Masked Enforcer

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6261-ITAI-1378-Comp Vision-Artificial

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Problem & Motivation

- Many environments need mask compliance.
- Manual monitoring is inconsistent.
- Automated AI detection improves safety and reliability.

Solution Overview

- AI system that detects mask use.
- Recognizes three categories:

-Mask On 😷

-No Mask 🚫

-Mask Incorrect ⚠️

- Works on images or video.

Technical Approach (I): How the AI Works

- Finds faces in an image.
- Checks for presence of a mask.
- Determines if mask is worn correctly.

Technical Approach (II): Training

- Dataset split into Train/Validation/Test.
- Model learns mask detection through repeated training cycles.
- More training improves accuracy but takes longer.

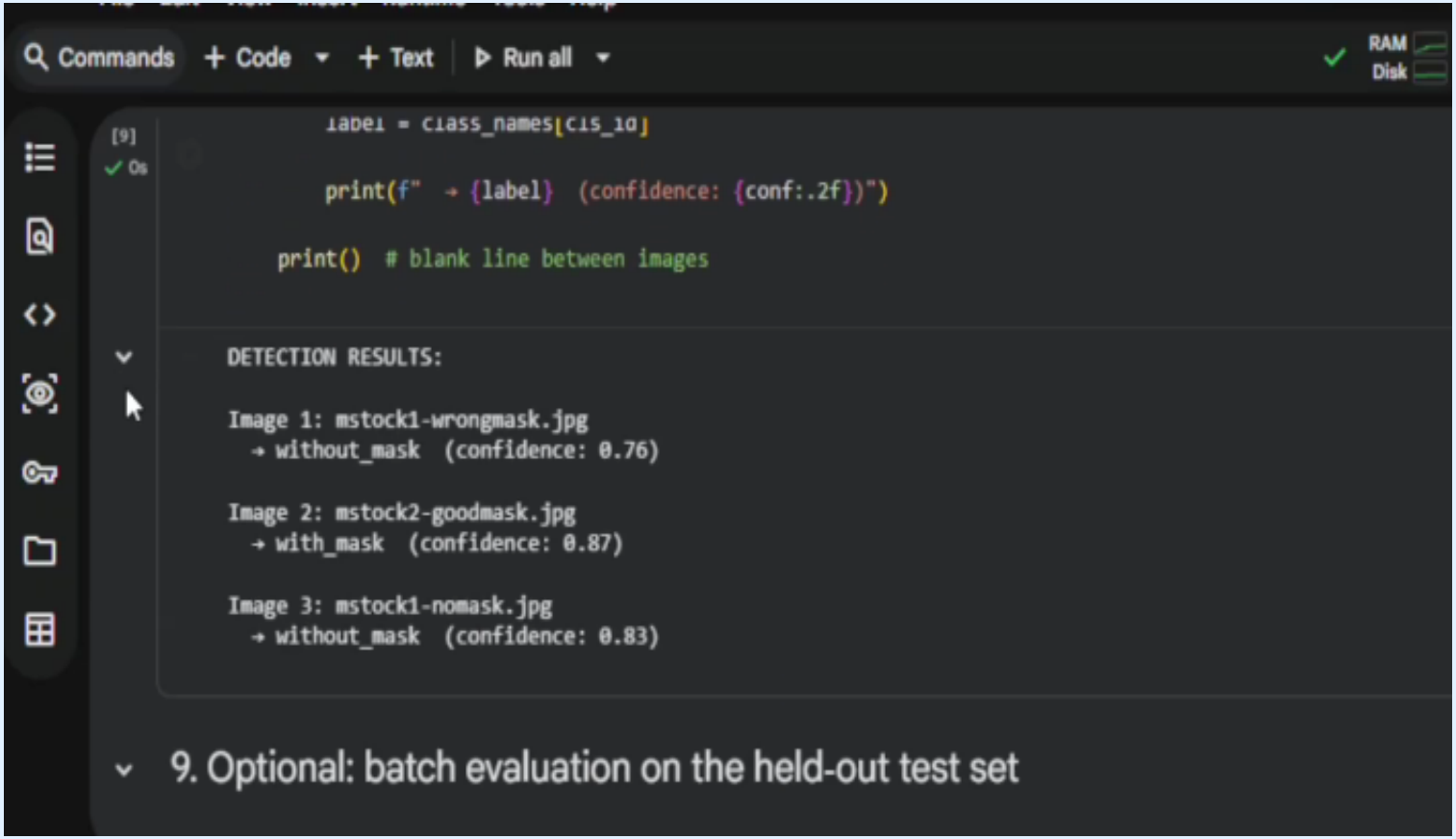
Dataset & Preprocessing

- Public mask dataset used.
- Images converted to YOLO format.
- Faces labeled into three categories.
- Data prepared for training.

LIVE DEMO

- Watch the system work in real time:
- https://youtu.be/IpvkmssNUD8

Results (I)

- 
Commands
+ Code
+ Text
Run all
RAM
Disk
[9]
0s
label = class_names[cls_id]
print(f" → {label} (confidence: {conf:.2f})")
print() # blank line between images
DETECTION RESULTS:
Image 1: mstock1-wrongmask.jpg
→ without_mask (confidence: 0.76)
Image 2: mstock2-goodmask.jpg
→ with_mask (confidence: 0.87)
Image 3: mstock1-nomask.jpg
→ without_mask (confidence: 0.83)
9. Optional: batch evaluation on the held-out test set

Results (II)

- Test 1

DETECTION RESULTS:

Image 1: wstock1-nomask (1).jpeg
→ without_mask (confidence: 0.89)

Image 2: wstock3-wrongmask (1).jpg
→ without_mask (confidence: 0.89)

Image 3: mastock2-goodmask (1).png
→ with_mask (confidence: 0.90)

Key Learnings

- Limited dataset made training harder.
- Incorrect mask class was difficult for the model.
- GPU greatly speeds up training.
- Learned end-to-end AI workflow.

Future Work

- Add more training data.
- Improve incorrect-mask detection.
- Deploy real-time video detector.
- Test larger YOLO versions.

Acknowledgments

- Thanks to the professor Patricia and classmates.
- Tools used: YOLOv8, Kaggle, Google Colab.
- AI assistants for debugging and explanation.