Content & Structure

The presentation structure is flexible, as long as you sufficiently cover the necessary content in a way that the audience (your classmates) can understand. You are welcome to be as creative as you want, and to make your presentation fun!

The main content that you should cover:

- **Problem (<0.5 min):** What is the problem that you are trying to solve? Why is it important? Why are you interested in solving this problem?
- **Demonstration (at least 1.0 min):** You will need to show a demonstration of your project evaluated on new, never before seen data. Try to be creative and engaging with the demonstration. For example, if you are doing an image classification task, you could record a video (or find one on YouTube) and feed the frames of the video to your model to make predictions. Process the result and play the video back as your demonstration.

- **Results (<1.0min):** Provide examples of quantitative and qualitative results. How are you measuring and comparing performance? How well did your model perform? What are some sample predictions generated by your model? Does it make sense?
- **End-to-End Pipeline (<0.5min):** Briefly describe your approach to solving the problem from raw input to the final prediction. Try to include one or two figures that summarize your input data (train/val split), data processing (if any), architecture (i.e. ResNet, LSTM, U-Net, etc.), outputs (binary, multiclass, etc.), and anything else that is relevant.
- **Discussion (at least 2.0 min):** What did you learn from doing this project? Focus on things that you would have liked to know before taking on this project, or things that your classmates may benefit from knowing before they take on a similar project. This could include computational challenges, training techniques, challenges with reproducing published results, or any tricks you learned by working on this project.

PPE DETECTION

Feature YOLOV11 & MiDas

By Tianli Xu, Yuetian Chen, Yiming yao, Weiran Wang

PROBLEM

What

- Inadequate & Inapropriate use of Personal Protective Equipment (PPE).
- Prevent accidents & Enhance overall site safety.

Why

- Construction is one of the largest sectors in Canada.
- $350 billion annual expenditure (~7.3 of GDP).
- 1.4 million workers (~7.0% of workforce).
- “Fatal Four”: Fall, Struck by an object, Electrocutions, and Caught-In/Between.

How

- PPE Detection.
- PPE Compliance Verification.
- Hazard Zone Detection and Proximity Alert System.

DEMONSTRATION

RESULTS--YOLO & COMPLIANCE CHECK

YOLO

What version of YOLO?
What data, size, classes?
Precision, Recall, MAP50, MAP50-95
train loss & val loss
test result

Compliance Check (Helmet & Vest)

- Self-designed rule-based algorithm.
- Utilizing bounding box information generated by the YOLO model.
- Calculating Overlaping Ratio (Between person and PPE items bounding box)
- If Overlaping Ratio > specified threshold: **Compliance**
- Otherwise: **Not Compliance**

RESULTS--MIDAS & CALIBRATION

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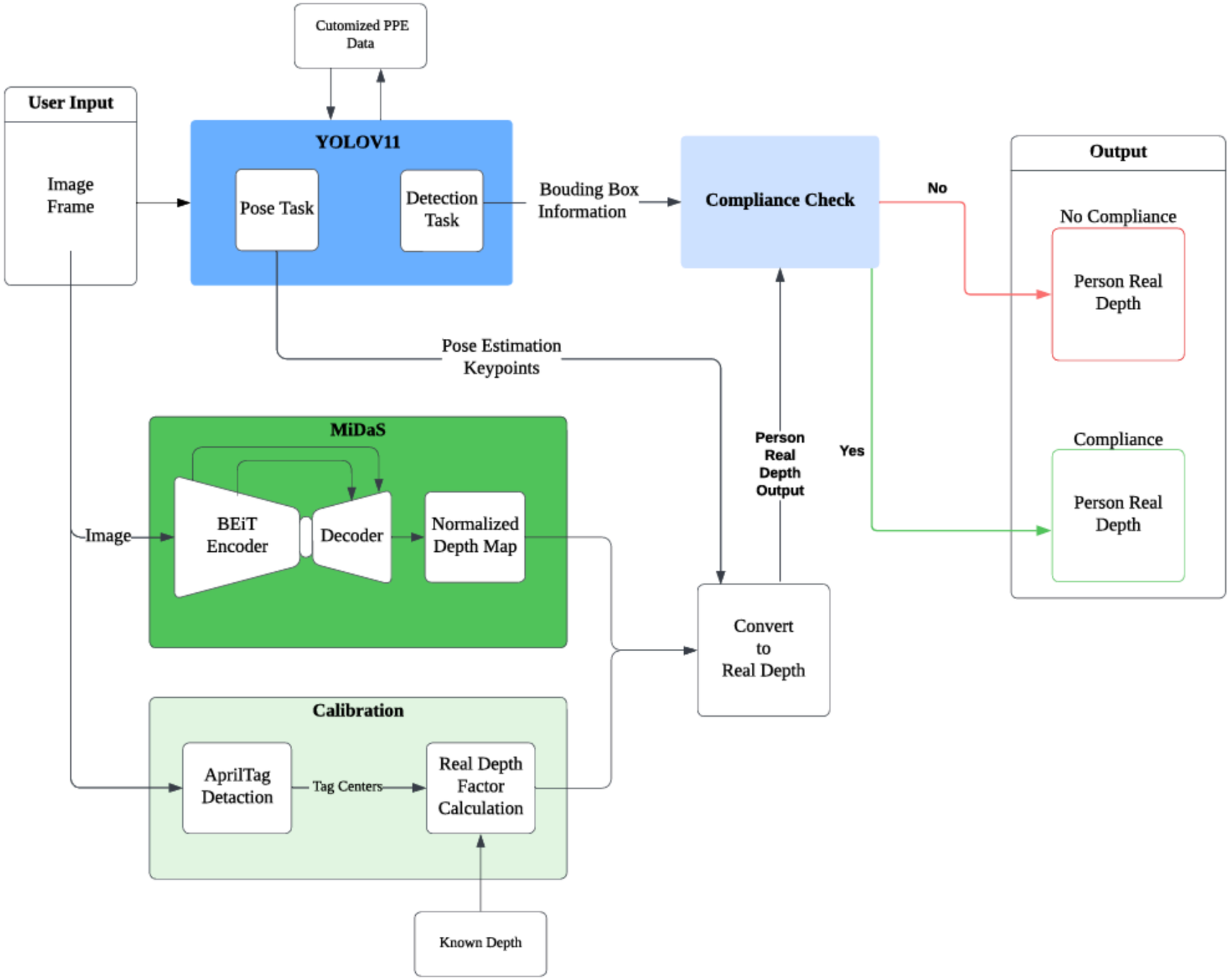
END-TO-END PIPLINE



DISCUSSION

01

“Catastrophic Forgetting”, neural network forgets previously learned information upon being trained on new data.
-- Freeze the backbone layers.
-- Mix training data or Human label.
-- Multiple YOLO models.
-- Machine learning algorithm as classifier.
-- Self-designed algorithm. (What we used)

02

YOLOv11 multiple function:
Object detection
pose detection
segmentation

03

train with different yolo model size

CONTINUE...

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THANK YOU