USING DATA MINING TO CONSTRUCT DYNAMICAL EQUATIONS FROM AGENT-BASED PEDESTRIAN SIMULATORS

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A fundamental challenge in the field of applied mathematics, especially over the last few years revolves around the processing and analysis of big-data coming from experiments or large-scale simulations. In particular, one of the main targets in the field is the data-driven construction of low dimensional mathematical models in a closed form, usually in the form of ordinary (ODEs) and/or partial differential equations (PDEs), which can be then analysed using all our theoretical and numerical analysis arsenal. Here, we apply a data-mining non-parametric statistical learning based approach to construct ODEs in a closed form from data produced by an agent-based simulator of pedestrian dynamics. We access the efficiency of the approximation by comparing the obtained interaction potentials that govern the dynamics of the ODEs with the ones driving the detailed simulation.