



## UNSUPERVISED GROUPING OF MOVING OBJECTS BASED ON AGGLOMERATIVE HIERARCHICAL CLUSTERING

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*Abstract- In this article, we present a method to identify a grouping of sensor nodes that show similar movement patterns in an ad-hoc manner. The motivation behind the ad-hoc grouping is to allow a system to monitor complex and concrete situations of people and/or devices such as “who is/are utilizing what object(s)” and “what objects are carried together” without any supervision of human before and at the time of interaction. An agglomerative hierarchical clustering algorithm was applied to a data stream to find the group members as a set of clusters within a certain height. A threshold was also determined in an unsupervised way based on simple statistics obtained from the previous clustering results. An off-line analysis was conducted on data collected in realistic situations. Although grouping two of the same but unrelated activities proved to be difficult, the proposed algorithm performed well in other relaxed cases such as walking with a bag vs. pushing a platform hand truck. Furthermore, we confirmed the effectiveness of clustering-based grouping in comparison with simple distance-based grouping.*

**Index terms:** Smart Objects, Agglomerative Hierarchical Clustering, Grouping, Accelerometer.