Automatic Analysis of Road User Behavior

Quantitative studies of interactions between pedestrians, bicycles and vehicles

Abstract

The traffic safety on country roads and high ways have steadily improved as work with zero-vision has progressed. However, this kind of improvement is not seen for vulnerable road users in city traffic. In city traffic interactions between pedestrians, bicycles and vehicles is more complex and have a high impact on traffic safety. Although, traffic practitioners acknowledge the importance of interactions in traffic, it is seldom studied in detail. Those studies that are done are often performed by manual observations. Leading to subjective and fragmented knowledge about interactions and their impact on traffic safety.

We will show how modern 3D computer vision technology can be used to automatically, objectively and quantitatively collect data about interactions and behavior in traffic. The sensor is based on the same principle as human vision, combined with artificial intelligence (AI) that analyze all traffic in intersections and open spaces.

We will show results from a number of real world measurements and analysis:

- Before and after change in road design: How pedestrians and bicycles change their behavior
- Quantitative give-way behavior at intersections
- Automatic conflict analysis at a heavily trafficked crossing point between bicycles and pedestrians
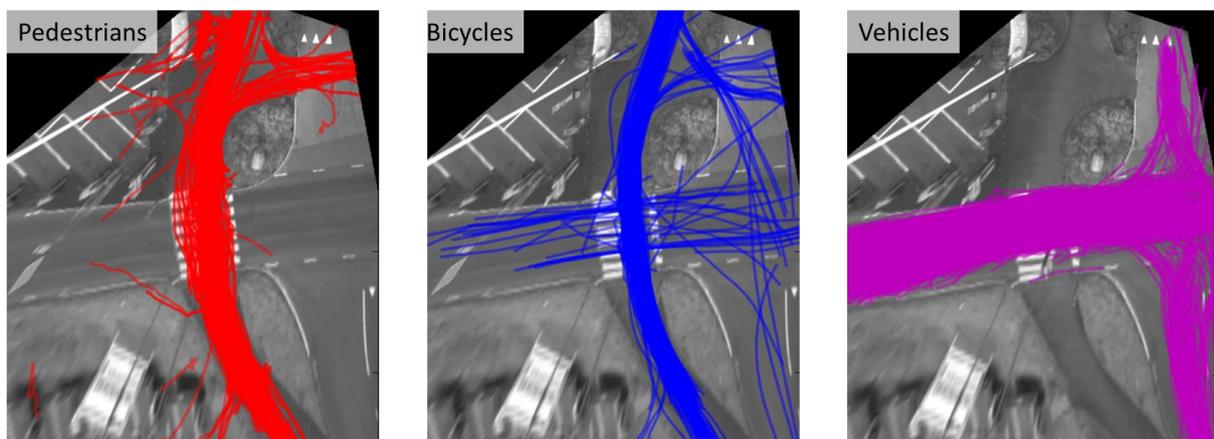
Automatically and simultaneously collected trajectories of pedestrians (red), bicycles (blue) and motorized vehicles (magenta). Each track consists of up to 25 measurements per second. At each point traffic type, position, speed, direction and time is registered. This unique data can then be further analyzed to quantify interactions and traffic safety related behavior.