Efficient Collection and Storage of Weigh-in-Motion (WIM) Data

A Rational Functions Approach to data analysis and storage

A high-performance algorithm is on offer which allows for efficient collection, storage and retrieval of BWIM data with minimal computational overhead.

Applications

- In-road WIM
- Nothing-on-the-road (NOR) or Free-of-axle (FAD) WIM, e.g. Bridge Weigh in Motion (BWIM)
- Rail WIM
- Remaining bridge life dynamic estimation
- Bridge usage statistics / local traffic data for further infrastructure developments

Benefits

- Requires only strain sensors in road
- Assessment of dynamic loading of bridge (or similar) structure
- Easy identification of overloaded vehicles
Advantages

- Weights can be assigned to individual axles and axle groups
- No need to estimate influence lines
- Data extracted in a concise manner, thereby making the transmission from site and storage at the central data warehouse more economical
- Data stored in highly-compressed form
- Rapid retrieval of information
- Distributed computing: most of the computation is on site, thereby making the system immune to failure of central data services

About

Vehicle overloading is a significant factor in the degradation of road surfaces. The analysis of sensor data is particularly complicated when dealing with multiple parallel lanes and vehicles with many axles.

The algorithm enables the signals received by WIM sensors to be assigned correctly to individual axles and axle groups, even when parallel moving lanes fail to stay perfectly in lane. The analysis does not require estimation of influence lines. The data are stored in compressed form and can be rapidly retrieved.

Development Status

The algorithm was developed at the Faculty of Mathematics of the University of Vienna. This mathematical data analysis method has been successfully field-tested.

Intellectual property Status; European and US Patents

BWIM algorithm is covered under Austrian patent number AT513258 and PCT application WO2014089591

Contact

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