Sorasak Khoomboon 2010: Fusion of GPS and Proximity Data for Vehicle Tracking: Applications for Farming Applicators. 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. 55 pages.

The purpose of this research is to improve the positioning accuracy of a stand along global positioning system (GPS) receiver through two techniques, namely, pos error prediction approaches, and time-domain system to estimate positioning error by integrating the positioning data from the GPS data and prior information. The prior information is the position of several control points in the field which may be obtained from proximity sensors. Proximity sensors may be a RF device that periodically broadcasts its location through the cheap short-range RF system, or the landmark in the field to let an operator of a vehicle enter the location information into the system. When a vehicle travels near a proximity sensor, its position will be calibration from the broadcasted information.

In the error prediction approaches, we propose four methods, the last error value, average error value, last error value with memory parameter, and average error value with memory parameter. From our experiment, the last error value yields the maximum improvement whereas the last error value with memory performs poorest. However, the last error value with memory can improve the accuracy when the majority of error is caused by the positioning noise. The time-domain system to estimate positioning error yield slightly lower positioning error reduction when comparing with the last error value. However, it yields the minimum standard deviation which implies the robustness of the time-domain tracking.

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