

MICHIGAN STATE

UNIVERSITY

Beta Presentation

Trailer Safety Using Computer Vision

The Capstone Experience

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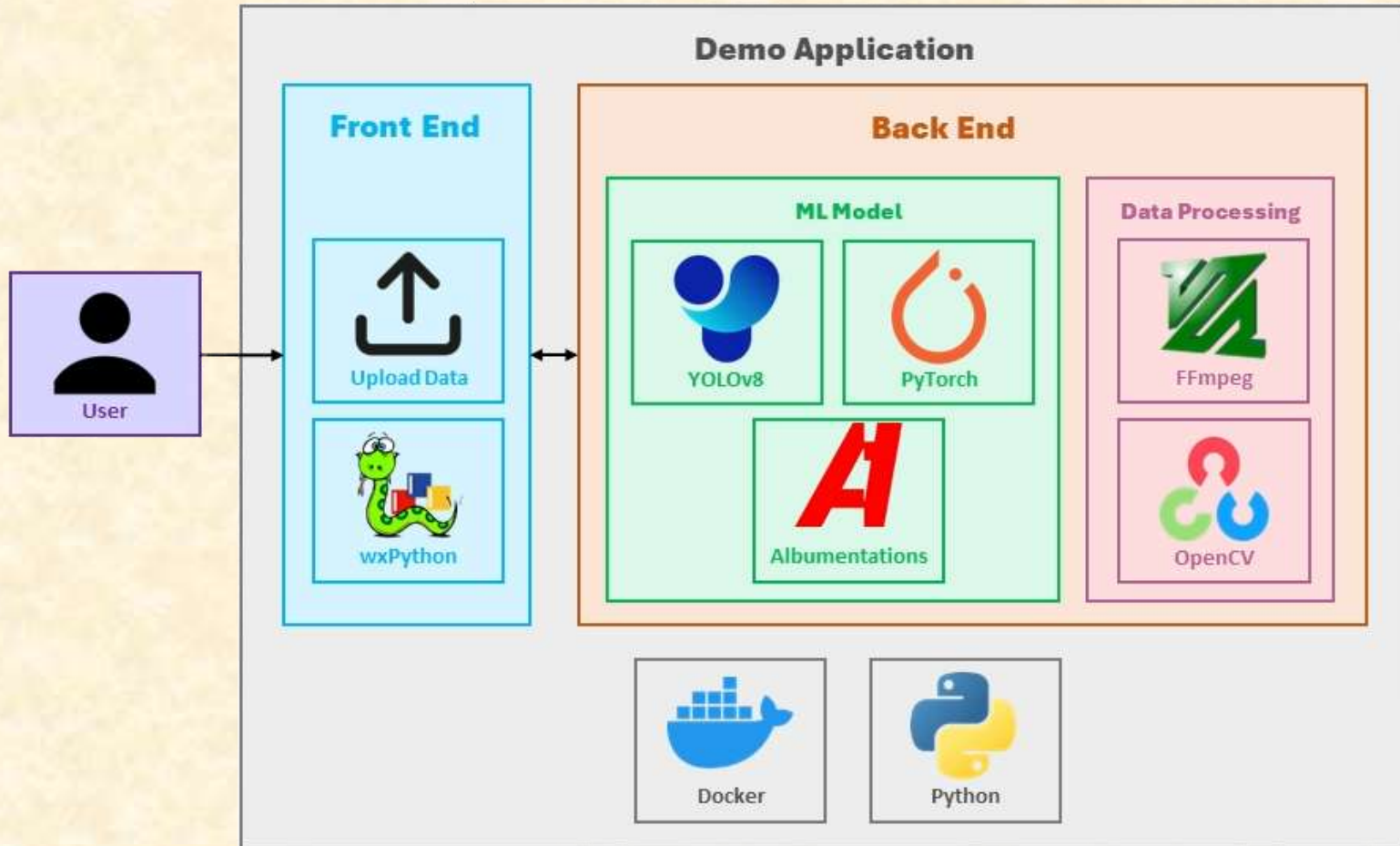
*From Students...
...to Professionals*

Project Overview

- Bosch: leading and worldwide German supplier in automotive equipment and services.
- Ensures vehicle has properly hitched trailer.
- Prevents:
 - Injuries
 - Vehicle Accidents
 - Vehicle Damages
- Analyzes image or video for component identification.
- Assigns pass/fail score based on checklist.



System Architecture



Incomplete Hitch

chain_detached 0.93
coupler 0.95
chain_detached 0.88
latch_closed 0.88
pin_closed 0.88

<u>Chains Connected</u>	FAIL
<u>Hitch Connected</u>	PASS
<u>Tongue Locked</u>	PASS
<u>Cable Connected</u>	---

INCOMPLETE

This Frame: 1
Total Frames: 1

Previous Next



Complete Hitch

The screenshot displays a video analysis window titled "Bosch" with a menu bar (File, Video Actions, Live Video, Help, About) and icons for zoom and download. The main video frame shows a top-down view of a hitch assembly with several colored bounding boxes and labels: "wire_attached 0.93" (orange), "chain_attached 0.86" (red), "coupler 0.90" (green), "chain_attached 0.78" (red), "latch_closed 0.88" (cyan), and "pin_closed 0.88" (green). To the right of the video frame is a list of detection results, each with a green "PASS" button:

- Chains Connected **PASS**
- Hitch Connected **PASS**
- Tongue Locked **PASS**
- Cable Connected **PASS**

Below the list, a large green box contains the word "COMPLETE". Underneath, it shows "This Frame: 1" and "Total Frames: 1". At the bottom of the interface, there are navigation buttons: "Previous" on the left, a central row of five thumbnails (the third one showing the current frame), and "Next" on the right. Each thumbnail features the Bosch logo.



Augmented Incomplete Hitch



The screenshot displays a video analysis interface for a hitch assembly. The main video frame shows a close-up of the hitch components with several bounding boxes and confidence scores:

- wire_attached 0.94
- latch_closed 0.93
- coupler 0.94
- latch_closed 0.84
- pin_closed 0.88

On the right side, a list of tasks and their completion status is shown:

- Chains Connected **FAIL**
- Hitch Connected **PASS**
- Tongue Locked **PASS**
- Cable Connected **PASS**

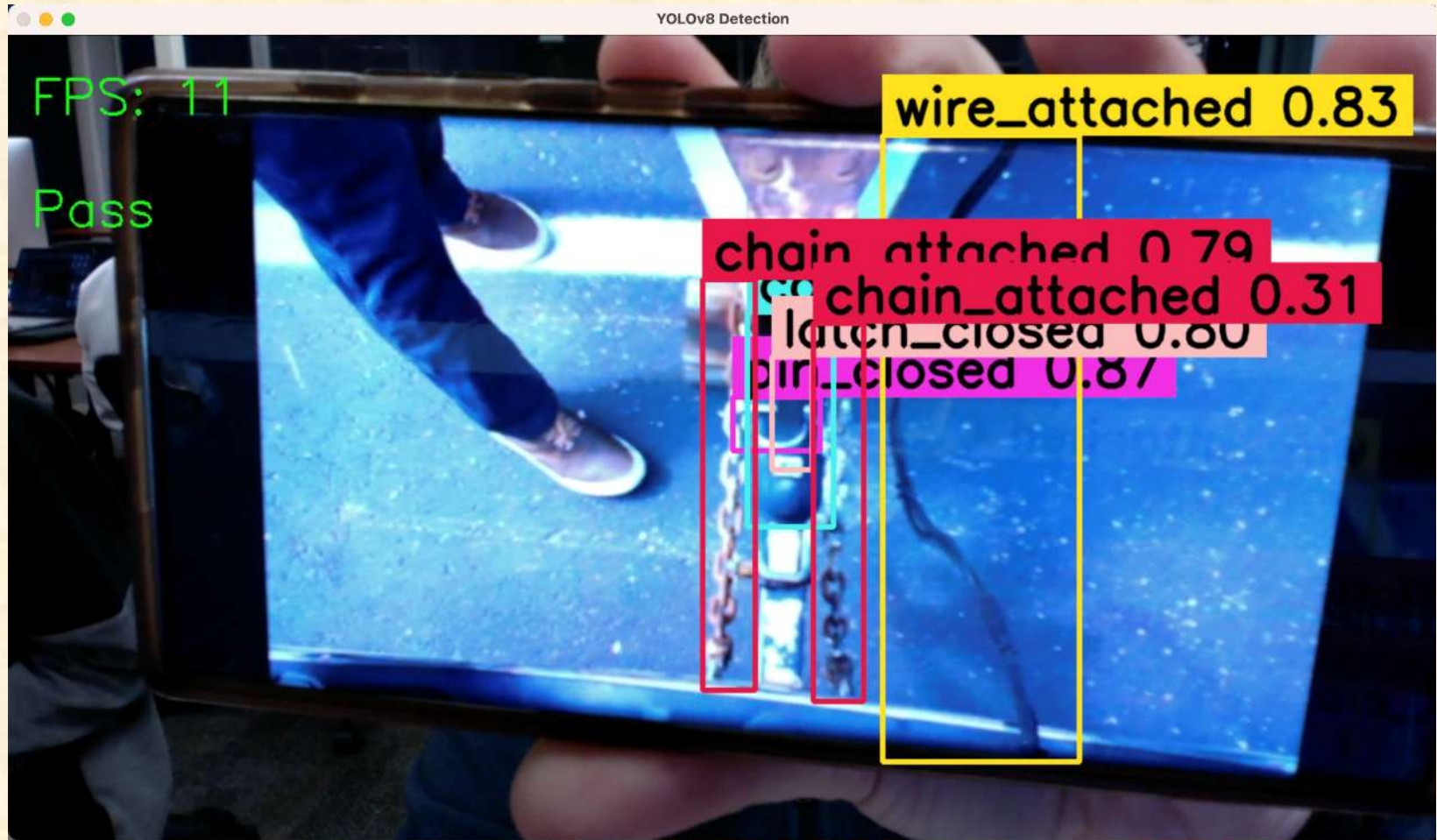
A large red box labeled **INCOMPLETE** is positioned below the task list. Below this, the following text is displayed:

This Frame: 1
Total Frames: 1

At the bottom of the interface, there are navigation buttons labeled "Previous" and "Next", and a sequence of five thumbnail images. The first, third, fourth, and fifth thumbnails feature the Bosch logo and a stylized road graphic, while the second thumbnail shows a close-up of the hitch assembly.



Live Video



What's left to do?

- Stretch Goals
 - Live Video Analysis
 - Kubernetes/Scalability
 - Video Download
 - Metrics Plot Display
 - Progress Bars in UI
- Other Tasks
 - Model Tuning:
 - Adjust Confidence Values
 - Cross-Validation Training
 - UI Light Cleanup



Questions?

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