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Comment

Further steps in the modeling of behavioural crowd dynamics, good news for safe handling
Comment on "Human behaviours in evacuation crowd dynamics: From modelling to "big data" toward crisis management" by Nicola Bellomo et al.

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The recent review paper [4] constitutes a valuable contribution on the understanding, modeling and simulation of crowd dynamics in extreme situations. It provides a very comprehensive revision about the complexity features of the system under consideration, scaling and the consequent justification of the used methods. In particular, macro and microscopic models have so far been used to model crowd dynamics [9] and authors appropriately explain that working at the mesoscale is a good choice to deal with the heterogeneous behaviour of walkers as well as with the difficulty of their deterministic identification. In this way, methods based on the kinetic theory and statistical dynamics are employed, more precisely the so-called kinetic theory for active particles [7]. This approach has successfully been applied in the modeling of several complex dynamics, with recent applications to learning [2,8] that constitutes the key to understand communication and is of great importance in social dynamics and behavioral sciences.

I can personally feel really proud to have been part of the initiation of this line of research. Indeed, paper [3] introduced one of the first models for crowd dynamics at the mesoscale, including analytical results and numerical simulations for a crowd moving in an unbounded domain. The problem of the movement of a crowd inside a bounded domain is pretty challenging, even more if we want to include inlet or outlet fluxes. One of the first attempts to deal with this matter in the kinetic framework was introduced in [1], where simulations tried to encourage the presence of panic conditions in the model. Now, I can state with satisfaction that these problems have been further analyzed and resolved, with special emphasis on behavioural and social aspects of crowds [5,6], giving as a result useful tools for crowd evacuation management.

It is clear from the group of authors in [4] and the framework in which the research has been performed that results are not only a breakthrough from the mathematical and computational points of view but also for all those sectors involved in the safe handling of large groups of people.

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