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Time and Networks in Mobile Communication

In industrial countries cell phone usage offers access to patterns of human dynamics and mobility at a level and detail unimaginable before. The purpose of this talk is to quantify the main features of human activity and travel patterns that can be discovered from this data. We start out by testing the standard hypothesis that human activity is fundamentally random in space (travel patterns) and time (interevent times). We find significant deviations from the random expectation. For the timing of the events the measurements indicate that human activity has a bursty character with well-defined mathematical characteristics, a property shared by a wide range of data, from mobile phone usage to library visitation and emails. In contrast, we find that human travel is far more regular than diffusion models would predict, described mathematically on many spatiotemporal scales a centrally biased random walk. We discuss the implications of these findings on the nature of time and space experienced by humans.

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