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Modelling pedestrian mobility on a road network: the Venezia project

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The tourist flows in the historical centre of Venice have been continuously increasing in the recent years and the local authorities have to cope with the problems of liveability level for the resident population and frailty of the cultural heritage. To face these problems and to propose new governance tools, the Venice municipality has proposed the project of a Smart Control Room (SCR) which constitutes a central hub for the collection and analysis, through dynamical models, of multi-source mobility data. The Information Communication Technologies (ICT) that provide dynamical data on the individual mobility, will be integrated by many flow counting and people counting sensors distributed on the road network. These sensors will allow to collect real time data of local flows, the pedestrian velocity field and the crowd density. These data have to be integrated into dynamical models that simulates the pedestrian microscopic dynamics and water mobility taking advantage from the knowledge of the use of the road network provided by the ICT data and the public transportation data. The models have to perform a nowcasting of the mobility state on the whole road network in the historical centre, to forecast the short-term evolution and to point out the criticalities. Moreover the models have to be able to analyze different possible scenarios to perform a real time governance of the tourist flows, to provide the stakeholders with a useful tool to plan a sustainable mobility during large tourist events. The Laboratory of Complex Systems Physics of Bologna University is in charge to develop the dynamical models for pedestrian mobility in Venice. We illustrate the main features of the models, the results of the performed tests to measure the flow and people counting using video-cameras equipped by a neural networks and the results of an analysis performed using GNSS data from mobile devices (collaboration with TIM) to reconstruct the dynamical features of individuals moving on the Venice road network.

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