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Crowd Textures

Martella, C.

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Claudio Martella

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From Sensing Proximity
to Understanding Crowd Behavior

The myriad of sensors present on mobile, pervasive, and ubiquitous devices we wear and install around us is allowing us to collect an unprecedented number of signals about our behavior in the real world, in addition to the massive volumes of data we already collect about our online activities. Spatio-temporal proximity is one of these signals and it is the topic of this dissertation.

Many of our social behaviors and interactions are characterized by a spatio-temporal nature. When we mingle, when we interact with some objects or appliances, when we share an office or a space with colleagues and family, when we queue on the way to a train, we generate a network of proximity relationships between us and the objects and people around. We call this network of proximity relationships the *texture of a crowd*.

In this dissertation we present a model for crowd textures based on spatio-temporal proximity, a set of techniques that can be used to measure and collect textures reliably at large scale, and a number of mining algorithms that can be used by crowd managers to recognize and visualize group and crowd behavior, with the final goal of ensuring the safety and comfort of the crowd.