# Personalization of Search Results using Interactive Intent Modeling

# Interactive Intent Modeling

### **Problem**

• In exploratory search, user is uncertain of precise search intent

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- User needs to learn while searching
- How to allow the user to learn quickly and to find relevant results?

### **User perspective**

- Need easy and meaningful ways to modify query
- Need to get approximate understanding of information space quickly
- Easier to recognize relevant search features than to generate them

### **Interactive intent modeling** [1, 2]

- After user initiates search session, a search intent model is constructed
- The intent model is visualized to the user, along with the search result
- User can modify her query by making changes to the intent model
- Dynamic approach to personalization

# Extensions

### **Controllability** [3]

"How to enable the user to achieve the kind of changes in the search m that the users wants to happen?"

Solution: Choose the weight for the most recent user feedback adapti so that the resulting user model agrees well enough with it.

### **Predictability** [3]

"How to allow the user to predict what essential changes will happen in user model as a consequence of different actions?"

Solution: Simulate 'possible future models' when user is choosing feedback to give, visualize approximate resulting model on-line to the us

### **Drift Detection** [4]

"How to detect what user feedback is still relevant to modeling the cu user interest?"

Solution: Estimate accuracy of each user feedback (simultaneously with current user model), highlight feedbacks with low accuracy to the user so that she can either correct the feedback or indicate that the feedback was accurate.

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### nachine interaction through an intelligent user interface based on chitecture

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century, the human-computer interface style has gone through command language manipulation interface, Graphics User Interface, multimedia user interface, etc. main pressing in the direction of virtual reality and multimodal user interface at present. cone predicts that the automatic speech recognition technology can change the key fields the future. This text sketches several kinds of commonly used human-computer s, probes into the design principles of ideal human-computer interface, and looks man-computer interaction in the future.

### bot - Multiple human interaction via intelligent user interfaces

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E TRANSACTIONS ON INFORMATION AND SYSTEMS, 2001-01-01T00:00:00) erprint user interface networked services interface interaction object

sses an application of fingerprint identification technology to enhanced human-machine also to information systems, specifically to a mobile authentication terminal for services and to digital appliances. A "Fingerprint User Interface (FpUI)," exploits rding not only who put a finger oil its sensor but which specific finger it was. With ly interface, a user can assign commands, data objects, status, or personalized settings igers. A functional architecture for a mobile authentication terminal, ''Pocket-PID," identification capability is proposed which features: an easy-to-use FpUI and high the identification function is totally enclosed within the unit. This enables a user's icated without any. possibility of actual fingerprint data. being disclosed. The itates implementation of networked services based on secure biometric user

## els

### atic Relevance Determination model

Bayesian regression model that also ates the accuracy of keyword feedback. incorporate feedback on the accuracy by ing the prior of w\_i according to feedback

 $y_i \sim Normal(x_i\phi, \frac{\sigma^2}{w_i})$ ~  $Normal(\mu_{\phi}, \lambda_{\phi})$ ~  $InverseGamma(\alpha_{\sigma^2}, \beta_{\sigma^2})$  $w_i \sim Gamma(\alpha_w, \beta_w)$  $w_i^{fix} \sim Delta(1.0)$ 

# **Experimental Results**

When offered the option to use interactive intent modeling, users tended to use it as their primary interaction mode (instead of performing keyword query modifications) [1,2]

Compared to a baseline with only keyword query modification possibility, interactive intent modeling resulted in better quality of results (Figure 1) and also improved the task performance. [1,2]

Improving controllability seemed to improve user performance in focused search tasks but reduce it in broader tasks. [3]

Improving predictability was found useful by the users: 70% of the users reported that helped them in their search tasks. This was both because the feature helped them predict the effects of actions and showed them which keywords were related to each other. [3]

In a simulation experiment where a simulated user is giving noisy feedback, the ARD model is able to perform asymptotically as well as an oracle (Figure 2), given a small amount of additional user feedback. [4]

Users rated the quality of recommendations given by the ARD model higher than a linear baseline model. [4]

Users interacted more with the interface when the timeline was present: they gave more feedback with the radar (and timeline) and issued less keyword queries, while retaining similar task performance. [4]

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Fig 2: Avg F1-score / iterations

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