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Although existing as a communication technology since the mid-nineties, Bluetooth has only recently been employed for positioning and tracking of individuals (O'Neill *et al.* 2006, Nicolai *et al.* 2007, Hay *et al.* 2009, Van Londersele *et al.* 2009, Kostakos *et al.* 2010). Despite its limited positional accuracy, Bluetooth tracking is a low-cost and widespread alternative for true location-aware technologies. A major advantage of this technique is that it is *identifiable* with respect to the tracked subjects. This is because Bluetooth-enabled devices broadcast a unique MAC-address that allows distinguishing the tracked subject at the individual level. Furthermore, due to its widespread integration in nowadays personal mobile devices (mobile phones, PDA's, laptops, headsets, etc.), Bluetooth allows for *unannounced* tracking (i.e. tracking of subjects that are not aware of being tracked). Hence, it gives scientists the valuable potential to conduct unbiased experiments and gather uninfluenced observations.

In this paper, we will consider the most basic and simple form of a Bluetooth tracking system. That is, a number of nodes (Bluetooth scanners) are installed, usually at strategic points within a study area, and whenever a Bluetooth-enabled device enters the radio range of a node, its MAC address is logged. In this way, a dataset is obtained, consisting of loglines of the form <*Node*, *MAC*, *timestamp*>. As the position of the nodes is known, we may infer a trajectory for each chronological sequence of loglines sharing the same MAC.

In the large body of research on movement behaviour, considerable work has been dedicated to the extraction of patterns from motion data (Laube *et al.* 2005, Gudmundsson *et al.* 2007, Dodge *et al.* 2008). Important contributions concerning the analysis of sequential aspects of human activities have been made by Shoval and Isaacson (2007). In line with this strand of literature, this paper will address the extraction of patterns from raw Bluetooth tracking data. Particularly, we are interested in the extraction of significant clusters of subjects that share similar movement patterns as these reflect how different groups of people behave differently within the same environment and/or situation.

As mentioned earlier, a trajectory can be considered a chronological sequence of discrete nodes with known locations. Hence, we may seek for clusters of similar node sequences. While this may seem rather straightforward for limited sequences, it is challenging to quantify the similarity between large sequences, especially when they consist of different

numbers of nodes. In addition to node position, inferring patterns of node duration (i.e. the time an individual spends within the range of that node) is also challenging. Clusters of similar durational sequences can be mined for and as such, the temporal dimension of behaviour can be taken into account as well.

We believe that the extraction and interpretation of clusters of similar spatial and temporal behavioural patterns will be particularly useful for large crowds within specific contexts such as visitors at festivals, shopping malls, market places, passengers in stations and terminals, etc. Therefore, the methodology outlined in this paper will be illustrated by means of Bluetooth tracking data gathered at a 5-day trade fair in Ghent (Belgium).

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