Adaptive Hypermedia Systems

Personalization and User Modeling

Patrick Siehndel

28.04.2014

Solution 1: Adaptive Hypermedia Systems (AHS)

1. Adaptive Hypermedia Systems can be applied successfully , if...

...the Hypertext is sufficiently large THis is the case in our scenario: There is a large amoung of furniture available in the shop, additional information like description of the different Ikea shop locations and further information about Ikea complement the hypertext.

...it is used by people with different goals and backgrounds This holds as well in the scenario. The following user groups might be considered:

- ***Online-shopper:*** Users, who buy their stuff online.
- ***On-site-shopper:*** Users, who first get information about the nearest Ikea store and products online to finally buy the furniture in the store.
- ***Assemblyman:*** User, who bought furniture and need support for the assembly.
- ***Ikea-Interested:*** Users, who are interested in general information about Ikea (Job applicants for example).
- ***...***

As both requirements are fulfilled, we can assume that adaptive Hypermedia Systems can be applied successfully for the online store of Ikea.

2. Example of a Hypermedia graph

A part of a possible Hypermedia graph for the Ikea store is depicted in Figure 1. The central vertex (could be interpreted as home page) is *Ikea*.

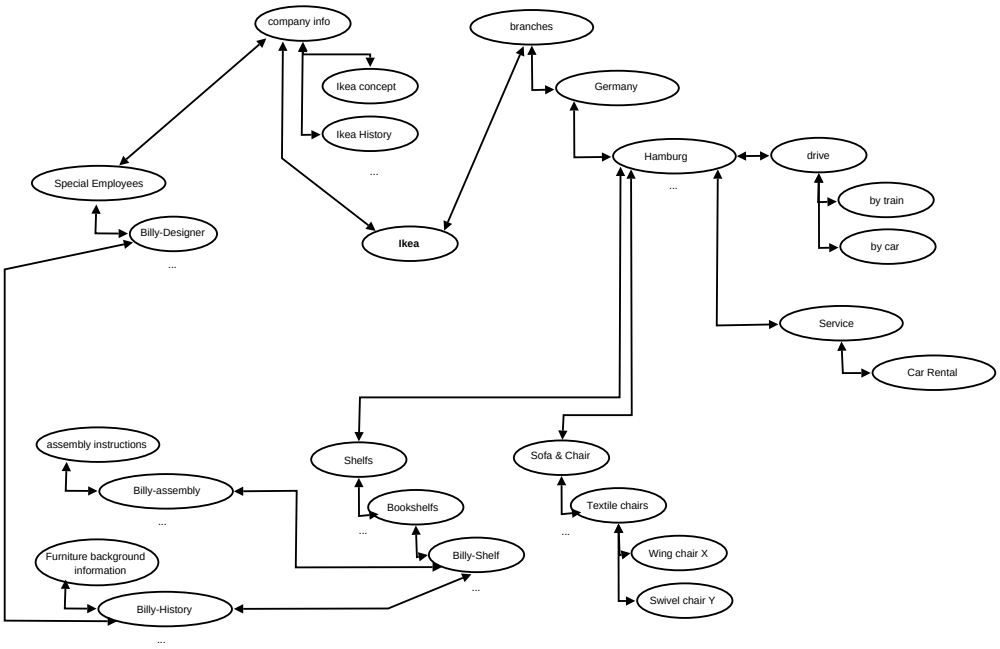

Abbildung 1: Example of a Hypermedia graph

3. Example of an adapted Hypermedia graph

The graph from Figure 1 fits well for on-site-shoppers. To fit the needs of the other user groups we identified in part 1., we extended the Hypergraph as depicted in Figure 2. Explanation:

Online-shopper (blue): The online-shopper does not care about the locations of the Ikea stores: Therefore, we removed the edge to the branches (light-grey) and added new edges to the products. Further, the online-shopper is not interested in renting a car but in delivery conditions. Thatswhy we replaced car rental with delivery.

Assemblyman (orange): additional edges that link directly to the assembly instructions.

Ikea-Interested (green): The new subgraph "world of living" gives Ikea-Interested a feeling about different living styles that Ikea offers...

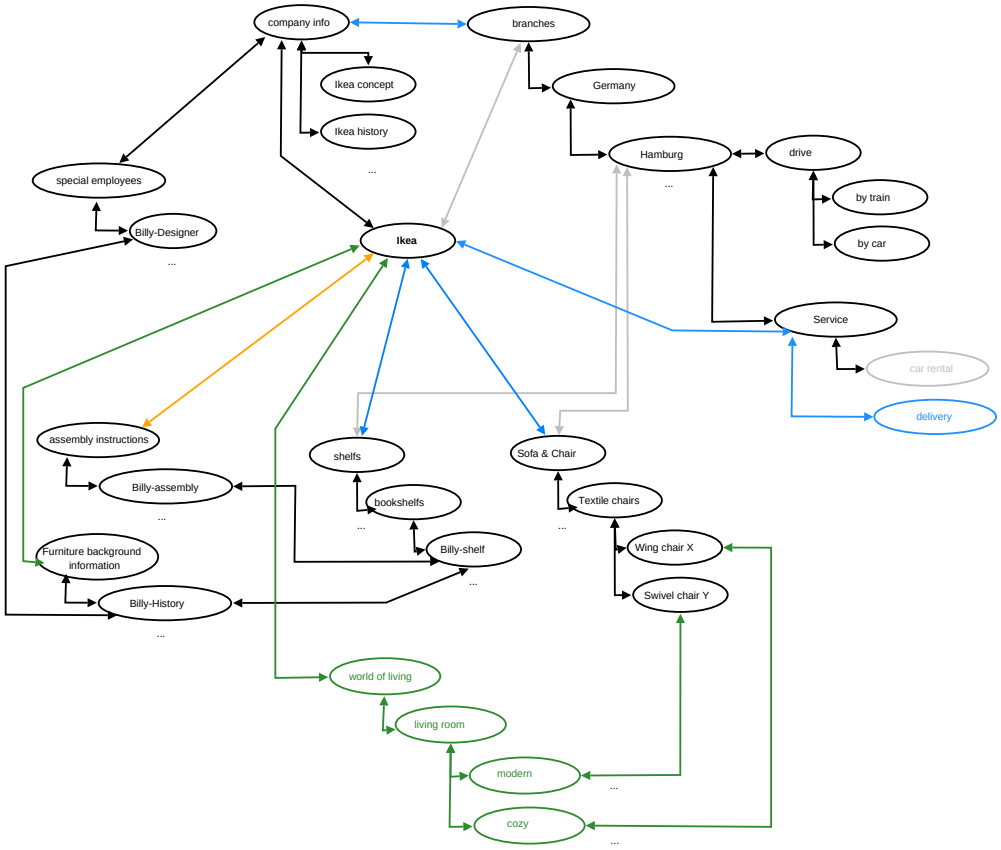

Abbildung 2: Example of an adapted Hypermedia graph

Solution 2 - Adaptive Educational Hypermedia Systems (AEHS)

(1) Document Space (DOCS)

Publications: $P_1, P_2, .., P_n$
Categories: $C_1, C_2, .., C_m$
A publication P_j is prerequisite for another publication P_i: $preq(P_i, P_j)$
A publication P_j is prerequisite for a category C_i, which means that the publication belongs to the category: $preq(C_i, P_j)$
A category C_j is prerequisite for another category C_i: $preq(C_i, C_j)$

(2) User Model (UM)

User: $U_1, U_2, .., U_r$
Additional attribute, which stores which of the publications and categories were understood by the user: $understood$
User U_i understood publication P_j : $userInfo(P_j, U_i, understood)$
Based on the requirements for the AEHS and with the Observations (see OBS) we define the following rules:

1. ***Rule:*** $\forall U_i \forall P_j obs(P_j, U_i, read) \Rightarrow userInfo(P_j, U_i, understood)$
   Description: When a user U_i read a publication P_j, we assume that the user understood the publication and note this in the user model.
2. ***Rule:*** $\forall U_i \forall C_j (\forall P_k (preq(C_j, P_k) \rightarrow userInfo(P_k, U_i, understood)) \wedge \forall C_l (preq(C_j, C_l) \rightarrow userInfo(C_l, U_i, understood)) \Rightarrow userInfo(C_j, U_i, understood)$
   Description: A category is considered to be understood C_j if all documents P_k and categories C_l which are a prerequisite for C_j are understood.

(3) Observations (OBS)

Attributes/observations: $read$ and $marked$
User U_i has read a publication P_j: $obs(P_j, U_i, read)$

(4) Adaption Component (AC)

A publication P_j is relevant for a user U_i:
$readingRelevant(P_j, U_i, relevant)$

Publications and categories, which are relevant, shall be marked green; other publications and categories shall be marked red:
$annotation(P_j/C_j, U_i, green/red)$

Rules to specify $readingRelevant$:

1. ***Rule:*** $\forall U_i \forall P_j (\forall P_k (preq(P_j, P_k) \rightarrow userInfo(P_k, U_i, understood)) \wedge \neg userInfo(P_j, U_i, understood)) \Rightarrow readingRelevant(P_j, U_i, relevant)$
   Description: To consider P_j as relevant, all prerequisite publications need to be understood and P_j should not be understood yet.

2. ***Rule:*** $\forall U_i \forall C_j ((\exists P_k (preq(C_j, P_k) \wedge readingRelevant(P_k, U_i, relevant)) \vee \exists C_l (preq(C_j, C_l) \wedge readingRelevant(C_l, U_i, relevant)) \wedge \neg userInfo(C_j, U_i, understood)) \Rightarrow readingRelevant(C_j, U_i, relevant)$
   Description: To consider C_j as relevant, one prerequisite publication or categorie needs to be be marked as relevant and C_j should not be understood yet.

Rules to specify *annotation*:

1. ***Rule:*** $\forall U_i \forall P_j readingRelevant(P_j, U_i, relevant) \Rightarrow annotation(P_j, U_i, green)$
   Description: If a publication P_j is relevant for a user U_i, it will be marked green.

2. ***Rule:*** $\forall U_i \forall P_j \neg (readingRelevant(P_j, U_i, relevant)) \Rightarrow annotation(P_j, U_i, red)$
   Description: If a publication P_j is not relevant for a user U_i, it will be marked red.

3. analogously for categories