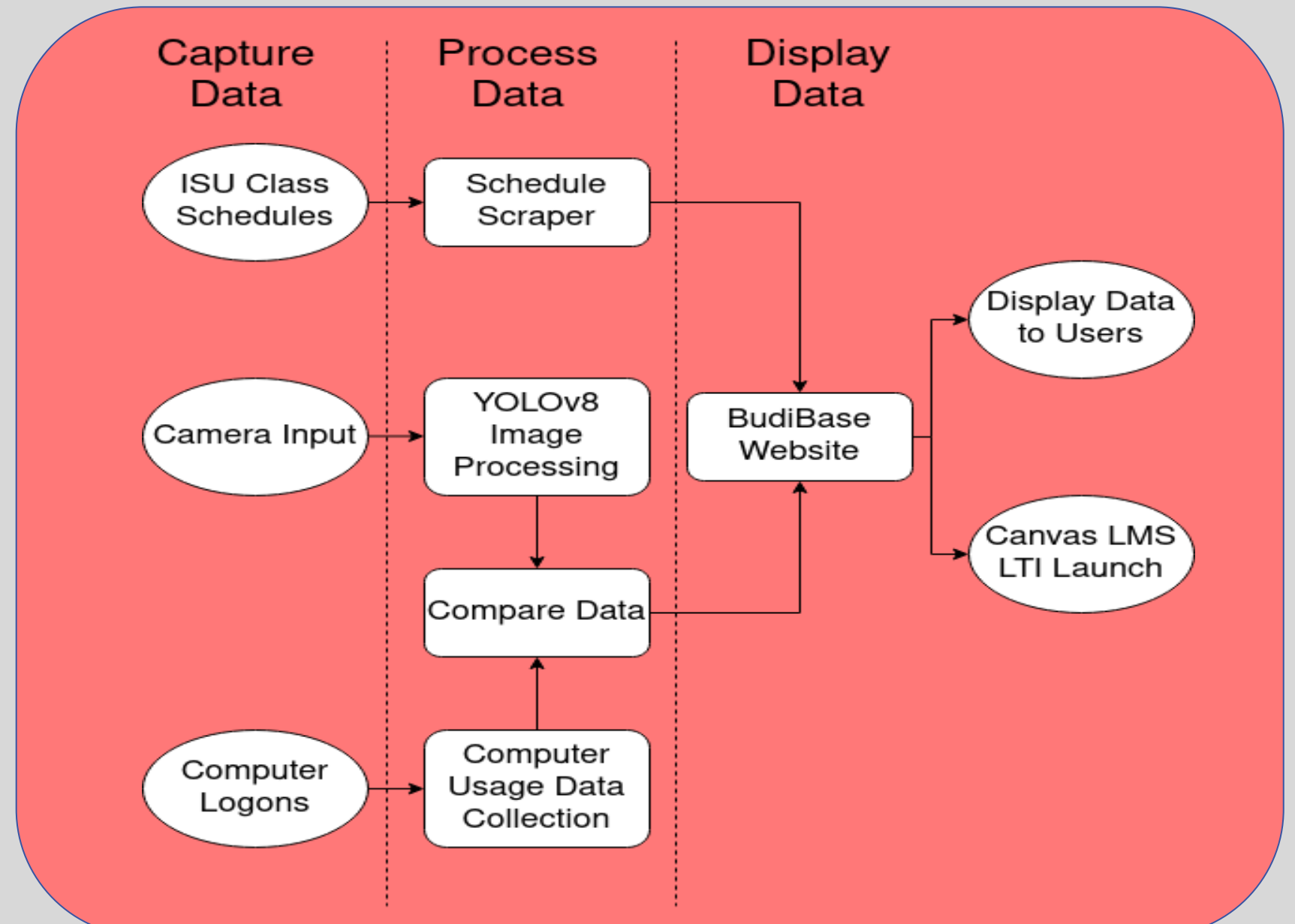


CLARE: Lab Availability Tracker

SDDec23-04

Introduction

- Engineering students want a way to plan ahead
- Iowa State does not have a convenient way to remotely determine how busy a lab is
- CLARE provides a solution utilizing computer usage tracking and computer vision



A website for engineering students



Detailed view for a specific lab on the CLARE website

Requirements

- Achieve 90% accuracy
- Display data on a website
- Integrate with Canvas
- Cost less than ISU's current solution

Technical Details

Website

- Built on BudiBase a low-code solution
- MySQL database
- Custom Svelte schedule UI
- Automated scripts to update schedule and historical usage

Image Processing

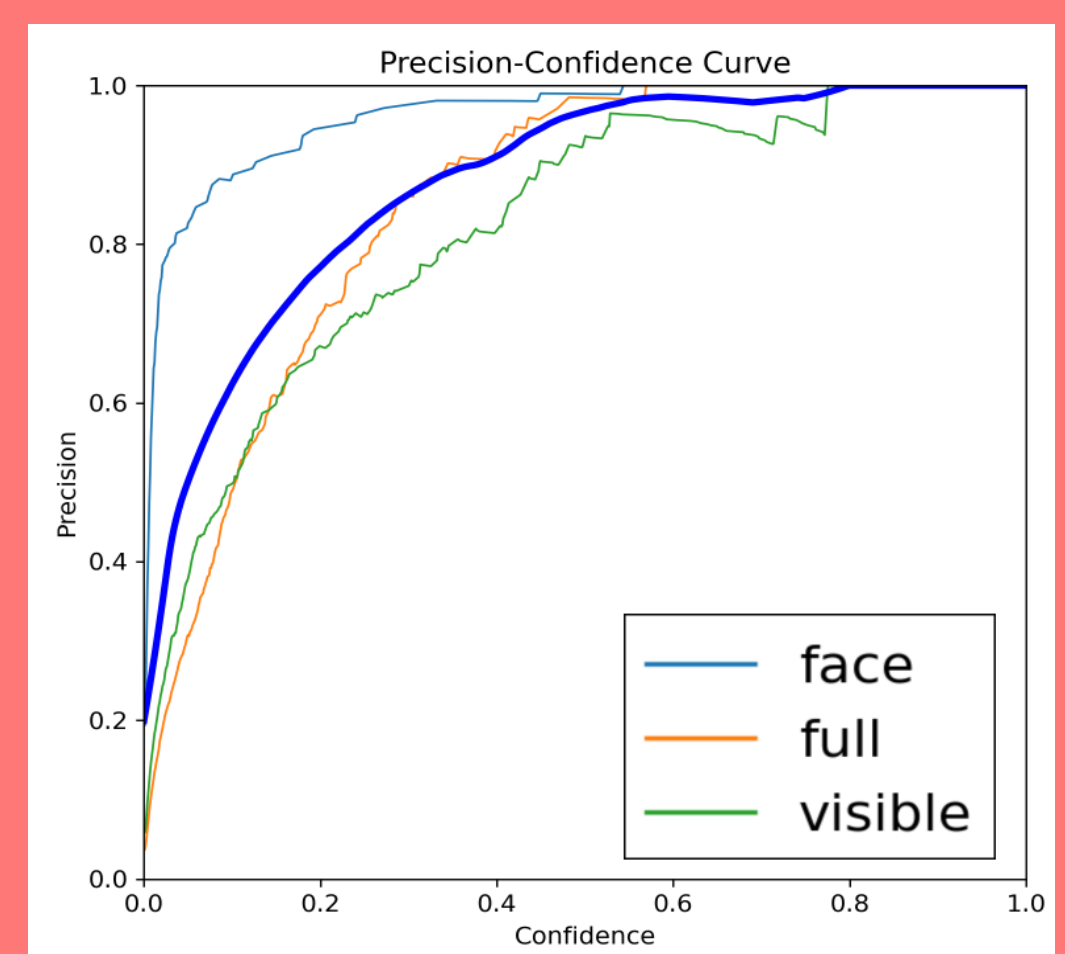
- YOLOv8 machine learning algorithm
- Built on PyTorch framework
- Images retrieved using webcam in lab room
- Determines lab occupancy using object detection
- Images are destroyed after processing

Desktop login Tracking

- Compatible with Windows & Linux
- Uses iNotify and Windows Task Scheduler
- Tracks logins/logoffs - Not users

Testing

- Automation and data processing run on short scripts
- Each script is tested individually in a unit test fashion with various inputs
- The more complex image processing and schedule parser are tested as a whole and checked that BudiBase was updated with the expected data



Testing results for ML model trained on "CrowdHuman" dataset

Resources

- Camera: \$70, unused one provided by ETG
- Server resources for website hosting
- BudiBase: Free tier
- Nvidia GPU (for ML): \$500

Engineering Standards

- IEEE 1016-2009 (Software Design Description)
- IEEE 23026-2015 (Website lifecycle)
- ISO/IEC/IEEE 29119 (1 - 4, Software testing)