PROJECT NAME

TEAM NAME - YATHARTH

COLLEGE NAME - Datta Meghe College of Engineering

CITY - AIROLI

STATE - Maharashtra

PROBLEM STATEMENT

THEME – AR / VR - AARS – Augmented Reality Accident Reconstruction System

Technology-Driven Accident Scene Reconstruction and Analysis System

Title:

Preserving Accident Scenes for Accurate Investigation

The Problem:

Accident scenes disappear within minutes. Traditional investigations are slow, manual, and often inaccurate - relying on sketches and human estimation. Vehicles are moved, skid marks fade, traffic must be cleared, and critical evidence is lost forever. Yet investigations, insurance claims, and court decisions depend on this missing evidence.

Why AR/VR?

Captures the scene instantly in 3D.
Preserves evidence that normally gets lost·
Allows immersive, on-site visualization.
Enables accurate reconstruction instead of guesswork.

The Opportunity:

Create a next-gen accident analysis system using AR + AI + 3D simulation to give police, insurance, and legal teams fast, precise, and evidence-driven reconstructions.

Reimagining accident investigation through immersive AR and real-world 3D intelligence.

A unified AR-powered forensic platform that captures, reconstructs, and simulates accident scenes with high precision—within minutes.

PROBLEM STATEMENT

Combines AR + AI + Photogrammetry + LiDAR + Physics Simulation to replace manual sketches and improve investigative accuracy.

Proposed Solution

1. Smart Scene Capture (AR Auto-Scanning)
- AR walkthrough for officers
- Converts video into an accurate 3D point cloud
- Auto-detects skid marks, debris, vehicle angles & lane geometry

2. AI-Driven Evidence Extraction
- YOLO + 3D spatial mapping
- Identifies vehicles, impact points, road layout & distances
- Standardized, bias-free evidence extraction

3. Dual 3D Reconstruction Engine
- LiDAR for depth-accurate scanning
- Photogrammetry for non-LiDAR devices
- Consistent quality across all smartphones

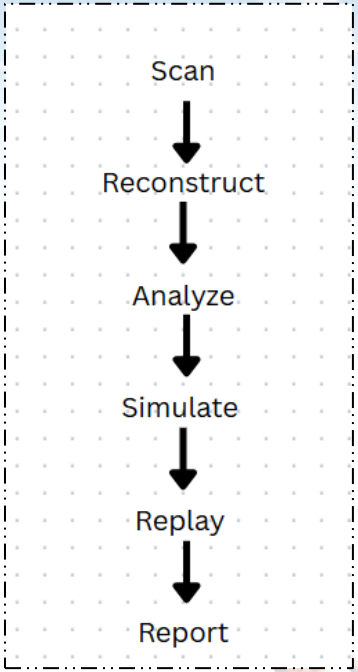
4. Physics-Based Collision Simulation
- Uses friction, skid length, vehicle mass & final positions
- Computes the most probable collision path
- Speed estimation + trajectory visualization

5. Immersive AR Replay
- Accident reconstruction anchored back into real world
- Walk-around analysis, slow-motion replay & hypothesis comparison

6. Instant Court-Ready Report
- Auto-generated report with measurements, annotated images & 3D snapshots
- Includes timestamps, signatures & tamper-resistant formatting

7. End-to-End Digital Evidence Chain
- Encrypted cloud storage
- Secure sharing with police, insurance & legal teams

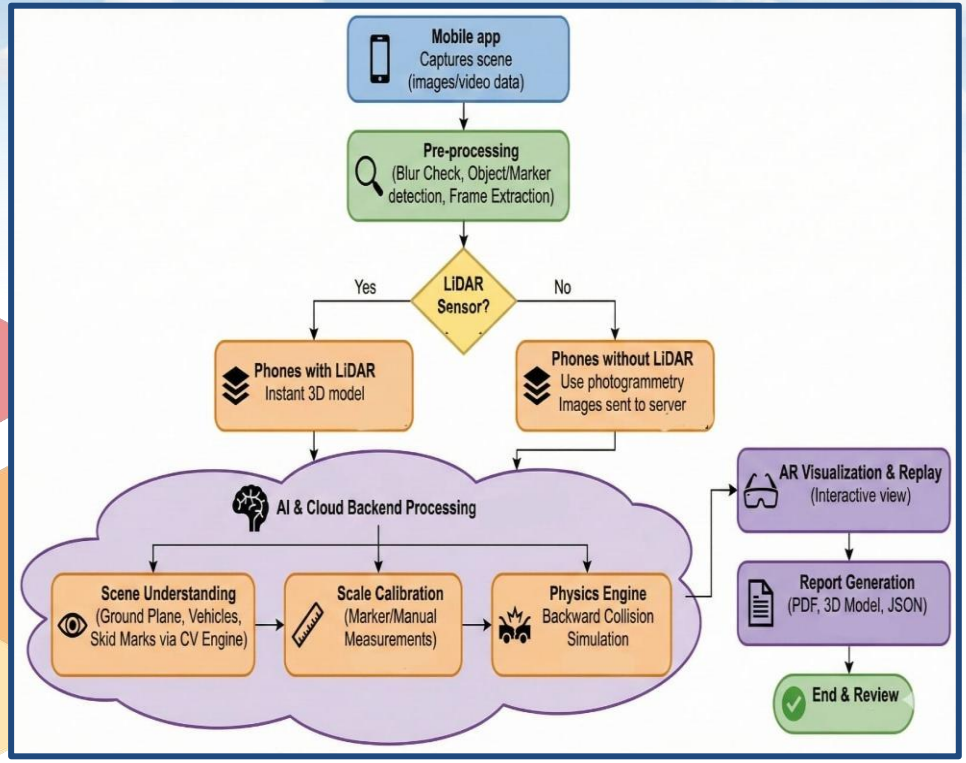
8. Built for Field Realities
- Works in low light & crowded scenes
- Sub-60-second guided scan
- Fully mobile-first, no special hardware needed



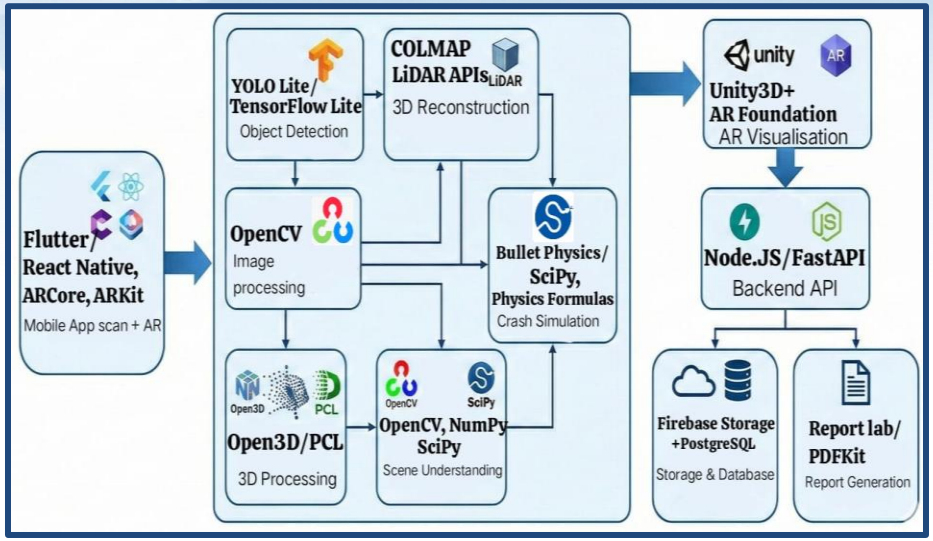
AARS delivers fast, accurate, and transparent accident investigation—anytime, anywhere.

ARCHITECTURE

FLOWCHART



TECH-STACK



PROTOTYPE:

https://ar-scene-insight.lovable.app

PROBLEM STATEMENT

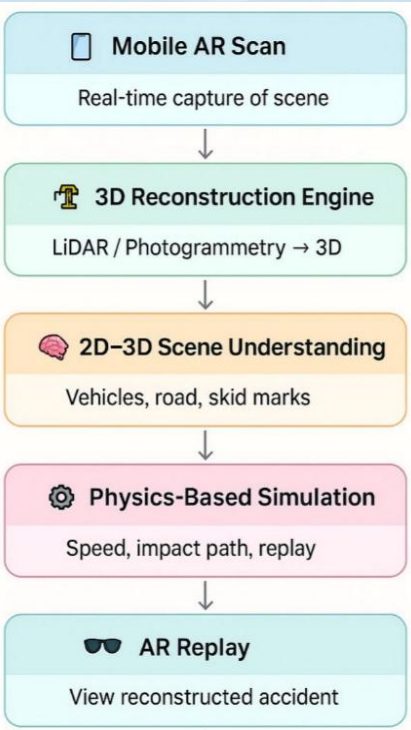
Innovation

1. Mobile-First Forensic Reconstruction
Transforms simple smartphone footage into a **forensic-accurate 3D accident model** without requiring drones, scanners, or specialized hardware.

2. Dual Reconstruction Engine (LiDAR + Photogrammetry)
Automatically selects the best method based on device capability, ensuring **consistent and reliable 3D scene generation** across all smartphones.

3. 2D–3D Integrated Scene Understanding
Combines YOLO-based 2D detection with 3D point cloud analysis to **auto-identify vehicles, road structure, skid marks, and lane geometry**.

4. Physics-Driven Reverse Collision Simulation
Reverse simulation using skid length, friction, and final vehicle positions to identify the most probable collision path.



5. Real-World AR Replay
Anchors the reconstructed 3D accident model onto the physical environment, enabling **on-site AR replay, walk-around analysis, and evidence review**.

6. Instant Court-Ready Report Generation
Automatically produces a structured report containing **measurements, trajectories, annotated images, and reconstruction visuals**, reducing investigation time dramatically.

7. Designed for Field Conditions
Optimized for **fast, guided capture (<60 seconds)**, handling poor lighting, obstructions, and dynamic accident scenes where evidence quickly degrades.

8. End-to-End Digital Evidence Pipeline
A complete workflow: **Scan → Reconstruct → Analyze → Simulate → Replay → Report**, integrating AR, computer vision, 3D mapping, and physics into one unified system.

Combining AR, AI, and 3D physics to deliver instant, accurate, and actionable accident reconstruction.

PROBLEM STATEMENT

SOCIAL IMPACT

Faster Investigations, Safer Roads

- Accident reconstruction reduced from **hours to minutes.**

→ quicker medical help & faster road clearance.

Accurate, Transparent Evidence

- 3D AR models remove human error.
- Builds **trust** between citizens, police & insurance.

Faster Justice for Victims

Court-ready reconstruction

→ quicker case resolution and reduced disputes.

Reduces Insurance Fraud

Objective collision data → fewer false claims, faster payouts.

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MARKET IMPACT

Why This Is a Scalable & Valuable Solution?

1. Massive Market Size

Primary Users

- Police & Transport Departments
- Insurance Companies
- Forensic Investigation Firms
- Logistics & Fleet Operators

2. Market Oppurtunities

- **1 crore+** annual motor insurance claims in India.
- **$9–12B** global accident reconstruction market.
- **25–30% CAGR** growth in AR/AI forensic tools.

Revenue Model

Govt / Police Licensing	Fleet Safety Analytics
Insurance API Integration	Forensic Consulting Marketplace

THANK YOU

TEAM

ABOUT

(NAME, BRANCH, YEAR, EMAIL ID, MOBILE NUMBER)

NAME	BRANCH	YEAR	EMAIL ID	MOBILE NO
Mrunali Sonje	INFORMATION TECHNOLOGY	III	sonjemrunali@gmail.com	8591118494
Prem Pandit	INFORMATION TECHNOLOGY	III	pandtiprem278@gmail.com	9970920200
Yashashree Naik	INFORMATION TECHNOLOGY	III	yashashree.naik.01@gmail.com	9867659906
Affan Mukri	INFORMATION TECHNOLOGY	III	affanmukri6007@gmail.com	9833267808