Kanittha Sae-Lim 2011: A Vehicle Tracking Algorithm by Fusing Video and GPS Data. Master of Engineering (Information and Communication Technology for Embedded Systems), Major Field: Information and Communication Technology for Embedded Systems, Department of Electrical Engineering. Thesis Advisor: Assistant Professor Teerasit Kasetkasem, Ph.D. 53 pages

Accuracy of positioning system is important for many applications ranging from the automatic navigation in the city through the precision agriculture in the field. A regular GPS receiver has a low cost but with a low accuracy (2 to 30 meters). As a result, we propose a low cost system where the positioning data from GPS is fused with the images obtained by the mounted cameras on a moving vehicle. Our method uses the particle filter as the tracking algorithm and improves the accuracy based on epipolar geometry, which represents the relationship of two corresponding images from video sequence. Local feature of the corresponding points among these views are extracted and matched by SIFT algorithm. Associated with the particle motions, these match points are reconstructed in 3D and then reprojected back to measure errors for weighting. The experiment demonstrates all optimum parameter values for each kind of tracking.

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