Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

1475 N. Scottsdale Road, Suite 200
Scottsdale, AZ 85287-3538
Phone: 480 884 1996 Fax: 480 884 1984

Case ID:M23-159P
Published: 1/17/2024

Inventors

Duo Lu

Yezhou Yang

Contact

Physical Sciences Team

Road Traffic Scene Reconstruction from Aerial Video

Conventional methods used for reconstructing road traffic scenes often rely on fixed sensors and cameras entrenched within road infrastructure. However, these approaches grapple with substantial limitations in terms of scope, cost-efficiency, and safeguarding individual privacy. The need to fortify road safety, strengthen urban planning initiatives, facilitate research endeavors, and improve the advancement of autonomous driving technology necessitates a novel approach for road traffic scene reconstruction. This approach should be adaptable, economical, and mindful of privacy concerns to comprehensively capture traffic scene data. Addressing the urgency for a solution that sidesteps privacy issues, extends coverage, optimizes expenses, and upholds accuracy stands as a pivotal requirement in the domain of traffic scene reconstruction. Innovative technologies that can potentially revolutionize this landscape by leveraging adaptable, mobile, and privacy-respecting methods to capture and reconstruct traffic scenes would mark a significant breakthrough in this field.

Researchers at Arizona State University have developed a framework for digitizing and reconstructing road traffic scenes from aerial videos (e.g., taken by drones). This advancement in the realm of road traffic data collection and scene reconstruction can be operated by utilizing consumer-grade drones and aerial videos to gather data and reconstruct traffic scenes accurately. Employing a keypoint-based vehicle tracking and localization pipeline, this framework offers a solution that transcends the limitations posed by fixed infrastructure. By processing aerial videos, this framework generates detailed vehicle trajectory data, facilitating the reconstruction of traffic scenes without relying on stationary devices. Crucially, this method ensures the privacy of individuals by producing data that excludes identifiable information. The framework encompasses multiple stages, including camera calibration, precise vehicle detection and tracking, vehicle model fitting, and state estimation, resulting in highly accurate vehicle localization and comprehensive motion analysis.

Related publication: CAROM Air - Vehicle Localization and Traffic Scene Reconstruction from Aerial Videos

Potential Applications:

- Traffic management (e.g., Departments of Transportation, city planners, transportation system engineers, etc.)
- Road safety analysis and driver behavior modeling
- Traffic incident detection

Benefits and Advantages:

- Accurate reconstruction (e.g., decimeter-level localization accuracy)
- Privacy-conscious data
- Efficiency and flexibility