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Author(s)	坂野, 良輔
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# User Behavior Modeling in Home Network

Ryousuke Sakano (610039)

School of Information Science,  
Japan Advanced Institute of Science and Technology

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Home network composed of appliance with different field is introduced by the home consumer, and it is expected to contribute to user's comfort and convenience. User is influenced from user's information like age, preference and environment like indoor temperature, weather lives while taking the home network while taking the interaction for the intention achievement. Along with it, it is necessary to verify the designed home network which modeling in user's behavior. The issue of modeling is not only the model construction method but also how to recognize the user behavior and how to express.

There is Bayesian network as a model who can correspond to such a issue. Bayesian network is connects by the link with the direction between variables with the dependence by the use of the graph structure to show a complex dependence that exists in the object issue, and forms an non-circulation directed graph in a single direction. It is suitable for handling imperfect information including user's intention and preference in finding causation between phenomena.

In the method of the proposal(sequence model) recently, it pays attention to user's behavior change process, the appliance that compose s the home network is classified, and output operation of appliance.

In this research, in addition to this proposal ,it proposes the method of doing use action simulation including generating user's intention by using the Bayesian network. At first, the recognition of the user behavior

that become base of the user model, The intention is formed with sets of partial intentions that effect an object. And I considered the element which constituted each. As a result, the intentions are formed from user's profile, user's preference, environment information and the time, partial intentions are achieved by putting appliance and a life behavior together. In this research, I classified the appliance which there was in the home network encyclopedically and made appliance category. About life behavior, I classified life behavior and defined the use appliance as a appliance category by putting it together. In addition, as the scenario that a user achieved intention, I extracted the use case. In the same appliance category, I made an association graph, association list and extracted a use case. Use case was extracted association graph, list which showed relevance of the appliance make from same appliance category.

At next, the modeling of the user behavior was done from defined user behavior in the combination of the bayesian network with the sequence model. The graph structure of the bayesian network was made by four layer structure. Four layer structure consists of the intention presumption layer, intention layer, appliance group layer, and partial intention layer. each layer has dependence relation. Therefore, I expressed that generation of partial intention from formation of intention. The sequence model was used to generate the operation of appliance. As a result, the operation of the appliance was able to be output from user's behavior history.

As recognition to the user behavior, I considered the character of the user behavior on the time axis. I recognize User's intention including series or parallelism and clarified them.

At last, the implementation and evaluation of the proposal method are carried out. In the implementation, the component was divided into the probability inference part and the command sequence generation part, and operation was confirmed.

As a conclusion, I proposed user behavior modeling method in home network. As future tasks, the modeling method of the adjustment to service from the inside and outside of the house and the visibility of the behavior of the user is improved. It is thought that the user's behavior is expressible by doing these.