# Drive-by approaches for railway bridge health monitoring (refer to Prof. A. Collina and Ing. L. Bernardini)

Drive-by (or indirect) approaches consist in assessing bridge structural health status by means of on-board train measurements. In fact, a damage across the bridge span reflects in a change of the dynamic interaction between train and bridge itself: drive-by approaches aim at detecting that change. This condition monitoring methodology, relatively new and subject of intensive research, is more efficient than the direct monitoring of the structure.
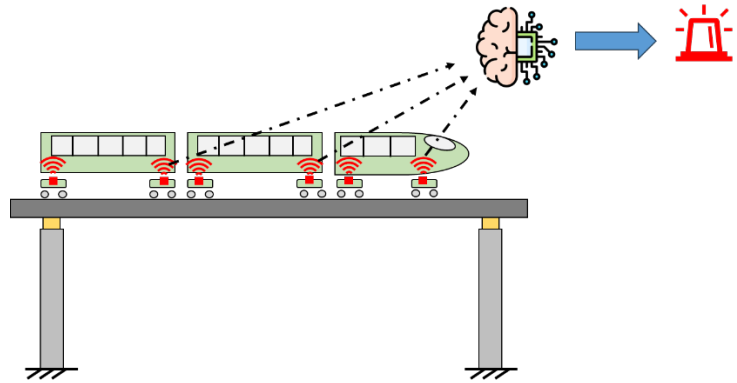
Drive-by approach represents a cost-efficient solution, since potentially allows to check a large number of bridges and viaducts with a limited number of instrumented trains in regular operation. On the other side it is more challenging from the point of view of signal processing tools and detection of a potential structural damage since it is indirectly obtained from train dynamical response.

The thesis work takes advantage of previous works, as well as some available measurements to tune bridge models. The focus is on the improvement of previously developed data processing procedure, and to develop and implement novel and effective algorithms for bridge health status evaluation and damage identification. The work is carried out by means of an already established time domain simulation tool for train-track-bridge interaction (ADTreS), developed and continuously upgraded at the Department of Mechanical Engineering.

The thesis work should face and tackle very specific influencing factors affecting the potential performances of the diagnostic method when applied to real-life scenarios, such as the influence of track irregularity on on-board measurements, and the extraction from the on-board acceleration data of specific indicators according to the type of bridge structure.