Workshop on Amplified and Memorable Food Interactions

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Abstract
Cooking has the potential to bring joy, a sense of achievement and social presence to individuals and groups. Food properties (food cues) such as scent, sound and taste are rich cues to the state of the cooking process, as well as, providing memories evoking emotions attached to social situations and people from the past. Thus, optimal methods to capture and present these cues is an on-going research challenge. In this workshop, we bring researchers, amateur cooks, and designers together to explore two research questions:1) how does enhancing our awareness of food temperature support a joyful and/or a memorable cooking experience? and 2) how can we use food cues to enhance our sense of joy, empower reminiscence and nudge communication between individuals?. We aim through this event to foster a research community that uses food interaction as a medium to promote a sense of joyfulness and social wellbeing.

CCS Concepts
•**Human-centered computing** → **Human computer interaction (HCI);** *Information visualization;*

Author Keywords
food interaction; amplified perception; thermal imaging; memory augmentation; reminiscence; communication.

Introduction and Background

Food is a rich medium represented by a combination of properties such as scent, flavor, texture, color and temperature. We call these properties within this paper *food cues*. These properties inform us about the cooking progress, as well as, act as cues reminding us of important events or people in our life. For example, the scent of baked cinnamon buns may signal that not only is the food well-cooked, it may remind us of a prized interaction or event such as a shared morning tea with friends or colleagues. An overcooked or burnt cinamon bun however may trigger negetive memories, such as that of meals which were supposed to be joyful, but were ruined by over-cooking. Other smells such as mulled wine may remind us of a particular time of year or season, such as Christmas. Innovative presentation of the food properties acts as a subliminal nudge to try new experiences. For example, the colorful and concise temporal presentation of "Tasty" videos encourage individuals to try cooking them and/or create a social context of sampling the cooked meals with loved ones.

Some Food interaction literature focuses on automatic detection of cooking steps [6], automation of cooking [5], documentation of recipes [2], and creating novel techniques to consume food [3]. We would like to complement this body of knowledge by focusing on *two under-explored directions*:1) how does enhancing our awareness of food temperature support a joyful and/or a memorable cooking experience? and 2) how can we use food cues to enhance our sense of joy, empower reminiscence and nudge communication between individuals? (E.g.: [4]) .

Our first research question is driven by the technologically under supported, yet critical food property that is *the temperature*. The ambiguous temperature instructions in recipes complicate cooking (E.g.: how an amateur cooker understands an instruction like "cook until it simmers but does not boil"). Thus, recipes which lead to failed cooking interactions may lead to frustration instead of the sense of achievement accompanying successfully cooked meals. Ambigiously, failed recipes may also provoke new outcomes, a different dining experiences, and therefore novel recipes. Regardless, thermal imaging has the properties to support a ubiquitous cooking experience. Thus, in this workshop, we will explore cases whereby thermal imaging leverage the interaction to support joyfulness and memorability in cooking as opposed to traditional thermal sensing approaches like thermometers.

Our second research question is motivated by the research gap in creating systems that leverage the psychological effects associated with food to enhance recall and support behavioral change. For example, food properties offer a rich media of cues to trigger the recall of past experiences (reminiscence). Reminiscence is important to our emotional and mental growth as it allows us to reflect on our evolving values and emotions towards the same events across time. Similarly, it can nudge us to reconnect with people from the past via providing reminders to past happy events with them. An example is contacting a cousin after smelling certain cookies that are associated with Christmas celebrations with that cousin. Thus, we explore how to visualize such cues to create novel interfaces supporting reminiscence, social communication, and enhance our sense of achievement and joy. Through this event, we aim to build an interested community that uses food as a medium to promote joyfulness, happiness, and social wellbeing of people.

Workshop Goals and Topics

Our goal is to inspire the MUM community to use ubiquitous computing to create a "joyful and memorable food experience". We use a focus-group approach with intensive

brainstorming activities to explore where technology could augment cooking processes, creating a sense of joy and wellbeing through amplified perception. We cover topics such as:

Wearable and ubiquitous sensing technologies In which scenarios can thermal imaging support cooking activities? What is the impact of the sensing scope granularity: all-surface data vs. focal points sensing? Which cues needs to be best supported to reduce frustration during cooking?

Psychological foundations What makes cooking a memorable experience? [7, 8] Which cues could food provide to trigger memories? What are examples of specific use or cases where food can support triggering memories? Can we use the cued memories to motivate behavioral change (e.g.: acquiring new habits like cooking)? Can we use the cued memories to nudge social communication? Which cues are needed to leverage the sense of achievement resulting from cooking? How can we use the cues to enhance our memory without needing external aids?

Cooking-support visualizations What is the optimal presentation method for thermal data? Do users prefer explicit visualizations of thermal data or implicit action points depending on the automatic state monitoring?

Psychological well-being visualizations How to represent and visualize cues to support reminiscence? How can we best encapsulate and replay the "sense of joy" accompanying food cooking and consumption? How to represent and visualize food cues to support social communication?

Innovative user interfaces How can we use lifelogging technologies to foster positive psychological effects of food experiences? How can we create systems to share the cues with others? How can we create systems that support

selective recall using food cues (enhancing / diminishing certain memories)? How can we create systems leveraging the usage of the thermal cues to support efficient cooking?

Privacy and societal implications What are the challenges and ethical implications of designing systems that implicitly motivate people to alter their communication or revive their memories? What are the challenges of continuously capturing thermal data in private spaces like kitchens?

Workshop Plan

We propose a full-day workshop, bringing together researchers from both academia and industry as well as amateur cooks or participants with a general interest in technology and food. The workshop includes informative presentations, brainstorming activities after defining the context via the existing literature.

Part 1: Introduction & Keynote

The workshop starts with a keynote to introduce the context of the research to our participants. Afterwards, we briefly introduce a sample of ubiquitous and wearable devices to our participants. Next, the participants briefly introduce themselves and their position papers. In our first interactive activity, we explore the perception of our participants towards ubiquitous technology in food and cooking context. Our participants will be asked to narrate individually their cooking expertise and behavior. Afterwards, participants are asked to mark scenarios that they identify as a challenging cooking task. (*Duration: 240 minutes*)

Part 2: Sensing Additional cues

The participants envision use cases for the ubiquitous sensing technologies such as thermal cameras to visualize and sense the temperature cue. Participants will discuss and present in groups three use cases for their technology. (*Duration: 60 minutes*)

Part 3: How do food cues trigger memories?
The participants are asked to work in groups to discuss how food cues trigger memories or make the cooking experience memorable. Afterwards, they will be asked to select a scenario with two technological interventions using ubiquitous technologies: the first is to support the dominant cue (flavor, smell, ...etc.), and the second is to explore how to utilize the temperature cue. Each group pitches their scenarios and their technological intervention to the workshop participants. (*Duration: 90 minutes*)

Audience Recruitment
Our target audience are researchers, designers and eager students providing creative contribution in the design sessions. Those are complemented by invited participants from industry using our contacts (E.g.: Microsoft Research and Mentor graphics). Additionally, we will invite the creators of local trending Facebook cooking support groups (E.g. "Kitchensita" [1]) to provide hands-on experience of challenges of sharing recipes and learning to cook. A website will be established for the workshop. We will recruit participants through our personal contacts, an open call for participants, and using social networks. We plan to have between 10-15 participants in the workshop.

Expected Outcomes
The main aim of the workshop is to foster a community of researchers and designers interested in: 1) using ubiquitous computing to support amateur cooking and 2) using food as a memory cue for reviving memories.The output from the discussion and hands-on sessions will result in collaboratively created designs for potential applications. We anticipate joint publication of the findings from the workshop in an article that highlights the main insights. Finally, based

on the participant's feedback, we plan to conduct a series of follow up workshops, aim to define further direction and concrete research trends and community contribution. We also aim to use the workshop as a driver to prepare a special issue of a journal, e.g., IEEE Pervasive as a continuation of already existing issues [1]. Overall, we envision that the workshop creates an active and persistent community addressing the workshop topic.

Organizers
Passant ElAgroudy: is a PhD student at University of Stuttgart. Her research focus is designing solutions to augment the memory and cognition via lifelogs.

Yomna Abdelrahman: is a PhD student at University of Stuttgart. Her research focus is amplifying perception and interaction using thermal imaging.

Sarah Faltaous: is a PhD student at University of Duisburg-Essen. Her research focus is applications of electric muscle stimulation.

Stefan Schneegass: is n assistant professor at University of Duisburg-Essen. His research focus is applications of wearable computing.

Hilary Davis: is a senior research fellow at Swinburne University. She is interested in how digital technologies such as digital cookbooks impact interaction at mealtimes.

Acknowledgments

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[1] https://www.facebook.com/groups/1843705972625919/?ref=br_rs

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