

**An analysis of
human-to-human dialogs
and its application to
assist visually-impaired people**

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Introduction : Exploratory search

- **Necessary in daily life**
 - many candidates
 - comparisons are important
 - shortest way is not known
- **Not easy for visually-impaired persons**
 - they must use TTS, instead of visual display
 - take longer time
 - require larger mental workload
- **Requirements**
 - 1) to understand the all-item list, broadly
 - 2) make satisfying choice; with least effort

At a restaurant (examples)

- **Many items; difficult to listen to all items**
 - at first, we should understand broadly
 - entree : salad, soup = 20items
 - main dish : beef, chicken, fish = 30items
 - dessert, drink = 20items
 - search : e.g. "exclude items with beef"
 - beef salad, beef steak, etc (10items are excluded)
 - refinement : e.g. "exclude items above 6 euro"
 - at last, we can compare the candidates
- **Names and natures often disagree...**
 - e.g. Sacher torte, Linzer torte
 - natures : chocolate cake with whipping cream

Two human-to-human dialogs

- Participants (Japanese)
 - two visually impaired persons
 - one supporter (with 10-years experience)
- Task : pick out a packed lunch
 - from the menu of a delivery service
 - in consideration of mood and physical condition
- Length : 20-40 min.
- Transcribed and analyzed manually



The skilled supporter was able to...

- **Read out loud effectively**
 - translate visual information to verbal communication
- **Communicate interactively**
 - with back-channels, appropriate responses, etc.
- **Lead to the relevant information**
 - categorize items by prices, main dishes, etc.
 - give easily associable nicknames
 - assist search refinement with conditions
- **Use "Shopping Cart" model**
 - reduce the mental workload
 - memorize the items of interest

Preliminary experiments

- To evaluate the "shopping cart" model
 - a set of instructions was created
 - simulated human-to-machine conversations
 - memorize search conditions & favorite items
 - strategy of dialog management
 - rough selection : only the num of items
 - comparison & final decision : item details



Examples

- Single page = single task
 - similar to the mobile sites

- Tasks:

- (a) Do you need the explanation of the menu?

- (b) Items are divided into three groups by price.

Please check to select.

- (c) The number of the items is 54.

Do you add the conditions for refinement?

The screenshot shows a multi-step menu selection process. At the top, a question asks if the user wants to hear the menu explanation. Below this is the 'Menu Selection' section, which includes a table of menu items categorized by price. A 'Conditions' section follows, asking if the user wants to add conditions for refinement. Annotations (a), (b), and (c) highlight specific parts of the interface.

メニュー全体の説明を聞くか
メニュー全体の説明を聞きますか?
[はい](#)
[いいえ](#)
[メインメニュー](#) 終了

メニュー選択
お弁当は、特上弁当、上弁当、並弁当に分かれています。

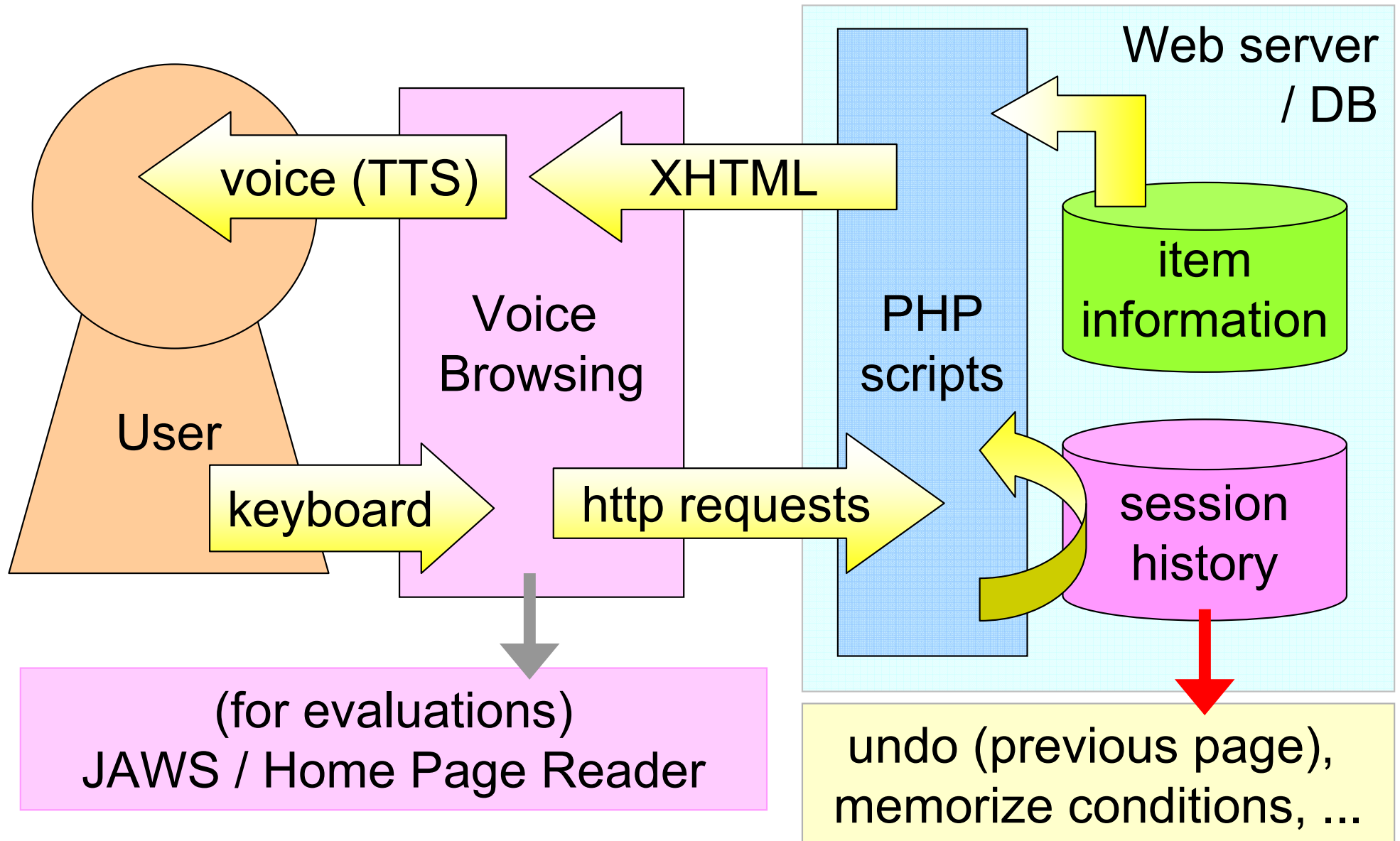
| メニュー名 | 説明 | 候補に残す |
|-------|---|--------------------------|
| 特上弁当 | 1200円から1600円の高級感漂うお弁当で、全19種類あります。型に入れた日にご飯にゴマをふったものとおかずの組み合わせからできており、サラダが充実しています。 | <input type="checkbox"/> |
| 上弁当 | 1200円のお弁当で、華やかな化粧箱に入っています。5種類あり、お肉もお魚も楽しめる方におすすめるお弁当です。 | <input type="checkbox"/> |
| 並弁当 | 800円から1200円の一般的なリーズナブルなお弁当です。揚げ物弁当、どんぶり弁当、カレーなど種類が豊富で、約50種類あります。 | <input type="checkbox"/> |

[チェックしたものを候補にする](#)
[メインメニュー](#) 終了

条件
該当商品は、54品です。
続いて、値段や中身の系統を条件として、候補となるお弁当を絞り込むことができます。条件を追加しますか?
[はい](#)
[いいえ](#)
[メインメニュー](#) 終了

(a) points to the 'はい' link in the first step.
(b) points to the 'メニュー選択' section.
(c) points to the '条件' section.

Implementation



Discussions

- "Shopping Cart" model was effective
 - reasonable selection was made in a short time
 - details are shown if the item was in the favorite list
 - names of the items : essential role
- Reduction of mental workload was important
 - help memorizing the conditions and items
- Implementation of "Undo" was important
 - without the function, the user was conservative
 - encourage to use new functions (to reduce time)
- Keyboard was preferred
 - considered easier than using speech recognition

Future works

- **Toward the exploratory search...**
 - apply to other tasks
 - session management for "Shopping Cart"
- **Reconsider the architecture**
 - session management / data model / presentation
 - accessibility, usability, multi-modal, i18n, security...
 - ITSCJ MMI Architecture WG / W3C
- **Implementations (plan)**
 - framework : Ruby on Rails
 - HTML : NVDA screen reader
 - VoiceXML : Galatea Project