

**Research Title:**

**Learning Pedestrian-Driver Communication and the  
"Almost-Accident" Phenomena**

**Primary Investigator:**

Name: **Prof. Esther David**

Faculty: **Department of Information Systems and Computer Science**

Academic Institute: **Achva Academic College**

This research promotes the vision of “zero externalities” in urban mobility by advancing intelligent computer-vision systems that safeguard vulnerable pedestrians. It focuses on developing a real-time deep-learning framework capable of identifying pedestrians who are at increased risk—particularly children and elderly individuals—before hazardous situations occur. These populations face distinctive challenges: children’s impulsive, unpredictable behavior and the elderly’s slower mobility and sensory decline significantly heighten accident probability.

To address this, the study introduces an AI-driven pedestrian recognition model designed for operation in complex, real-world conditions. Unlike prior efforts centered on facial recognition or high-resolution imagery, the proposed approach processes anonymized, low-resolution, long-distance inputs like those captured by urban surveillance or vehicle-mounted cameras. By classifying pedestrians into children, adults, and elderly, the system enables autonomous vehicles and smart infrastructure to anticipate risk, issue early warnings, and decelerate in advance, thereby preventing collisions.

Methodologically, the research evaluated multiple neural architectures—convolutional, transformer-based, and hybrid models—tuned over hundreds of annotated images representing varied environmental conditions (occlusion, lighting, and motion blur). Preliminary results indicate satisfiable accuracy across all age-group categories, demonstrating the potential for dependable early detection in real-time driving contexts.

Integrating technological performance with ethical design, the system supports privacy preservation through facial anonymization while promoting sustainable and human-centered mobility. The project contributes a major step toward intelligent transportation ecosystems that minimize environmental, social, and human costs - advancing the goal of zero externalities and zero casualties in road safety.