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DUMPERS

Distributed User Modeling for Personalized Exploring Recommender Systems

ToKeN2000

About us

Project DUMPERS aims at websites that adapt themselves to minimize user effort, by creating user models and explore suggestions. User models are created by logging interactions and extracting user interests. The system will make recommendations to assist the user, but also to explore possible improvements of the site, the user model or the user's current session.

Links

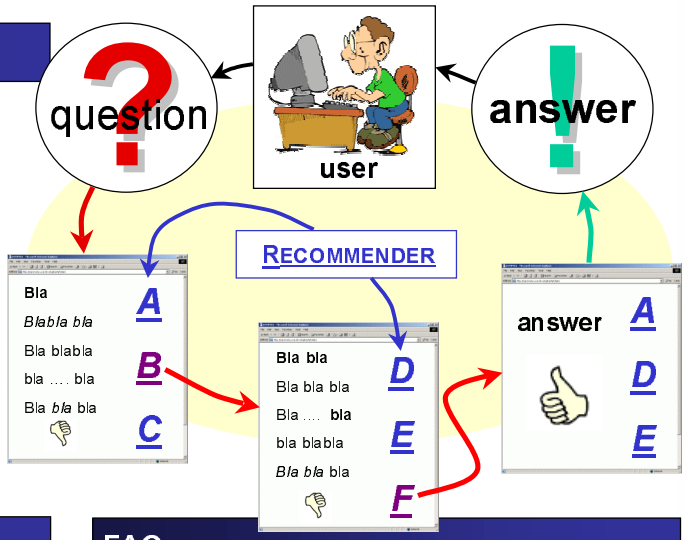
Dumpers is a ToKeN2000 project. It collaborates with the Geriwijzer project, which will serve as example application and test platform. The GERIWIJZER is a experimental site that guides the elderly, their family, or their practitioners to heath related information. ToKeN2000 project NARRATOR uses this site to investigate the use of narratives in information retrieval.

Problem

Someone with a question queries the site to find the answer. When the answer is not on the page the user selects a link and the next page is shown. The "user" is happy when finally the answer is shown.

A recommender system can assist the user by suggesting other pages through links. The system has to guess what the user is after. In some cases the system does not know the user (first time visitor), or the user cannot enter the question in a form. The system only knows the navigation behavior of the user.

The main question is:
How can the system guide the user to the answer?



Solution

Reinforcement Learning can optimize sequential decision making processes, like making recommendations, based on scalar evaluations. The user's "happiness" can be expressed as a scalar reinforcement and the total future happiness for each page can estimated from the users interaction with the site. Better recommendations can be made by considering estimated future happiness.

Exploration is a process added to reinforcement learning for evaluating consequences of alternative actions (making other recommendations). Instead of pure random, the exploration can be base on information about the content of the site or the user. In our application domain it is even possible to determine when to explore and when to assist the user (exploration/exploitation trade off).

To get sufficient data for learning, the system will use data from all users. The result is that the site adapts to the average user, which happens to be the best solution for dealing with first time visitors. More regular users can benefit from customization. A user model can be created that captures the difference between this particular user and the average user.

Topic of project DUMPERS are adaptive websites with recommender systems, that aim at reducing the navigation efforts of the users. The research focuses on learning algorithms, user modeling and exploration strategies for recommender systems. The GERIWIJZER site serves as an example application, and eventually our results will be tested on this site.

FAQ

How does the system knows if the user appreciated presented page?

It can ask the user or guess it from the time the user takes to click a link. It can also present only half the answer and have the user click a link (see more) to see the rest.

How does a recommender system differ from a more "traditional" reinforcement learning task?

It is always possible to present all information (the answers) or all links (the recommendations) on one page, so the "optimal" recommendation can always be given. The user's effort in following links is replaced by the effort in scanning the page. The web designer determines the difficulty of the learning task.

What information can be stored in the user models?

Information the user enters in forms and traces of visited pages can be stored. The recommended links NOT followed can also be stored, since they indicate what the user doesn't want. If the site categorizes the user, then the category can also be placed in the user model.

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