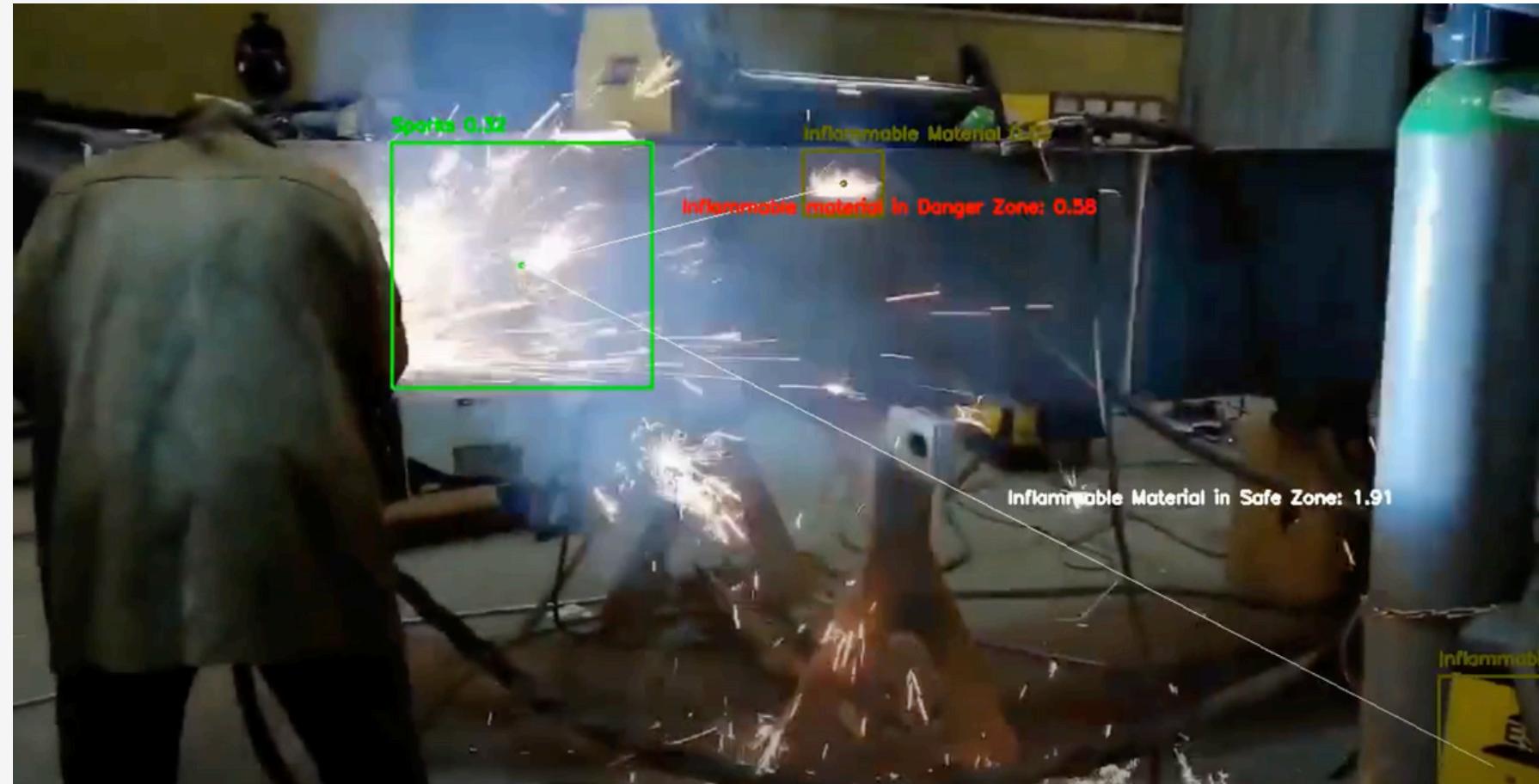


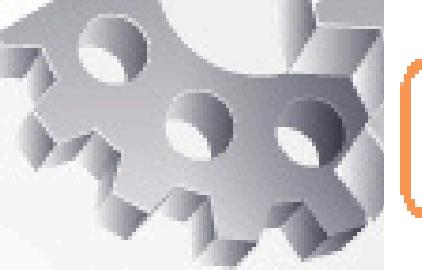
## Experimental Results :





## Experimental Results :





## **Draft paper Publications :**

[https://docs.google.com/document/d/1paGDKMqGQg4KJsMYzEaJARH3a9OevDjT/edit?  
usp=sharing&ouid=106770405698588442142&rtpof=true&sd=trueext](https://docs.google.com/document/d/1paGDKMqGQg4KJsMYzEaJARH3a9OevDjT/edit?usp=sharing&ouid=106770405698588442142&rtpof=true&sd=trueext)

## **References:**

- [\*\*https://www.slideshare.net/slideshow/safety-helmet-detection-inengineering-and-management/25375586#1\*\*](https://www.slideshare.net/slideshow/safety-helmet-detection-inengineering-and-management/25375586#1)
- [\*\*https://www.mdpi.com/2079-9292/12/8/1933\*\*](https://www.mdpi.com/2079-9292/12/8/1933)
- [\*\*https://www.mdpi.com/1424-8220/23/22/9095\*\*](https://www.mdpi.com/1424-8220/23/22/9095)
- [\*\*https://www.mdpi.com/2071-1050/15/3/2358\*\*](https://www.mdpi.com/2071-1050/15/3/2358)
- [\*\*https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9863726/\*\*](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9863726/)
- [\*\*https://www.mdpi.com/2075-5309/13/8/2093#:~:text=The%20abundance%20of%20digital%20image,with%20safety%20protocols%20%5B36%5D\*\*](https://www.mdpi.com/2075-5309/13/8/2093#:~:text=The%20abundance%20of%20digital%20image,with%20safety%20protocols%20%5B36%5D)

# THANK YOU!