CIVE 650C Class Project Proposal

Detection Error Identification and Correction with High-Resolution Traffic Event Data of Loop Detectors at Signalized Intersections

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Loop detector is the most common vehicle detection tool at signalized intersections. The accuracy of loop detection would greatly influence the efficiency and safety of signal control. However, studies have shown that loop detectors may produce many errors in field application, such as pulse-breakup error (Lee and Coifman, 2011a), splashoever error (Lee and Coifman, 2012), and so on (Corey et al., 2011; Lee and Coifman, 2011b). Thus, identification and correction of these detection errors is essential for realizing efficient and safe traffic at signalized intersections. Traditionally, traffic controllers only provide aggregated data, such as 5-min volume and 5-min occupancy, which are inadequate for identifying detection errors precisely. Recently, the high-resolution traffic event data has been attracted much attention, since they could provide much more information than aggregated data (Wu and Liu, 2014). The high-resolution traffic event data means that the detector and signal status are collected with the 1/10 second accuracy, or even higher. The high data collection frequency implies that we could exactly know when a detector is activated and deactivated, and when the status of a signal changes. Thus, high-resolution traffic event data are perfect for identifying detection errors.

This study would use the high-resolution traffic event data collected from 06/24/2015 to 07/20/2015 at SE 97th Ave and SE Lawnfield Rd, Clackamas, OR. The raw data is about 900 MB with the simultaneous video data. Although this dataset may not be called big data, it can be taken as an example of implementing big data analytics to high-resolution traffic event data because the 24/7/365 high-resolution traffic event data collection has been implemented in many places (Bullock et al., 2014). Statistical analysis would be done to the raw data to find suspicious detection errors, which would be then verified by the video data. Then, the verified detection errors would be corrected, and the corrected data would be sent to signal control systems. A reliable and efficient algorithm is expected to be developed for detection error identification and correction in finally.

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