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Cooking Together

A Digital Ethnography

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Abstract

Cooking together is an important part of everyday life, a social event in which people enhance their relationships through shared stories and swapping ideas on food preparation. We present a new methodology for studying human interaction to inform the design of interactive systems. In our digital ethnography we study a selection of YouTube videos and use Kendon's theory of F-formations to catalogue a set of spatial patterns created between cooks, kitchen spaces and cameras that influence the social aspects of cooking together. A new F-formation specific to this domain is identified and used to suggest design opportunities for a digitally enhanced kitchen space for sharing the social experience of "cooking together" for people living in different homes.

Keywords

Digital ethnography, collaborative cooking

ACM Classification Keywords

H.5.m. [Information interfaces and presentation (e.g., HCI)]: Miscellaneous;

General Terms

Human Factors.

Introduction

Cooking together is an important part of our lives. We cook with friends, families, colleagues and strangers to share not only the experience of creating a meal, but in the spirit of commensality, it is a social event where we enhance our relationships with others through shared stories, relating daily happenings and discovering new ideas about food preparation from each other. Given this role of food and the kitchen as a place for social interaction, it is important to understand the role technology might play in this context [4].

In this paper we explore, as a starting point, new methodologies for studying human-food interaction while cooking in order to inform the design of interactive systems facilitating this activity. Specifically, we seek to understand people's shared experiences of cooking better for the purpose of generating design ideas for digital augmentation of future kitchen spaces. For example, we would like to develop digitally enhanced kitchen designs giving people the experience of cooking with family, friends and others who are geographically distributed. This would give people the opportunity to interact socially with close ones living in another place as an integrated part of their daily lives and household routines – an important aspect of keeping distant relatives and friends connected [13].

However, rather than building and evaluating such a setup, we wish to have our design informed by an understanding of the activity of shared cooking and of shared cooking involving a "remote viewer" in the experience. Hence we have studied people sharing cooking experiences from their own kitchen space to an outside audience using digital video posted on YouTube. In this research, we have focused on peoples'

interactions with co-present others, with the physical kitchen layout, with cooking artifacts and with their remote audience (via the camera) using the theoretical lenses of proxemics [5] and F-formations [10].

Background and Related Work

A number of research efforts have begun exploring digital technologies in support of cooking [e.g., 6,9,15, 16,17]. Studies vary in approach. Some support the functional aspects of cooking and overcoming various difficulties with it. Increasingly, research is turning its attention to the social meanings and practices of cooking in which the kitchens are viewed as "sites where meaning is produced, as well as meals" [1]. For example, sharing recipes as a social act [16] or providing mentoring support for friends and family while they learn to cook [15]. Our focus is concerned with the shared experience of cooking and bringing people together socially in a "cooking space" - across distributed households. We want to develop appropriate technologies for these spaces that are both useful and sensitive to the social concerns of these spaces. To do this we need to make sense of people's cooking practices, so that this understanding can meaningfully inform design and seed innovation [1].

While traditional HCI methods of understanding users, such as direct observation, have been used in the home, they are not without their problems. As the movie "Kitchen Stories"[7] so charmingly illustrates, it is not ideal, or even logistically possible, to sit in an observation chair in the corner of other people's kitchens to observe their cooking behaviors. Research confirms that although the home is relatively easy to access, direct observation inevitably disrupts the ordinary flow of household activities and can cause

people to alter their ordinary behavior [3] - doing this for a wide range of homes, people and scenarios can be even more challenging.

In an attempt to overcome some of these challenges we explored a form of "digital ethnography" [12] to gain access to how people interact with each other, with food, and with the physical artifacts and spaces of the kitchen environment while cooking together. In particular, we wanted a sense of how people present themselves and respond to sharing their cooking experience with others beyond the physical confines of their own kitchen. In digital ethnography, researchers immerse themselves in the digital world rather than physical and make use of digital data such as words, images, audio files, video and online communities. Inspired by recent research, our methodology draws on YouTube as data source [e.g. 2,8,14].

Study Method
As people voluntarily and enthusiastically share a variety of different cooking situations with others on YouTube, we used their video files to conduct a digital ethnography on how people cook together and share this activity digitally with others. In this way, we were able to rapidly gain access to a breadth of information about a variety of people in different generations, cultures and situations documenting their own experiences of "cooking together" (fig 1).

Our focus was on understanding the social aspects of cooking. In particular, we were interested in how people coordinate the cooking effort, how they organize themselves spatially in respect to physical space and each other, the role of food in this shared experience and in particular how they include (or not) the viewer

of the video in the interaction. The fact that technology (the camera) is already a key component in the orchestration of the kitchen space, use of artifacts, interaction with food and others, gave us valuable insight into how this coordination was managed and people's spatial patterns of interaction people.

Proxemics and F-formations
The very activity of cooking influences the ways in which human interaction is spatially organized in the kitchen. Architectural design of kitchen spaces also structures the kinds of interactions and social activities that are enacted within them. People adapt their activity patterns in respect to artifacts and others. Working side by side at a kitchen bench, for example, influences how people communicate as opposed to working at opposite sides of a kitchen island. Facing a video camera during the interaction adds yet another level of complexity. The viewers perceived distance from the cook affects the intimacy of the interaction. Issues such as eye gaze and field of view can all affect the nature of the interaction. Through our analysis we aimed to understand how these physical aspects contributed to shaping the experience people have when cooking together.

By studying the natural proxemics involved in the activity of cooking together, in terms of the distance classifications of Hall [5] (i.e. *intimate*, *personal* and *social*), between co-located people and the camera in the kitchen space we can understand how distance affects the sense of participation in different aspects of the cooking activity. This gives insight about how to digitally support the presence of remote participants, with appropriate distances and camera angles, so that they become part of the social experience.

figure 1.
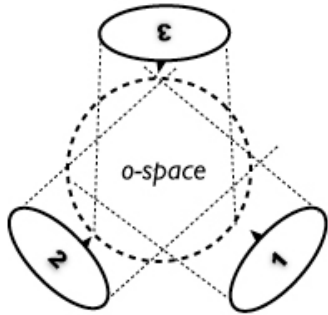YouTube video of "cooking together".

figure 2.

F-formation – *circular* - overlapping transactional segments create the o-space.

figure 3.

Content map formed through content analysis of videos – categories and attributes - spatially arranged in 2D map in respect to relationship of corresponding category attributes of the videos.

In order to understand the spatial aspects of shared cooking practices and motivations, our methodology draws on Kendon's F-formation (facing formation) theory [10]. This conceptual tool has been used to analyze physical spaces in terms of how they support social interactions and by extension, their potential augmentation with technology [11]. F-formations help explain how people arrange themselves spatially with respect to others and artifacts in different kinds of interactions and collaborations. These F-formations can therefore be used to explore the influence of physical context on social interactions. In an F-formation system, individuals have a spaced called a *transactional segment*. This is the space where they focus attention and manipulate artifacts. This space is defined in relationship to their lower body, and changes in size depending on the kind of activity people are doing. An F-formation is formed when the transactional segments of two or more people overlap (fig 2) and create a shared inner space, where the main activity occurs, called the *o-space* [10].

Analysis

Our initial data set was 169 YouTube videos comprising the search results for the keyword phrase "cooking together" on 15 November 2010, sorted by relevance. Discarding duplicates and unrelated videos resulted in a final set of 61 videos of people cooking together. The first phase in our method was a qualitative content analysis of these videos, resulting in inductive development of the following categories: *video production, cook expertise, relationship of cooks, genre, content, intended audience, skill level, location, background story, mood, food role, people role, motivation*. A second outcome from this phase was a content map showing relationships between the 61

videos in respect to the categories (fig 3). As a result of analyzing the content map, eight distinct video types were identified. These types were: *family life; family cooking; celebrities cooking; amateur cooking show; professional cooking show; documentary; educational video and advertising*.

For detailed analysis of interactions between people, food and physical space, we selected a set of 6 representative videos, one from each relevant video type. We looked for the F-formations as defined by Kendon [10]: for two people (*L-shaped* (standing perpendicular), *vis-à-vis* (facing) and *side-by-side*); and for groups of three or more people (*circular, rectangular, semi-circular* and *linear* arrangements). We identified spatial patterns of interaction between people, artifacts, spaces and the camera (viewer perspective) to see how people shared activities and interacted with others and artifacts in respect to the kitchen's physical layout. We used Kendon's diagramming practice for recording F-formations at a birthday party [10, fig.28] to "transcribe" the videos, recording patterns of behavior by creating a series of maps showing the arrangements and movements of people and cameras within the kitchen.

Each frame is time stamped (*t*) and records a newly established position of individuals. People are shown as numbered ovals with two lines extending to show their transactional segment, and hence where they intersect to create an F-formation. Previous positions (dotted) and paths of movement through spaces are represented, as are artifacts currently being used. We also documented the virtual position of the camera (black square) and the field of view (dotted lines) from that position. This made it possible to identify the
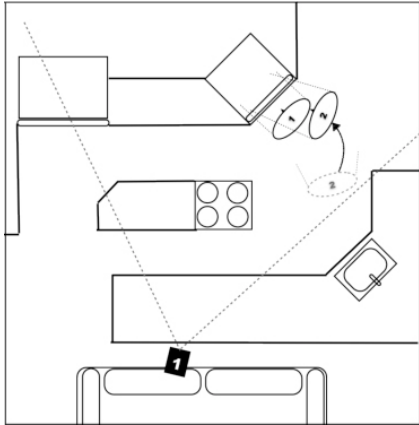
figure 4.
Formation analysis map of kitchen, cooking artefacts and people from YouTube Video 57 – box 1: camera; ovals 1 & 2: people (with transactional segments).

figure 5.
Screen shot of YouTube Video 57 – cook (mother) showing oven temperature to second cook (daughter).

viewer's participation in any F-formations. Each person's current activity, the focus of the current camera shot, and the general field of view as a description (e.g., half of kitchen bench top in view) were also noted (see fig 4).

These maps were then analyzed to identify the following: the F-formation between co-located cooks (*F-f*); the F-formation between us (the viewer) and the cooks (*F-f(c)*); the distance between cooks (*Pdist*); and the perceived distance between us (the viewer) and the cook *(Cdist)* using distance classifications of Hall [5]. This coding was then studied to identify spatial patterns supporting social connections in the human-food interaction.

Discussion

An important part of the understanding gained through observing how people interact when cooking together was seeing how kitchens were turned into shared places for positive, delightful, pleasurable and exciting experiences with food [4]. Focusing the digital ethnography on F-formations [10] and proxemics [5] allowed us to identify situations when interaction with the camera, the cooking partner, and/or both, worked well. That is, we looked for o-spaces formed by all participants' transactional segments (cooks and viewers), and any focal artifacts of the interaction located in that o-space (i.e. the food being prepared, the kitchen utensils being used). For example, by using this method to include interactions with the audience (via the camera) we are able to identify their inclusion in F-formations. From this we can extrapolate on potential placement of video cameras in digital kitchens that support remote viewers experiencing focused social encounters with people in the physical kitchen.

As well as identifying those spatial patterns that supported a shared o-space between the viewer and co-located cooks, we also discovered a new formation with a shared o-space. In documenting the spatial maps of the human-food interactions it became apparent that a spatial pattern, not previously identified in Kendon's analysis of social encounters, was an important part of the cooking interaction. We call this formation: *spooning* (or *over-shoulder)*. It is an important part of showing technique (e.g., putting something in the oven), sharing progress (e.g., looking into the pot), and working together (e.g. emptying food from a heavy pot), during a cooking activity. This was observed both in respect to the people in the video (see fig 5), but additionally when the camera was given an over the shoulder shot of what the cook was doing. In both cases the transactional segments intersect on the activity being performed and hence a new type of formation system is created and maintained for the duration of the activity. We can now reflect on whether this formation is a new F-formation, or something else. From our observations, the *spooning* arrangement created *personal* and *intimate* views into the shared activity and is an important factor for experiencing what the other person is seeing and doing – as well as feeling intimate with that person and their activity. This is supported in the categories from our initial analysis, including: sharing, exploring, participating, relating, socializing, involving, and showing. Supporting this sharing and intimacy in cooking has significant implications for the design of camera positions when attempting to distribute the experience. Rather than mounting cameras directly above the stovetop, or third-person shots of the activity from afar, much more care has to be put into achieving camera views that are comparable to being present as an active participant.

Conclusions and Future Work

We presented a digital ethnography of the spatial aspects of people's interactions while cooking together using YouTube videos as our data source and the concepts of F-formations and proxemics as our analytical lenses. We showed how this methodological approach to studying people's interactions in difficult to observe situations has potential benefits for HCI, providing insights of value for designers. In the case of cooking together we showed how digital ethnography of YouTube videos allowed us to map out the spatial organization of physical spaces with attention to people, objects, food, and the camera. Confirming findings reported in [11], we illustrated how mapped social interactions in a kitchen provides a starting point for considering what and how technology might support cooking together with distant friends and family.

References

1. Bell, G. and Kay, J. Designing technology for domestic spaces: A Kitchen Manifesto. *Gastronomica*, (2002), 46-62.

2. Blythe M. and Cairns P. Tenori-On Stage: YouTube As Performance Space. In *Proc. NordiCHI 2010*, ACM Press (2010), 72-81.

3. Crabtree, A. and Rodden, T. Domestic Routines and Design for the Home. *Computer Supported Cooperative Work, 13*, 2 (2004), 191-220.

4. Grimes, A. and Harper, R. Celebratory Technology: New Directions for Food Research in HCI. In *Proc CHI 2008*, ACM Press (2008), 467-476.

5. Hall, E.T. *The Hidden Dimension*. Anchor Books, 1966.

6. Hamada, R., Okabe, J., Ide, I., Satoh, S., Sakai, S., and Tanaka, H. Cooking Navi: Assistant for Daily Cooking in Kitchen. In *Proc. Multimedia 2005*, ACM Press (2005), 371-374.

7. Hamer, B. *Kitchen Stories* (Salmer fra kjøkkenet) [Motion picture]. Norway, IFC Films, 2003.

8. Harley, S. and Fitzpatrick, G. Creating a conversational context through video blogging. *Computers in Human Behaviour, 25*, 3 (2009), 679-689.

9. Ju, W., Hurwitz, R., Judd, T., Lee, B. CounterActive: An Interactive Cookbook for the Kitchen Counter. In *Ext. Abstracts CHI 2001*, ACM Press (2001), 269-270.

10. Kendon A. Conducting Interaction: Patterns of Behavior in Focused Encounters. Cambridge University Press, Cambridge, 1990.

11. Marshall, P., Rogers, Y. and Pantidi, N. Using F-formations to analyse spatial patterns of interaction in physical environments. In *Proc. CSCW 2011*, ACM Press (2011), 445-454.

12. Masten D.L. and Plowman T.M.P. Digital Ethnography: The next wave in understanding consumer experience. *Design Management Journal, 14,* 2 (2003), 75-81.

13. Nardi, B., Schiano, D., Gumbrecht, M. and Swartz, L. Why we blog. *Communications of the ACM – The Blogsphere, 47,* 12 (2004), 41-46.

14. Rotman, D. and Preece, J. The 'WeTube' in YouTube – creating an online community through video sharing. *Int. J. Web Based Communities, 6,* 3 (2010), 317-333.

15. de Runa, J., Harpring, J., Rafiuddin, M. and Zhu, M. Not Enough Cooks in the Kitchen. In *Proc. CSCW 2010*, ACM Press (2010), 485-486.

16. Terrenghi, L., Hilliges, O. and Butz, A. Kitchen Stories: sharing recipes with the Living Cookbook. *Pers Ubiquit Computing, 11,* 5 (2007), 409-414.

17. Tran, Q., Calcaterra, G. and Mynatt, E. Cook's Collage: Deja Vu Display for a Home Kitchen. In *Proc. HOIT 2005*, Springer (2005), 15-32.