Docket #: S14-219

Robust Anytime Tracking Combining 3D Shape, Color, and Motion with Annealed Dynamic Histograms

Although tracking has been studied for decades, real-time tracking algorithms often suffer from low accuracy and poor robustness when confronted with difficult, real-world data. Stanford inventors at Professor Sebastian Thrun's lab have invented a tracker that combines 3D shape, color (when available), and motion cues to accurately track moving objects in real-time. The tracker is anytime, allocating computational effort based on the shape of the posterior distribution. The tracker can thus be run for any amount of time, after which the current approximation to the posterior is returned. the tracker is allowed to run for longer, the accuracy continues to improve. This tracker can thus be used in any robotics system, with speed or accuracy requirements chosen based on the needs of the application.

Applications

- The tracker is applicable to any situation in which one would want to estimate the velocity of objects that are pre-segmented and for which data association has already been performed. One key application for this technology is for autonomous driving, in which we demonstrate our tracker to be useful.

Advantages

- By combining 3D shape, color (optionally), and motion, the estimated velocity of tracked objects in real-time at a much greater accuracy than previously known methods. Current state-of-the- art trackers give noisy estimates of the velocity of moving objects, especially due to occlusions, viewpoint changes, and sudden speed changes. This tracker robustly handles all of these situations.

Patents

- Published Application: 20150363940
- Published Application: 20170316569
- Issued: 9,710,925 (USA)
- Issued: 9,990,736 (USA)

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