Software for detecting the direct reflection of the sun on conductors based on LiDAR point clouds

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Description

The innovative software is designed to evaluate direct sunlight incidence on road users, leveraging urban and interurban LiDAR point clouds. Its advanced features calculate solar trajectories, assess sunlight impact on drivers' visibility, and identify environmental obstructions that block sunlight. Compared to similar technologies, this tool uniquely integrates spatial geometry with solar analysis for enhanced precision. It has significant commercialization potential in civil engineering and road safety planning while being environmentally friendly by optimizing designs that mitigate sunlight hazards.

Input Data Handling: The software processes LiDAR point clouds and trajectory data, incorporating solar calculations by day, month, and UTM zones for customized results.

Sunlight and Road Interaction: It calculates road orientation, slope, and solar angles, determining sunlight's effect on drivers and visualizing obstructive environmental elements.

Innovative aspects and advantages

Tools, Methods and Solar Trajectory Calculation: The software uses LiDAR point clouds and trajectory data to calculate sunlight incidence on drivers, analyzing geometric road data and environmental obstructions. It calculates the sun's position (solar angles) for any day, tracking sunlight every 15 minutes from sunrise to sunset, ensuring precise solar path analysis.

Field of View Analysis: The tool evaluates sunlight impact on the driver's horizontal (±60°) and vertical (50° to -70°) fields of view to identify glare risks.

Intersection Detection: It calculates intersections between solar rays and road elements, determining whether objects block sunlight from reaching drivers.

Innovative Aspects: Combines road geometry, solar trajectory, and LiDAR data, enabling comprehensive sunlight studies with high precision and visualization capabilities.

Commercialization Value: The software is ideal for civil engineering and urban planning, improving road safety designs and enhancing driver visibility in various road environments.

Environmental Friendliness: Promotes sustainable urban planning by reducing accidents and improving energy-efficient road safety measures through precise sunlight analysis.

User Inputs and Customization: Users input LiDAR data paths, study dates, step intervals for trajectory analysis, and UTM zones for location-based sunlight studies.

Programming and Accessibility: Developed in Python, the software is efficient, open-source, and executable on most systems, offering broad accessibility for researchers and engineers.

Commercial applications and potential users

The invention is applicable in research centers, technological institutes, universities, companies, and industries within the software that targets civil engineers, urban planners, and road safety professionals. Its commercial applications include optimizing road designs, enhancing driver visibility, and mitigating sunlight glare hazards. It supports sustainable urban planning and improves safety through precise sunlight impact analysis.

Intellectual property status

- Registeration number: 03 / 2024 / 875

Type of collaboration

We look for a company to commercial exploitation process or companies interested in R&D agreements for its development.

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