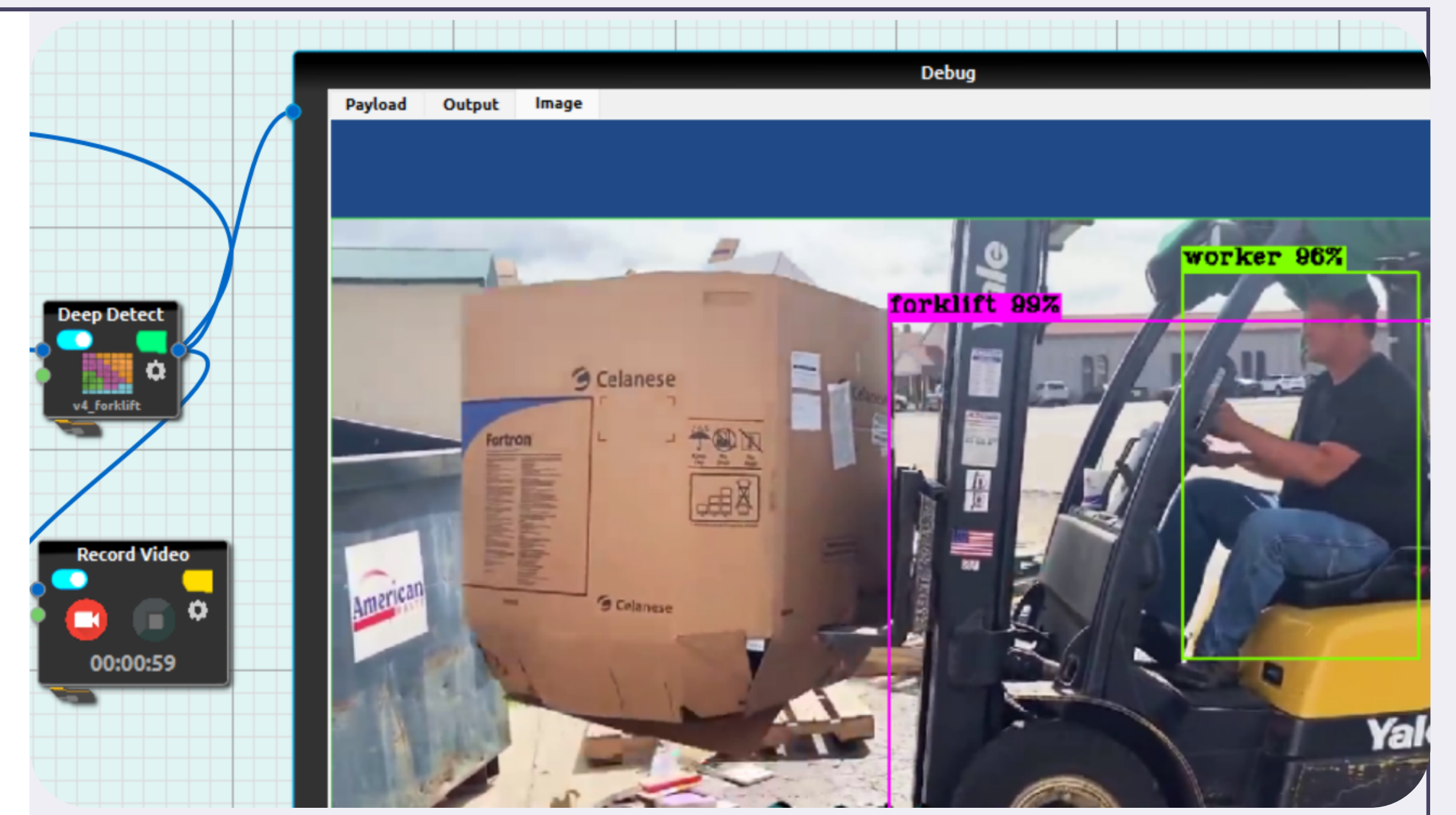


# Real-time detection of unsafe forklift behavior in the warehouse based on Deep Learning and Pose Estimation

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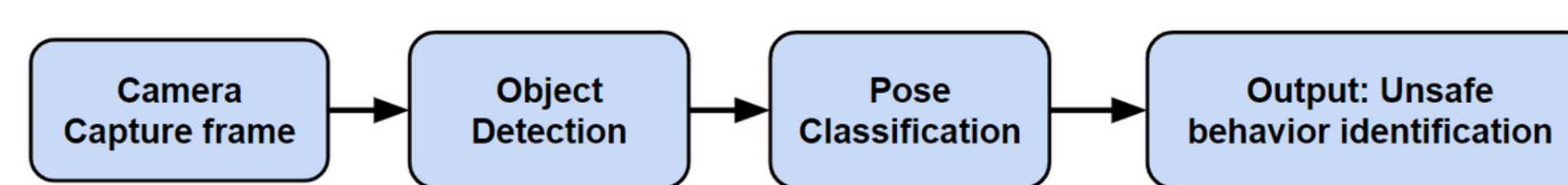
## Problem Statement

Identify unsafe forklift behavior in the warehouse while running through the intersection.

## Project Overview

This research will focus on forklifts operating and moving within the warehouse. Also, to help forklift operators prevent an accident caused by unsafe behavior and provide better instruction following Hiyari Hatto protocol.

## Program flowchart



System overview: First, the input videos are from the camera. Second, the classification object forms the video. Third, estimation of human poses or actions. Finally, Estimated an unsafe behavior.

## Objective

- Ensure the forklift operator follows the Hiyari Hatto protocol and makes correct gestures and visual checks
- An application for identifying unsafe behavior of forklift operator in the warehouse
- The dataset and labeling of identifying Hiyari Hatto protocol
- To prevent an accident that might occur in the warehouse during forklift operation
- Improve instruction on better safety measures

## Activation Procedure

**Step 1**  
• Collecting dataset inside the warehouse

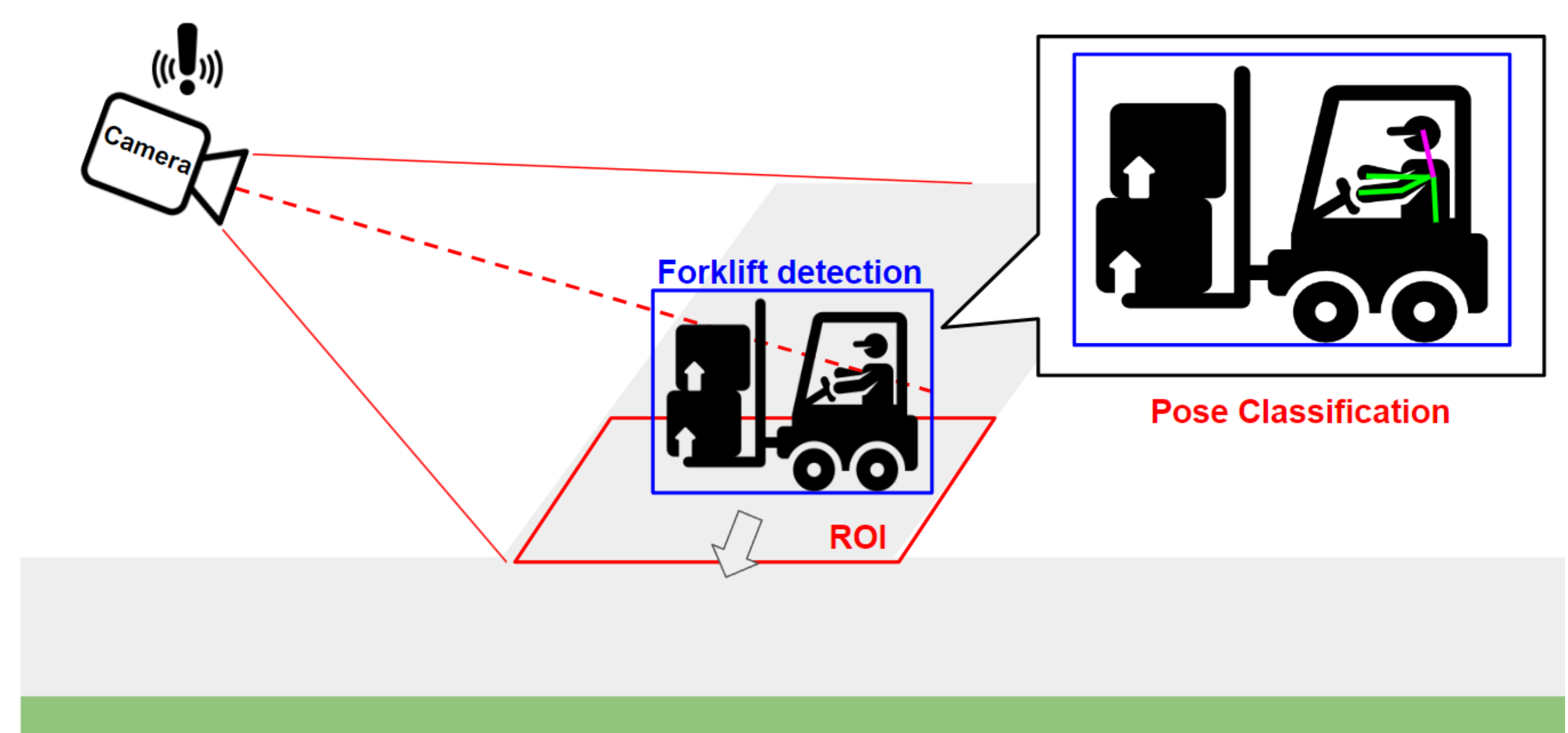
**Step 2**  
• Extract the body keypoint

**Step 3**  
• Training the forklift detection model

**Step 4**  
• Training the pose estimation model

**Step 5**  
• Model Evaluation

## Project Scenario



The camera was installed inside the warehouse to capture forklift activity while it passes through the intersection. Real-time images are fed via Wi-Fi to the AI station, which quickly detects and classifies any unsafe behavior of the forklift operator.

## Expect Outcomes

- Identify the Human body joints
- Estimate unsafe behavior following the hiyari-hatto protocol
- Design a Neural Network or Technique for custom hiyari-hatto pose classification
- Hiyari-hatto Pose Keypoint dataset
- Improve the better instruction for safety measures

## Conclusion

In summary, this research will provide better instruction on operating and moving within the warehouse on a forklift through the intersection. However, the research still has some overcoming issues on the forklift operator dataset. We want to decrease the number of accidents and ensure that the forklift, operator, and warehouse staff follow proper Hiyari hatto protocol and make correct gestures and visual checks while operating.

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## Pose Estimation from Generated dataset

