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Technology Transfer Office

System and Method of Dynamic Light Source Control

Researchers at the University of South Florida have developed a technique that identifies spatially distributed targets of diverse, and even non-uniform, shapes, sizes and consistency, such as cyclists; by receiving reflected light back to a sensor that continuously updates an image of a field of view.

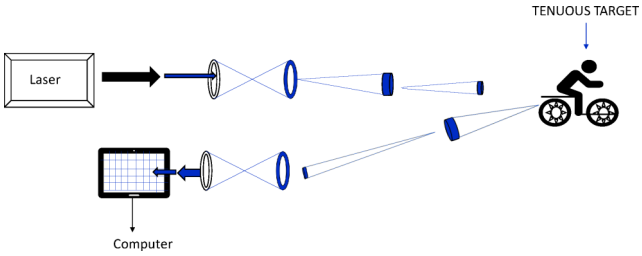
Light detection and ranging (LiDAR) is a method that uses light in the form of a spatially narrow laser beam to measure the distance to a target. Autonomous LiDAR systems are being used for 3D mapping of targets related to driverless vehicles. However, such systems use a fixed beam shape that is sufficient when the target area is larger than the laser beam. When a tenuous and spatially distributed target, such as a bicyclist, is illuminated, then a significant portion of the laser beam is not reflected back towards the LiDAR receiver. Therefore, there is a need for a mechanism which dynamically changes the area of the laser beam to better overlap the spatial components of the target (e.g., bicycle components separated by open areas), thereby increasing the signal backscattered from the target.

Researchers at USF have developed a dynamic real-time multi LiDAR beam shaping and detection method by adopting dynamic focusing. This invention allows microcontrollers the ability to create multiple LiDAR beams simultaneously and tailor the combined transmitted beam in real time, so that the fraction of laser light intercepted and backscattered by the target is increased. The beam is shaped using various of mirror and lens arrangements. Multiple laser beams with different spatial sizes are transmitted which in sequence controls the size and shape of the LiDAR beam. LiDAR detection finds application in autonomous vehicles.

ADVANTAGES:

- **Real-time dynamic beam shaping**
- **Improves autonomous driving**
- **Increases backscattered LiDAR signal**
- **Increases reliable detection range**

Enhanced LiDAR Beam Shaping for Precise Detection of Tenuous Objects



Invention Focusing the Light Source and Receiver on a Spatially Tenuous Object

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