Exploring the Activity Fabric of an Intelligent Environment with Hierarchical Hidden Markov Theory

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Abstract : The Internet of Things (IoT) was designed for widespread convenience. With the smart tag and the sensing network, a large quantity of dynamic information is immediately presented in the IoT. Through the internal communication and interaction, meaningful objects provide real-time services for users. Therefore, the service with appropriate decision-making has become an essential issue. Based on the science of human behavior, this study employed the environment model to record the time sequences and locations of different behaviors and adopted the probability module of the hierarchical Hidden Markov Model for the inference. The statistical analysis was conducted to achieve the following objectives: First, define user behaviors and predict the user behavior routes with the environment model to analyze user purposes. Second, construct the hierarchical Hidden Markov Model according to the logic framework, and establish the sequential intensity among behaviors to get acquainted with the use and activity fabric of the intelligent environment. Third, establish the intensity of the relation between the probability of objects' being used and the objects. The indicator can describe the possible limitations of the mechanism. As the process is recorded in the information of the system created in this study, these data can be reused to adjust the procedure of intelligent design services.

Keywords : behavior, big data, hierarchical hidden Markov model, intelligent object

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