Presentation Strategies for Micro-Navigation in the Physical World

Typically, people arrange their belongings in hierarchical storage structures, such as cupboards, drawers, and other containers. To help people locate and retrieve an object, we need to present navigation information in an efficient way. Motivated by the advancements in AR and localization technologies, we investigate presentation strategies in tasks that involve navigating to an object inside a hierarchy of physical containers within the user’s reach.

Presentation Strategies

We consider two types of navigation aids: Those that provide route knowledge via step-by-step instructions, using simple graphical overlays, and those that provide survey knowledge via map-like overviews, using 3D depth visualizations.

Route aids (Spotlight, Icon) cue the absolute location of the target from the user’s perspective. Icon instructs whether to open or remove a container to retrieve the target.

- Gradual guidance, reduces stress and anxiety of planning

Survey aids (X-ray, Cutaway) show the containers that require interaction from the user to retrieve the target.

- Help plan a route and develop alternative routes

Experiment

We compared the performance of survey and route aids in terms of task completion time, error rate, and user preference.

Results

Empirical data shows that users performance with route and survey aids is comparable in simple hierarchies, but deteriorates for survey aids in complex hierarchies. Users showed no preference of one aid over the other (n.s.).

Users found that route aids require less processing time and effort, and survey aids help understand a container hierarchy. Further investigations on more complex tasks in different contexts (e.g., warehouse) could reveal the value of each aid.

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