

Background

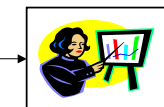
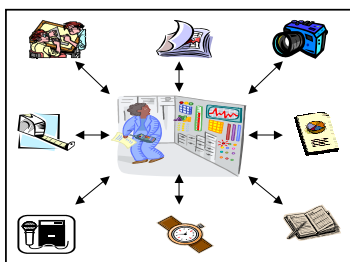
INTRODUCTION

PhotoFile allows you to take digital photographs and immediately annotate them. The system is designed for engineers, designers and ethnographers who conduct observational research in the field.

DESIGN PROBLEM

- Engineers, designers, and ethnographers often go out into the field to analyse and observe systems. Conducting observational research for a complex system can be a challenging and intricate task. This is because:
- Researchers may need to examine many items. This includes the system itself, the environment around it, the people who use it, and how they use it.
- When various types of data need to be collected, many different specialized tools need to be used.

Researchers collect data about the system, environment, and users. Tools to collect data include cameras, notes, measuring devices, and recording devices.



Researchers use observations to compile results of system analysis

STAKEHOLDERS

The primary stakeholders are engineers, designers, and ethnographers. Others who may be affected by the system include clients, supervisors, as well as users of the system being analyzed. Nine participants responded to a fifteen minute long, open and closed-ended questionnaire.

MAJOR OBSERVATIONS

- The purpose of conducting research varies from researcher to researcher. Examples of things observed in field work: operations, procedures, tasks, users, etc.
- Researchers use many tools and artifacts while conducting field work. E.g: paper, pen, documents, cameras, recording devices, notes, lists, documents, and schedules. The contents have to be organized and the tools have to be physically managed.
- Researchers use the tools listed above to conduct the following tasks: describe observations, note time, measure objects, sketch, record audio/video, and follow up with any post mortem issues.
- Most people feel that photographs are a valuable contribution to field work.
- The people who don't take pictures on the field do so because they feel it would jeopardize the 'naturalness' of the environment.
- Most people indicated that they multitask while conducting field work.
- People hold the PDA in one hand, with the stylus in another (this is important with regards to what additional tasks they can physically perform).
- People equally prefer categorizing photos chronologically and/or categorically (and both add great value).
- Using the listed tools, most people still forget to collect some sort of data.

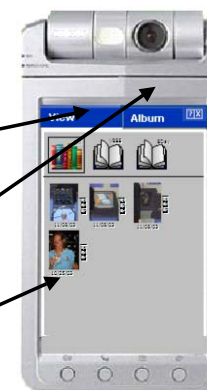
DESIGN REQUIREMENTS

- The system can't assume too much about the stakeholders, nor the environment in which the researcher is using the system. System functionality should focus on commonly used tasks and tools that are not specific to an environment or a situation.
- Annotation tools can 'replace' the tools and artifacts that researcher use in the field. This will facilitate multitasking and reduce the need for using multiple tools.
- Annotation tools can allow users to conduct similar tasks as the tools and artifacts which they replace.
- Provide a mechanism for taking photographs. Provide a mechanism for integrating the photographs with other data.
- In order to maintain a natural atmosphere, photo taking should be as ubiquitous as possible.
- The system should allow users to: perform more than one annotation on a photo; switch between photos, and allow interruptions in the workflow.
- Since both hands are occupied, the photo taking mechanism should not require the full hand. E.g. Should not expect user's to stop writing to look through a lens and focus.
- Since participants responded that they categorize photos both chronologically and categorically, both should be available.
- Since researchers often forget to collect some sorts of data, the markup tools can serve as cues for collecting salient data.

DESIGN

CONCEPTUAL DESIGN & FUNCTIONALITY

- Annotation tools should satisfy general, common needs. As well, templates may not be an effective option since there is so much variability among the users.
- The following annotation tools replace the physical tools: text entry, measurement, audio recordings, timestamp, and sketch. Other tools may also be necessary and will be determined through usability testing.
- Ensure that each Annotation tool adequately replaces the physical tool. E.g. the text entry tool allows users to describe observations.
- Provide functionality to make annotations directly on photographs.
- For example, users won't need to lift the camera lens to eye level to take a photo. Users can focus lens on an area, or 'snap' a photo, using one of several mechanisms (in addition to a button).
- Multiple annotations can be made on one photograph. Provide two togglable modes: 'View' mode and 'Album' mode. Allow users to save and return to (multiple) annotation layers.
- The mechanism can be an icon on the monitor, a physical button on the PDA, aligned with the way the device is held, and/or a button on the stylus. Clicking a button on the stylus makes use of the metaphor of clicking a pen to expose the ballpoint.
- Photographs are automatically time-stamped; 'Album' mode will be a folder structure; both photos and folders can be named.
- Use icons for annotation tools (as opposed to hidden menus). Icons must accurately represent corresponding functionality.



EVALUATION METHOD

- Usability testing involved 5 potential users, and three stages:
1. Users were asked to complete tasks with think-aloud techniques. First, they traversed through the annotation icons, then they traversed through the Album folders.
 2. Using the physical prototype, users were asked to try various mechanisms to simulate rotating the lens to a suitable position, and 'snapping' a photo.
 3. Users were asked open-ended questions regarding existing as well as additional functionality, as well as general comments.

PROTOTYPES

1. Early design established with low fidelity paper prototype.
2. Horizontal, interactive prototype with links and animation created in PowerPoint.
 - Allows users to take several photographs in a scenario.
 - Can annotate, save, and organize photos in albums.
 - Annotations are simulated.
3. Physical prototype simulates shape and size of system.

Designing PhotoFile: A Tool For Documenting Observations

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CONCLUSIONS & RECOMMENDATIONS

The PhotoFile addresses researchers specialized needs for documenting observations. These needs can be summarized by 3 usability goals:

- Effectiveness
- Efficiency
- Ubiquity

Next iteration of prototype:

- Redesign in order to account for issues discovered during usability testing: the need for clear icons, consistent labels, clear functionality, error prevention, useful tools, and flexible functionality.
- Formative evaluation of design in order to verify overall effectiveness, efficiency and ubiquity

EVALUATION RESULTS

- On average, 17% (2/12) of the icons and labels were not clear to users.
- On average, 17% (2/12) of the icons had surprising or undesirable outcomes when selected.
- Icons lose some meaning due to proximity to other icons with unrelated functionality.
- Valuable suggestions: e.g. Hyperlink annotation tool, viewing options such as zoom and pan.
- Inconsistent labels caused confusion.
- Inability to 'undo' actions, 'delete' annotations, confirm save of layer prior to selecting new photo.
- Varied preferences for mechanisms to focus camera lens and 'snap' a photo.
- Entire system generally well accepted. All user's speculated that the system can be an efficient organization tool for documenting observations.

Heuristics to Re-examine:

❖ Visibility & Recognition	❖ User Control & Freedom	❖ Match of System and Real World
❖ Flexibility & Efficiency	❖ Consistency & Standards	❖ Error Prevention & Recovery

Results