

Machine-Assisted Cooking

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ABSTRACT

In this paper we describe the formatting requirements for SIGCHI Conference Proceedings, and this sample file offers recommendations on writing for the worldwide SIGCHI readership. Please review this document even if you have submitted to SIGCHI conferences before, some format details have changed relative to previous years.

Author Keywords

Guides; instructions; author's kit; conference publications; keywords should be separated by a semi-colon.

Optional section to be included in your final version, but strongly encouraged.

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous

INTRODUCTION

Cooking can be a source of enjoyment and pride and a forum for creative experimentation. Compared to prepackaged and most restaurant meals, homemade meals can be healthier and cheaper. However, developing the proper skills to cook with confidence takes time and patience. The tools, ingredients, motor skills, effective use of heating/cooling appliances, pressures of precise timing, importance of precise timing, as well as several other factors may seem overwhelming to novices. In a world where people are on the run, prepackaged meals, restaurants, and near-instant food delivery are appealing alternatives to cooking.

Many people perceive cooking as stressful and time-consuming or simply not worth learning. We believe the difficulties involved in cooking are primarily due to cognitive overload. Getting your first meal right is almost impossible without help, and failure may discourage people from trying again. There are few resources that currently exist which help mitigate the cognitive load experienced by first-time cooks. For instance, printed cookbooks increase cognitive load, because ingredients and instructions must be memorized in order to cook without interruption. Cooking blogs (e.g., [1]-[2])

provide plenty of recipes and guides, but these sources are merely digital versions of printed cookbooks. ?Cook Assistant Lite? is one cellphone application that has made cooking interactive [3], but the application requires the user to continually interact with the application, which leads to even more interruptions while cooking.

In this paper, we propose a digital cooking assistant design for novice cooks. Our design focuses on the following points:

- Mitigate interruptions that are due to overutilization of visual input (necessary visual observations while cooking and having to continually read something to determine what to do next) and motor functions (hands are used for cooking and clicking through applications or scrolling on a blog).
- Mitigate cognitive overload that is due to the physical and temporal demands of cooking, which are exacerbated by the memorization of ingredients and instructions.
- Make instructions in recipes more accessible, teach users new cooking techniques, and help users decide what to make with the ingredients they already have at home.

Features of our design include text-to-speech instruction; timers for managing multiple simultaneous tasks; reminders to check oven and stove temperatures; easy-to-read interfaces that display one step at a time with large pictorial, audio, and/or video aids, somewhat reminiscent of turn-by-turn navigation of a GPS; and lifelines to contact other users who have previously tried the recipe.

Our approach is user-centered. We survey both novice and expert cooks in order to identify key differences between skill levels. For instance: What do novice cooks find most difficult about cooking? What prevents them from cooking more often? What motivates experts to cook? Survey results inform our design of several paper-based interfaces. We then conduct a round of in-person questionnaires to obtain feedback on multiple paper-based designs, which help to identify prominent features and issues with each design. We show multiple designs in parallel to each participant. After incorporating feedback on paper prototypes, we implement the digital design leveraging the recipe API BigOven [4]. To assess the quality of our digital prototype(s), we conduct a within-subject experiment, comparing user performance on cooking recipes with and without our prototype(s). During the performance phase, we collect qualitative data by observation. After each cooking session, we ask the user to assess their cooking experience based on the following factors (NASA

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Task Load Index): mental demand, physical demand, temporal demand, performance, effort, and frustration. Finally, through further user testing and design/development iteration, our final product embodies the features that help first-time and novice cooks succeed in their cooking adventures.

FIELD VISIT #1: BLAH

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Contextual Studies

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Design Observations

Interactive Icons

Speech Processing

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The first set of keywords will be used to index the paper in the proceedings. The second set are used to catalogue the paper in the ACM Digital Library. The latter are entries from the ACM Classification System [?]. In general, it should only be necessary to pick one or more of the H5 subcategories, see <http://www.acm.org/class/1998/ccs98.html>

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Figure 1. With Caption Below, be sure to have a good resolution image (see item D within the preparation instructions).

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Use a numbered list of references at the end of the article, ordered alphabetically by first author, and referenced by numbers in brackets [?, ?, ?, ?]. For papers from conference proceedings, include the title of the paper and an abbreviated name of the conference (e.g., for Interact 2003 proceedings, use *Proc. Interact 2003*). Do not include the location of the conference or the exact date; do include the page numbers if available. See the examples of citations at the end of this document. Within this template file, use the `References` style for the text of your citation.

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Objects	Caption — pre-2002	Caption — 2003 and afterwards
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CONCLUSION

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ACKNOWLEDGMENTS

We thank CHI, PDC and CSCW volunteers, and all publications support and staff, who wrote and provided helpful comments on previous versions of this document. Some of the references cited in this paper are included for illustrative purposes only. **Don’t forget to acknowledge funding sources as well**, so you don’t wind up having to correct it later.

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