Longkangkumkum

RIDER DETECTION

BANGKOK'S SIDEWALKS - A DANGER ZONE

- **Bangkok sees a staggering 168,735 motorcycle-related accidents!**
- **Bangkok reports 915 motorcycle accidents on sidewalks annually.**

WHY CATEGORIZE RIDER ?

- **By categorizing riders, we can apply the right enforcement measures, holding companies accountable for delivery riders while ensuring fair penalties for general and motorcycle taxi riders.**

OVERVIEW

- Data Cleaning
- Data Augmentation
- Modeling
- Training Strategy

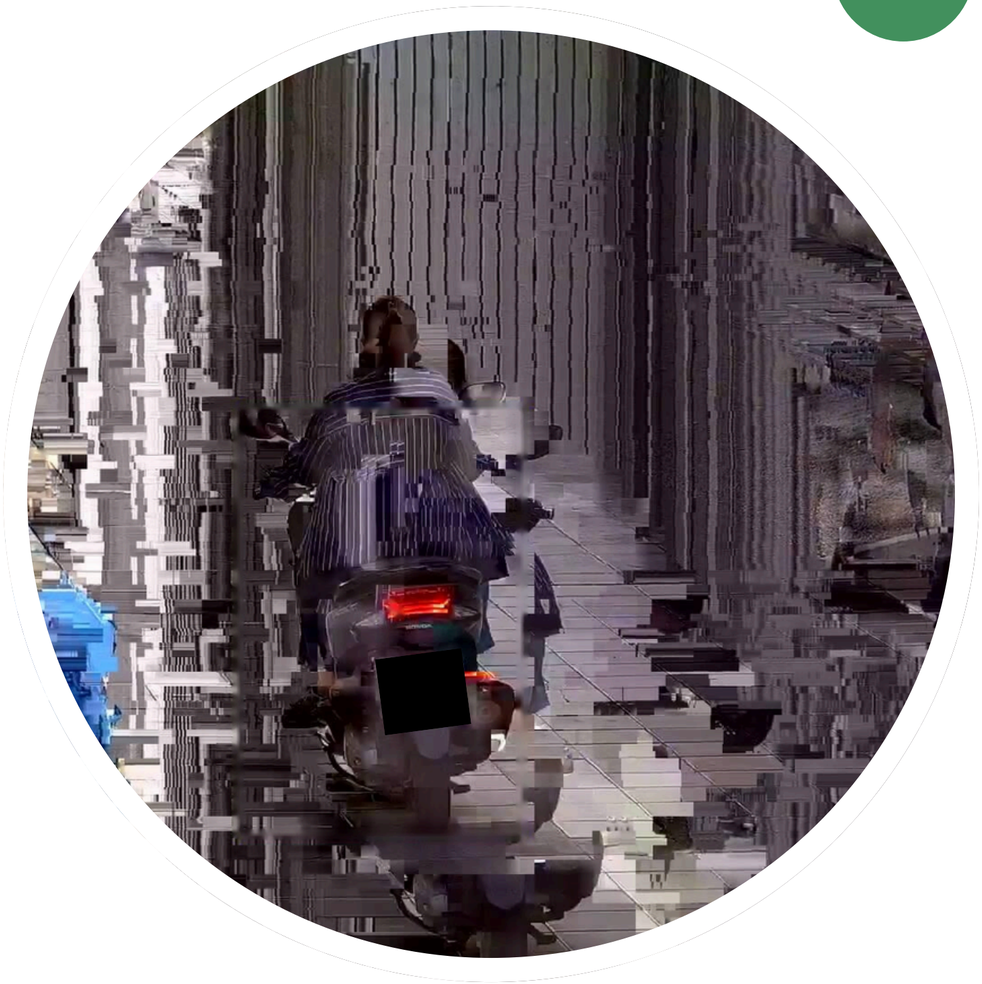
SOLUTIONS

How AI Detects and Penalizes Sidewalk Violators

Camera → **AI Detection** → **Rider Type** → **Penalty Applied**

Rider Type	First Violation	Repeat Offense	Max Penalty
Grab/Lineman	-5% daily earnings	+1% deduction per violation	Permanent ban
motorcycle Taxi	Warning & record	Mandatory training after 5 offenses	License suspension
Normal People	Auto fine via SMS	Increased fine each time	Vehicle registration hold

CHALLENGES IN MODEL TRAINING



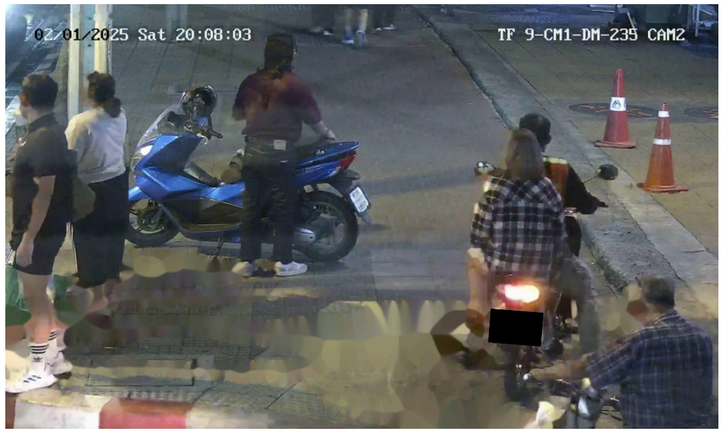
Blurry Camera Footage

One of the biggest challenges in AI model training is low-quality CCTV footage. Factors like poor lighting, motion blur, and bad angles make it difficult for AI to read license plates correctly and classify riders with high accuracy

Data Cleaning

Classify the images correctly first

Remove corrupted images as they cannot be accurately detected.



Remove ambigious images where the motorcycle rider cannot be clearly detected.

Augmented Image 1

Augmented Image 2

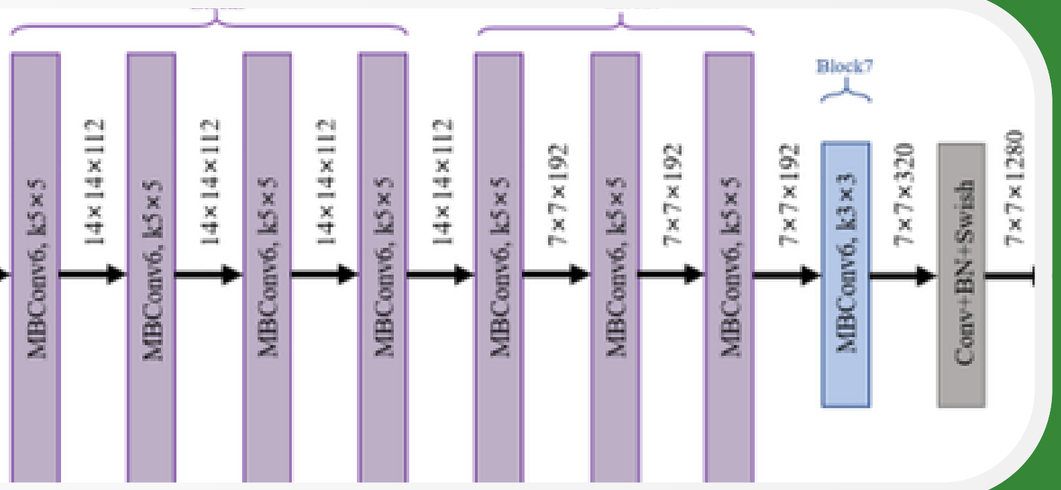
Augmented Image 3

Augmented Image 4

Augmented Image 5

Data Augmentation

- Resize images to 384x384
- Random rotation up to 20 degrees
- Horizontal flip with 50% chance
- Color adjustments (brightness, contrast, saturation, hue)
- Random cropping
- Normalize pixel values



Our Model

Using EfficientNet B1

- More advanced than ResNet (Uses GAP, better efficiency)
- Simplest version (B1) to avoid overcomplication on small dataset
- Balances performance and computational efficiency

Model Training Strategy

K-Fold Cross Validation & Stacking

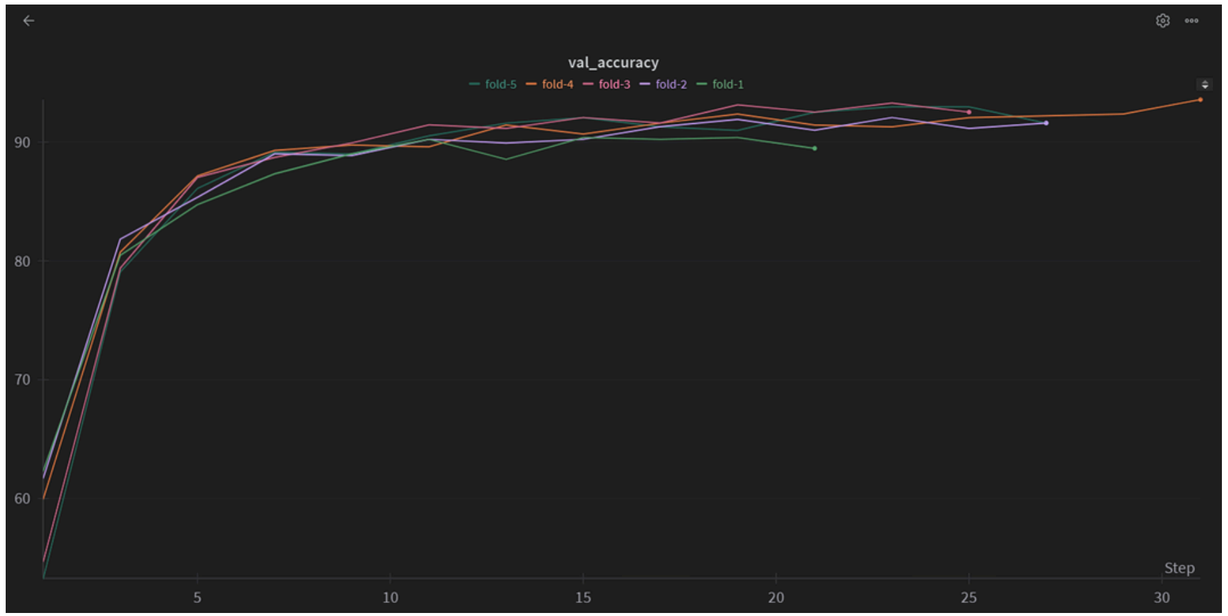
- Why?
  - Small dataset K-Fold ensures robustness
  - Stacking with averaging → Improves generalization
- K-Fold Approach:
  - Train multiple models on different folds
  - Average predictions for final output

```
# Load datasets
BATCH_SIZE = 32
train_dataset = ImageDataset(root_dir=
test_dataset = ImageDataset(root_dir=t

# --- Hyperparameters ---
LEARNING_RATE = 1e-5
MAX_EPOCHS = 20
PATIENCE = 3
K_FOLDS = 5
criterion = nn.CrossEntropyLoss()
ETA_MIN = 1e-6
```

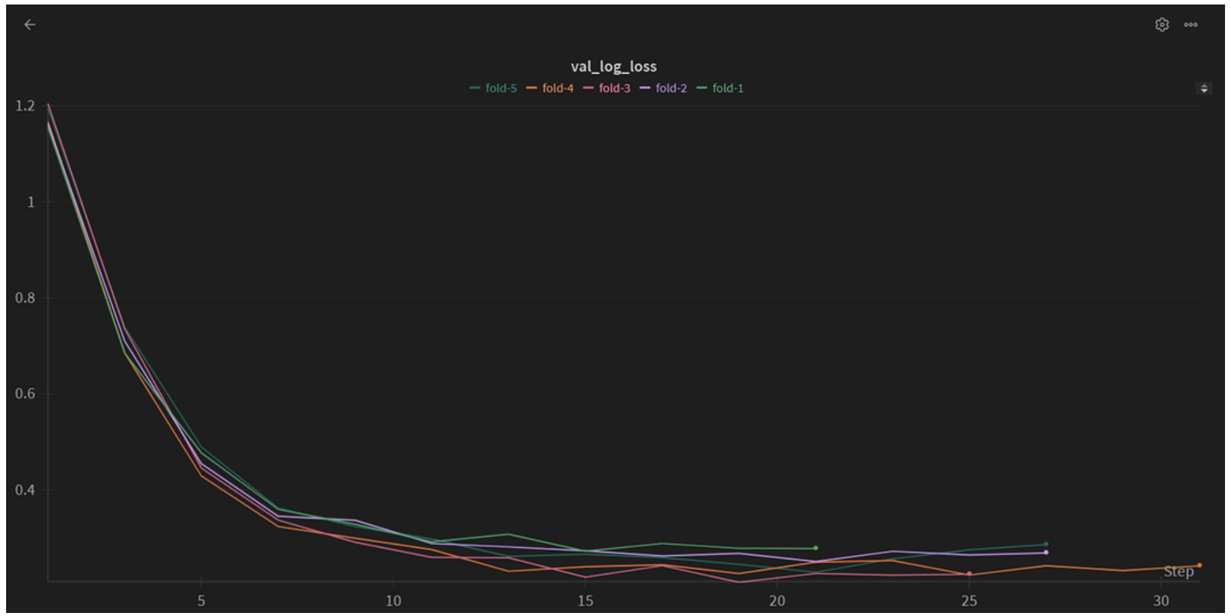
PERFORMANCE

ACCURACY



- ~ 0.90

LOG LOSS



~ 0.25