Route GUARD

Project 3

A PROBLEM WORTH SOLVING

PROBLEM

The popularity of electric scooters and similar small vehicles in Almaty has led to a sharp rise in accidents and unsafe riding behaviours.

In 2025 alone, for example, there were 79 recorded e-scooter accidents in Almaty between January and August.

The lack of rider discipline, increasing speed, and complicated urban conditions contribute to the risk of collisions, loss of control, and injuries.

So, a ban on scooter driving without helmets is on the horizon, but is the market ready?

Thus, we made 2 solutions:

Custom helmets/Company agreements

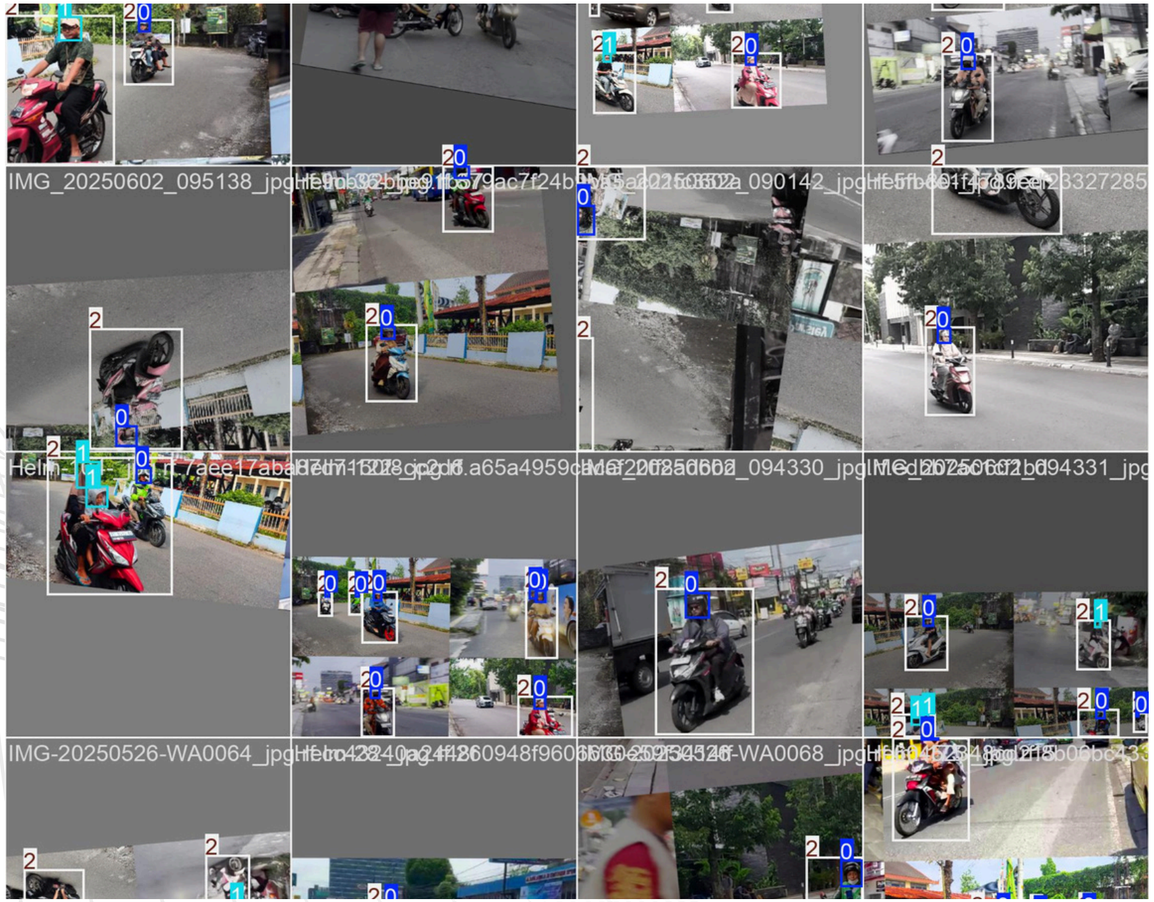
Computer vision software for detecting those, who drive without the helmet

HOW TO CATCH THOSE WHO DRIVE .... NOT SO SAFELY

05

TECHNICAL PART

HELMET DETECTION FOR RIDER SAFETY



Every year, thousands of road injuries happen because riders don’t wear helmets.
Our project uses computer vision to automatically detect whether a rider is wearing a helmet — in real time — using YOLO, a state-of-the-art cv model.

WORKFLOW

The system receives an image or video frame, runs YOLOv8-based detection, and identifies three classes — helmet, no-helmet, and riding. Results are then visualized on our Flask-based web interface.

06

YOLO MODEL TRAINING

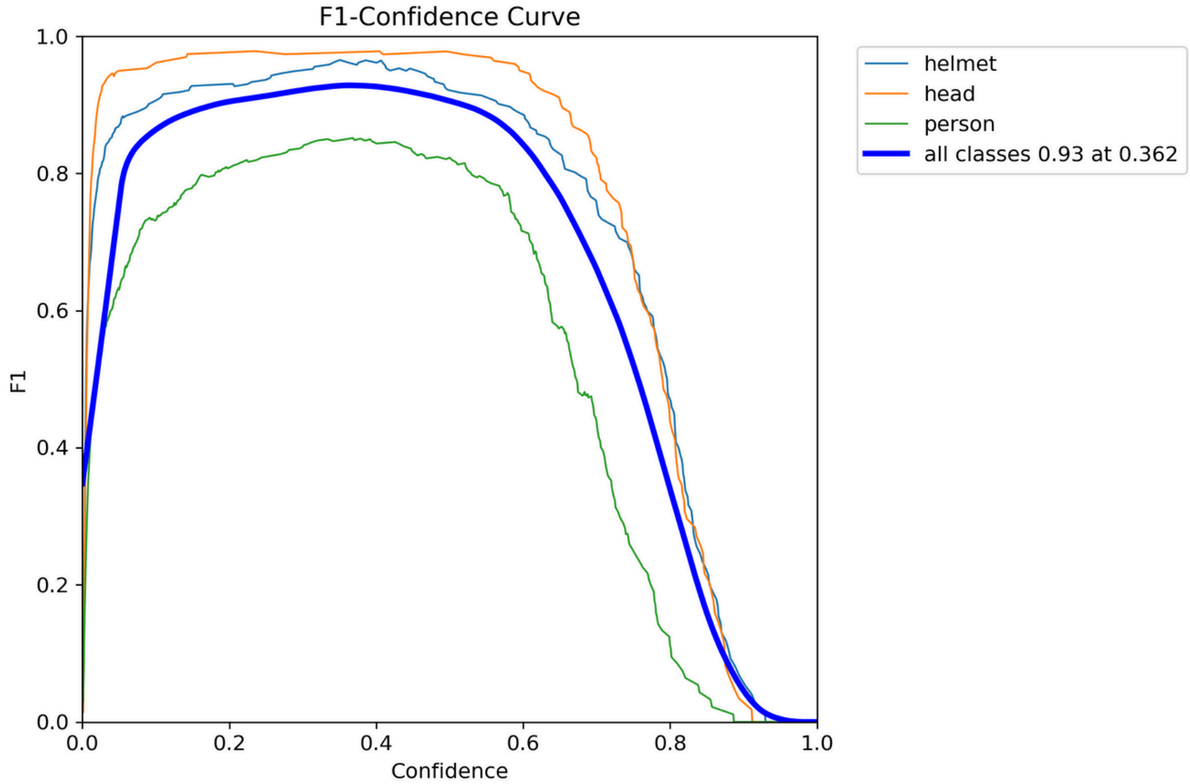
WE TRAINED OUR MODEL ON THE YOLO HELMET DATASET V2 (FROM KAGGLE), WHICH CONTAINS OVER 12,000 LABELED IMAGES ACROSS THREE CLASSES: HELM, NOHELM, AND RIDING.

THE DATASET WAS PREPROCESSED FOR YOLO FORMAT (IMAGES AND .TXT LABEL FILES PER IMAGE).

WE USED A YOLOV8M BACKBONE AND TRAINED FOR 120 EPOCHS.

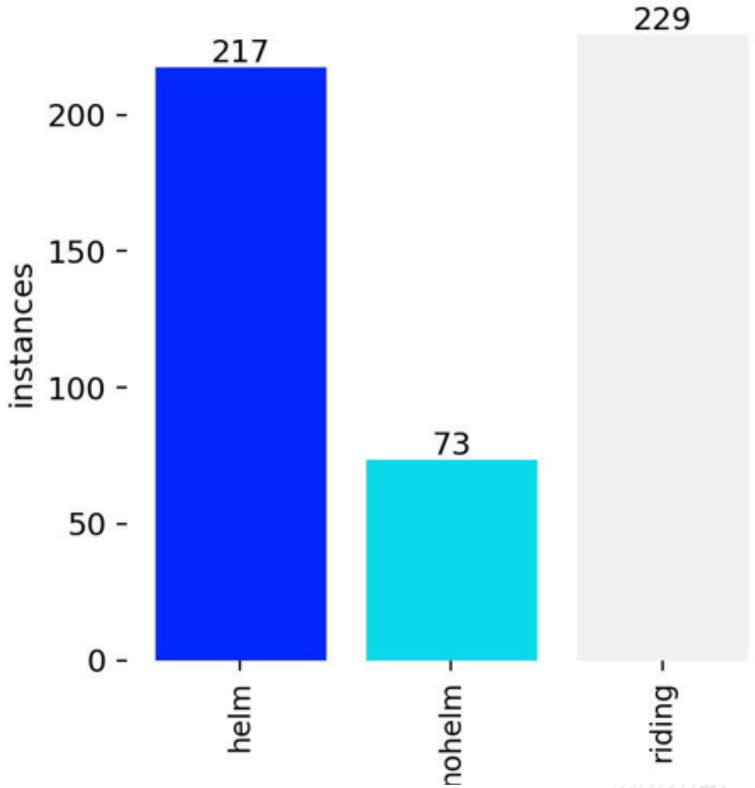
RESULTS

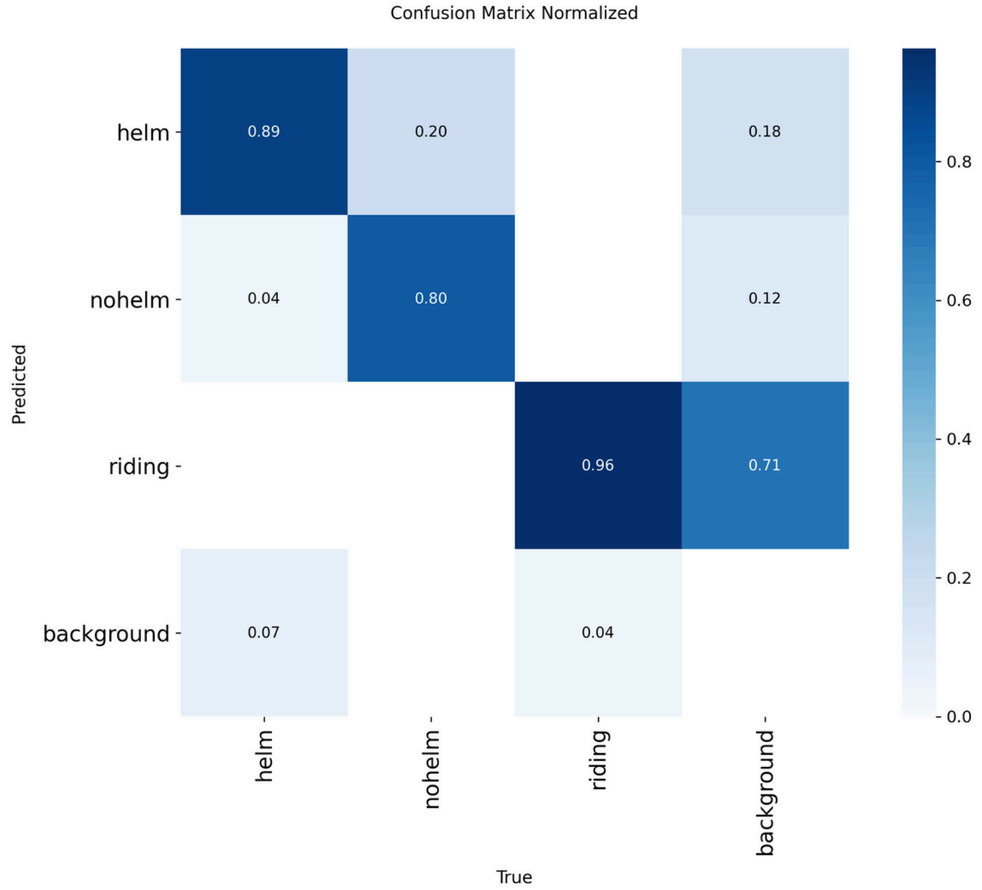
- Classes: 3 (helm, nohelm, riding)
- mAP@0.5: ~0.86
- Epochs - 70
- Batch size - 16



07

A BIT MORE STATS....





08

TIME FOR A DEMO

09

FUTURE

The model performs reliably in detecting riders and their helmet status under different conditions.

In the future, this can be extended to real-time video monitoring, alerting systems

PRODUCT IN ACTION

AN INSIDE LOOK AT HOW OUR PRODUCT WORKS AND WHAT SETS IT APART.

- Our helmets are equipped with sensors that record only the technical parameters necessary for the system to work, such as the fact the helmet is worn and the user's movement route during the ride.
- We do not collect any personal user data (name, phone number, specific device identifier, etc.).
- All the data is used exclusively during the ride to verify that the helmet is on and that the user is moving in a safe zone.
- After the ride ends, the information is automatically deleted from the server and the device. Thus, neither the route nor the behavior of a specific user is stored or can be retrieved.

TARGET AUDIENCE & ENGAGEMENT STRATEGY

WE SERVE A WIDE AUDIENCE OF ELECTRIC-SCOOTER RIDERS, OFFERING FEATURES THAT ATTRACT AND RETAIN THEM:

- THE SCOOTER WILL NOT START UNLESS THE HELMET IS WORN - ENFORCING SAFETY FROM THE BEGINNING.
- HELMETS INCLUDE INTEGRATED HOOKS SO USERS CAN ATTACH THEM AND KEEP THEIR HANDS FREE WHEN PARKING OR WALKING.
- HELMETS WILL BE CUSTOMIZABLE AND DISTINCTIVE - ALLOWING RIDERS TO EXPRESS STYLE AND STAND OUT FROM STANDARD HELMETS.
- AFTER CONTINUOUS USE FOR SET PERIODS (1 MONTH, 6 MONTHS, 12 MONTHS), USERS EARN BONUSES AND RIDE DISCOUNTS.

THANK *You!*