



AI-Based Car Accident Detection and Notification System



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Team Caliber



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Model Architect

Did you know that?

13%

of motor vehicle crash fatalities could be prevented by reducing emergency response times to under 7 minutes.

7.9%

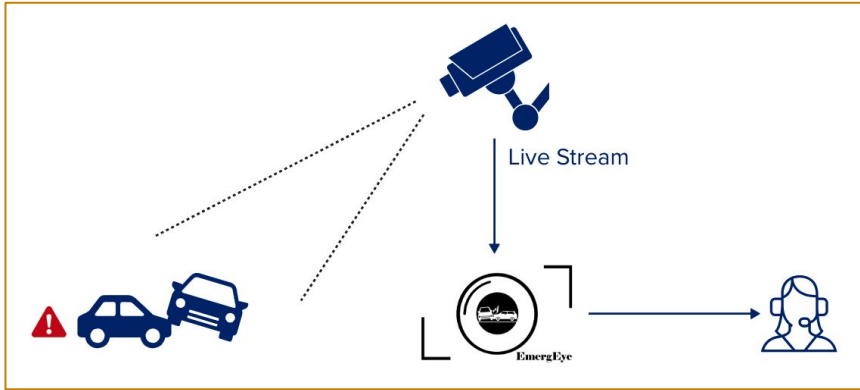
increase in pedestrian survival time can be achieved by reducing notification time by 9%.

Problem

Current reliance on witnesses delays response, with accidents often going **unreported for critical minutes** especially in low-traffic or poorly monitored areas.

Traditional detection methods also **lack accuracy** on accident severity, further delaying medical aid and lowering survival rates.

Solution



- Short latency - end-to-end 42 sec
- Standardized & Informative notification message

Monitors Live Stream Traffic Videos



Detects Severe Accidents



Sends Immediate Notifications to 911



**Assisting responders in SAVING
LIVES**

EmergEye (Intro Video)



Dataset Overview

Video Example - Severe

What makes it severe?

Car/Object is fired/flipped/shattered

Video Example - Non-Severe

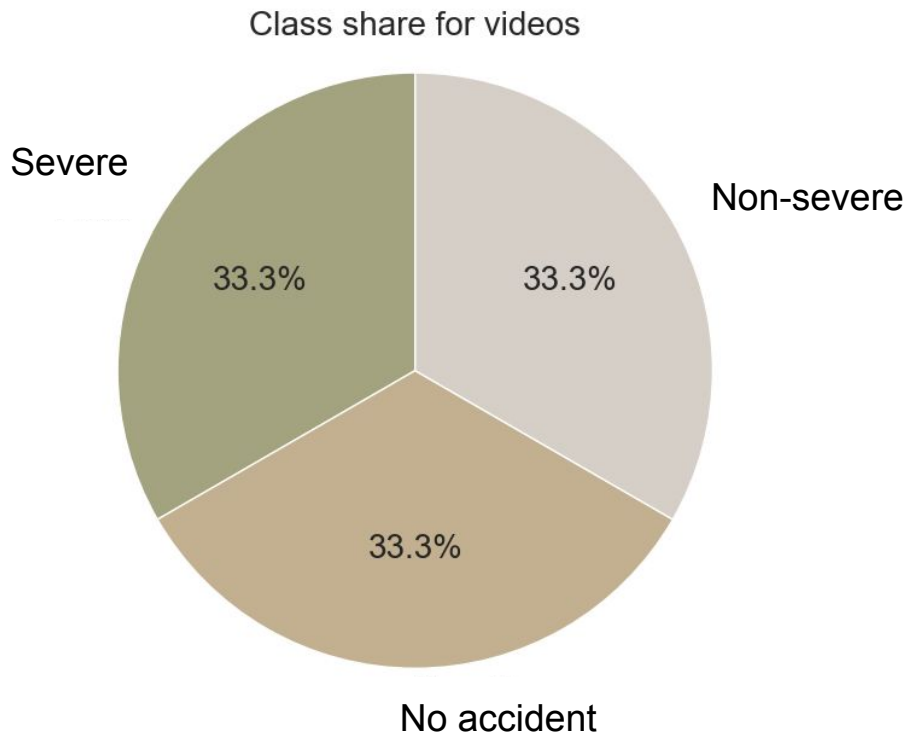
What makes it non-severe?

Car/Object is not flipped/complete/not fired

Video Example - No accident

What makes it no accident?

Car/Object is almost to have accident but turns out to be no accident taken place.

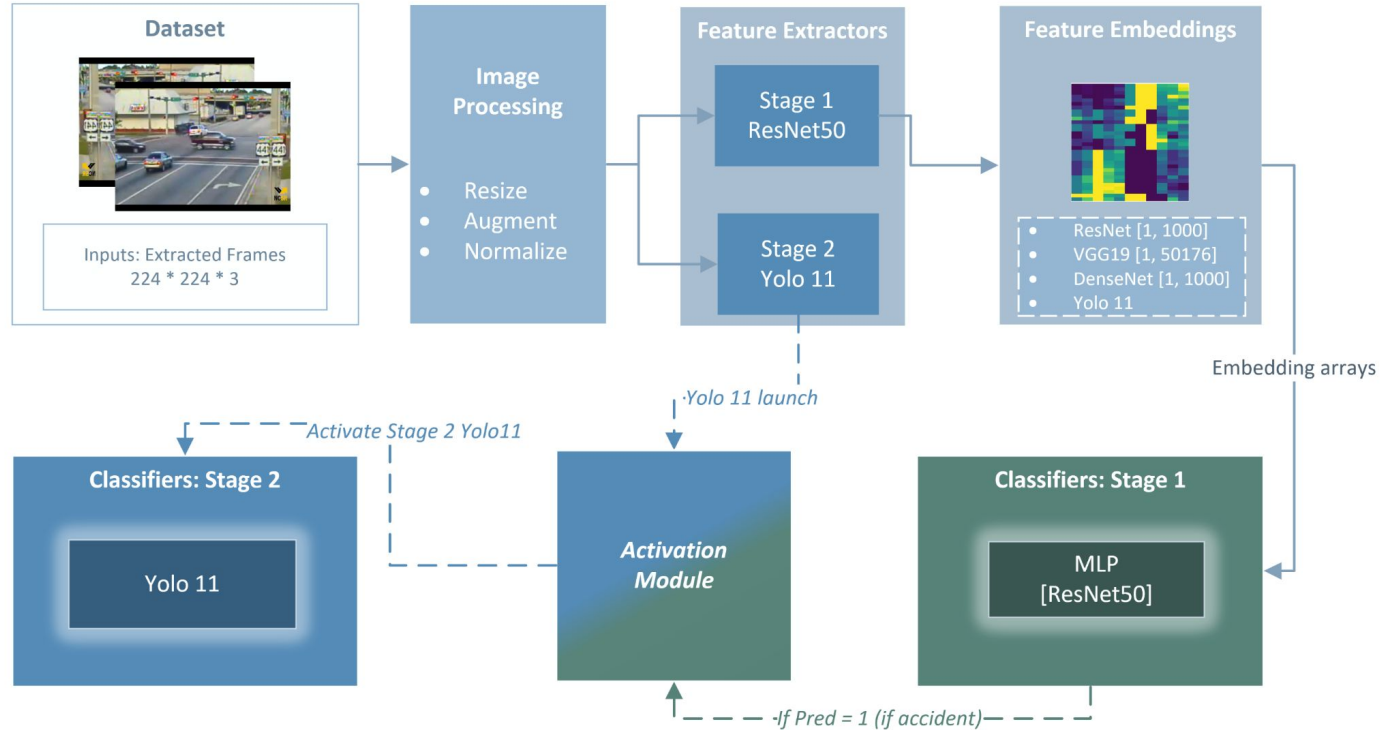


Training



Why we design our model architecture:

- Low Latency
- High accuracy and stable
- Computation Resource savings



Training Results

Stage 1: ResNet50 + Multi-linear Perceptron

Stage 1 Model Training Log (Test F1)				
Feature Extractors	ResNet50	VGG19	DenseNet	Yolov11
Classifiers				
SVC	0.88	0.63	0.84	0.89
MLP	0.90	0.84	0.89	
Random Forest	0.56	0.51	0.56	
KNN	0.87	0.89	0.88	
Ensemble: Stacking	0.87	0.83	0.88	
Ensemble: Vote	0.87	0.86	0.90	

Confusion Matrix			
Predicted	accident	108	15
	non_accident	10	95
		accident	non_accident
		TRUE	

Best Performer	ResNet50 + MLP
Accuracy	0.90
Precision	0.88
Recall	0.91
F1	0.90

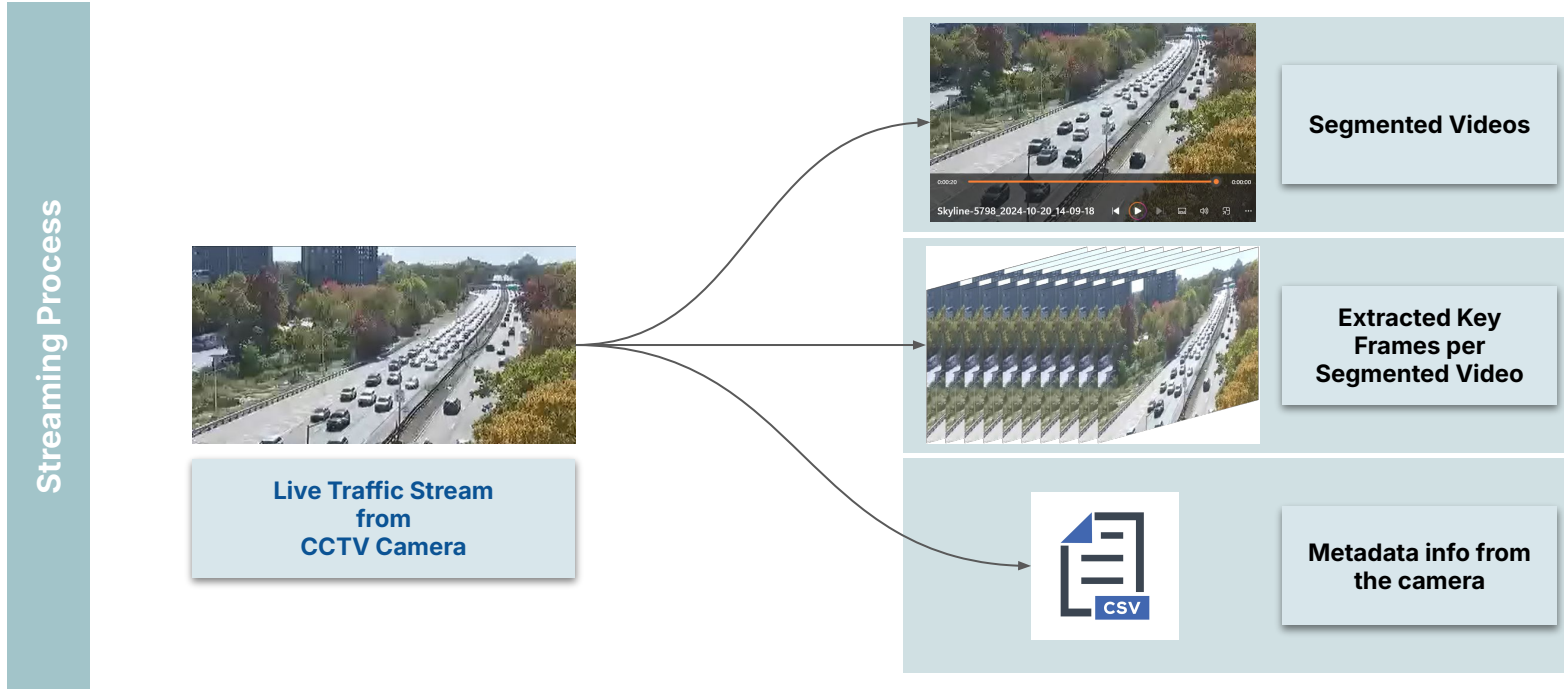
Stage 2: Second Training on Yolo 11

Stage 2 Model Training Log (Test F1)				
Feature Extractors	ResNet50	VGG19	DenseNet	Yolov11
Classifiers				
SVC	0.88	0.85	0.89	0.95
MLP	0.89	0.91	0.86	
Random Forest	0.73	0.65	0.73	
KNN	0.88	0.79	0.71	
Ensemble: Stacking	0.89	0.88	0.88	
Ensemble: Vote	0.92	0.88	0.80	

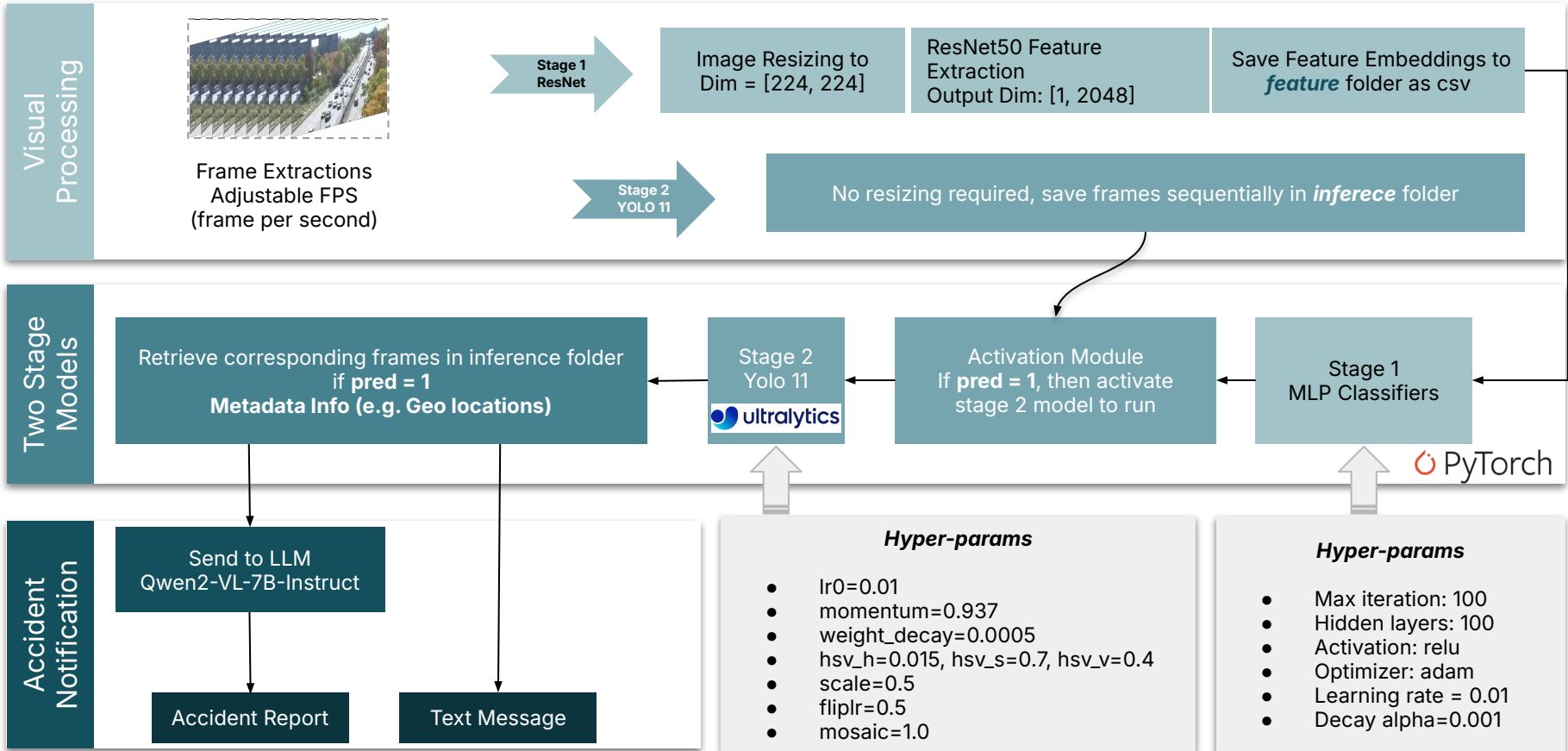
Confusion Matrix			
Predicted	severe	31	6
	non_severe	1	67
		severe	non_severe
		TRUE	

Best Performer	Yolo11
Accuracy	0.93
Precision	0.92
Recall	0.99
F1	0.95

Stream Data Pipeline



Detection & Notification Pipeline



Demo Video



Challenges And Future Roadmap

Enhanced Detection in Extreme Conditions

Continue refining EmergEye's AI models to reliably detect accidents even in challenging scenarios, such as poor weather, low lighting, and heavy traffic.



Multi-Camera Monitoring Capability

Expand EmergEye's functionality to monitor and detect accidents across multiple CCTV feeds on a single screen, enabling broader coverage and faster response for large areas.



EmergEye: AI-Based Car Accident Detection System



Mission

Instantly identifies severe accidents across diverse settings, ensuring prompt awareness and action.



Impact

With EmergEye, we're not just detecting accidents; we're creating a faster path to safety and potentially saving lives.

Adaptable AI: EmergEye's Broader Applications

Elderly Care and Fall Detection	<p>Monitor elderly individuals, detecting falls or sudden movement;</p> <p>Notify caregivers immediately to prevent delays in assistance.</p>
Child Safety Monitoring	<p>Detect potential hazards or unsafe situation;</p> <p>Alert caregivers instantly if a child is in danger or unsupervised in risky areas.</p>
Public Space Incident Detection	<p>Monitor public spaces for incidents like fights, medical emergencies, or vandalism;</p> <p>Alert security or emergency services promptly.</p>
Home Camera Pet Monitoring	<p>Identify unusual activities, distress signals or health issues in real-time;</p> <p>Provide peace of mind to pet owners when they are away.</p>

THANK YOU

Learn more and follow our journey on our website.

www.emergeye.online

