ROAD DAMAGE COST ESTIMATION MODELS

This project uses two cost estimation models to estimate the repair cost of potholes, cracks, and other road damages detected by the YOLOv8m deep learning model.

MODEL 2 – ROAD TYPE BASED REPAIR COST ESTIMATION

This model assumes that different road types have different repair costs:

1. ASPHALT ROAD COST:
   Rate = 500 per m²

2. CONCRETE ROAD COST:
   Rate = 800 per m²

Damage Area (m²) is computed from bounding box detection:

$$Area\_m^2 = Pixel\_Area \times 0.000001$$

Estimated Cost:

$$Cost = Area\_m^2 \times Rate$$

MODEL 3 – PWD STANDARD COST ESTIMATION MODEL

PWD (Public Works Department) estimation includes:

1. MATERIAL COST (bitumen mix / premix):
   350 per m²

2. LABOR COST:
   200 per m²

3. MACHINERY COST:
   150 per m²

4. OVERHEAD/TRANSPORTATION:
   100 per m²

Total Rate:

$$\text{Total Rate} = 350 + 200 + 150 + 100 = 800 \text{ per } m^2$$

Estimated Cost:

$$Cost = Area\_m^2 \times 800$$

SUMMARY OF COST MODELS

Model	Basis	Formula
Model 2	Road Type (Asphalt/Concrete)	Area × (500 or 800)
Model 3	PWD Standard (Material + Labor + Machinery + Overhead)	Area × 800

USAGE IN STREAMLIT APPLICATION

- User uploads an image or video.
- The system detects road damages using YOLOv8m.
- The total damaged area is computed.
- User selects "Model 2" or "Model 3".
- The app displays estimated repair cost.

This document explains the cost formulas for academic and project documentation.