
Visualising the landscape of Human-Food Interaction research

Ferran Altarriba Bertran

University of California Santa Cruz
Santa Cruz, CA 95064, USA
faltarri@ucsc.edu

Katherine Isbister

University of California Santa Cruz
Santa Cruz, CA 95064, USA
katherine.isbister@ucsc.edu

Samvid Jhaveri

University of California Santa Cruz
Santa Cruz, CA 95064, USA
samvid@ucsc.edu

Danielle Wilde

University of Southern Denmark
Kolding, Denmark
wilde@sdu.dk

Rosa Lutz

University of California Santa Cruz
Santa Cruz, CA 95064, USA
rolutz@ucsc.edu

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Abstract

While conducting a review of food-related technology research, we discovered that activity in this area is skyrocketing across a broad range of disciplinary interests and concerns. The dynamic and heterogeneous nature of the research presents a challenge to scholars wishing to critically engage with prior work, identify gaps and ensure impact. In response to this challenge, we are developing an online visualisation tool: an app that affords diffractive reading of the literature, mapping interferences and differences from varied perspectives. We present our first iteration of the app, which enables scholars to navigate the literature through seven lenses—focus, agency, domain, date of publication, author keywords, and publication venue and type. Here we present the first iteration of the app, toward receiving critical input from concerned researchers, to validate our approach and ensure relevance moving forward.

Author Keywords

Human-Food Interaction; Human-Computer Interaction; Data Visualization; Science Mapping Tools.

ACM Classification Keywords

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

Introduction

As authors new to Human-Food Interaction (HFI), we found the literature extremely heterogeneous and—

without a comprehensive literature review—difficult to navigate. We therefore decided to undertake such a review. We began with a keyword, title and abstract search of 'food' in the ACM database, manually filtered the first 700 results to guard against repetition, and added texts based on author knowledge and their appearance in reference lists. The resulting dataset formed the basis of a systematic mapping study that is still underway. The study is not complete as the dataset¹ presents significant challenges. Notably, the range of disciplines and concerns represented is vast and research in this area is extremely dynamic, so additions must be made regularly if the dataset is to adequately represent this burgeoning field (Table 1).

To better position ourselves to engage with this dynamic and heterogeneous landscape, we decided to make an interactive app that can facilitate diffractive reading of the literature. Diffractive reading maps interference, not replication, reflection or reproduction: not where differences appear but rather where the effects of difference appear [4, 10]. Diffractive reading affords varied perspectives, and thus subjective engagement with a dataset. Through diffractive reading scholars from different disciplines working with different agendas and concerns can take divergent perspectives on the same dataset. They can thus identify gaps, and critically engage with and better position their research concerns within the field.

¹ Link: <https://goo.gl/aGtwjt>

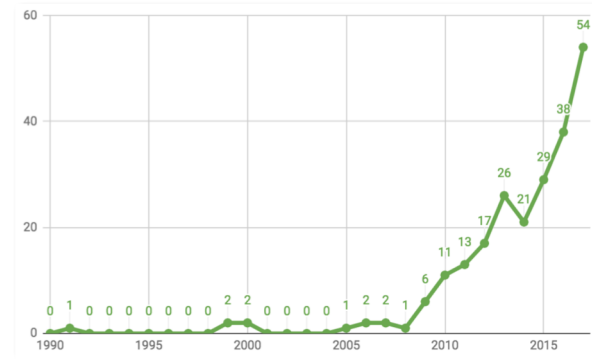


Table 1: Human-Food Interaction research publications per year, based on our current dataset.

We present our app as a work-in-progress. The aim is to open it up to critical input from concerned researchers, validate our approach, and ensure relevance. The purpose of the app—to enable researchers with divergent concerns to navigate the existing literature—is ambitious, given the dynamic nature of HFI research. Nonetheless, we feel that such a tool could prove invaluable if the research community uses, contributes to and challenges its boundaries as it grows. As described below and in the sidebar, the app provides 7 lenses—focus, agency, domain, date of publication, author keywords, and publication venue and type—through which to navigate the dataset. These lenses were determined most useful in terms of organising the data in a way that relevant factors in the interaction between humans and food are highlighted. This determination has not yet been validated.

The exponential growth in research in this area (see Table 1) poses a challenge that our app is designed to address. Its successful development will enable

Key functionalities

Visualize data (Figure 1).

The web app allows users to create an interactive data visualization of our database research contributions in HFI. It can be filtered by focus, agency, domain, date of publication, author keywords, and publication venue and type.

Add/edit a publication, using a standard web form.

Curate new data entries and edits, only available to designated users to ensure quality control.

A version of the app is available at:
<https://goo.gl/RWq2CX>

researchers who work, build on each other's findings, and critically reflect on their practice. Further, we hope the approach taken with this app may provide a response to such challenges in other areas of research, where research activity is heterogeneous, dynamic, and difficult to navigate.

Related work

The field of Human Food Interaction (HFI) is new, diverse and as with many emerging areas, not all researchers whose work engages with humans, food and interactive technologies position their work under this moniker. In this section we begin with an overview of what we consider to be key texts or movements within HFI. We then discuss data visualisation and position our approach within this context.

A number of books bring together HFI research, or are well represented in our dataset [6, 24]. There is a FoodCHI SIG [3], and an ACM Future of Computing Academy working group on Computing and Food [20]. HFI is represented at a broad array of conferences, ranging from interaction design [15, 17] through to AI [22]. And, while there is not yet a conference focused on HFI, related workshops and symposia include: FoodCHI [7, 21], digital gastronomy [18], multisensory engagement with food [19, 25], mobile engagement with food [16], and others [1].

The use of data visualisation as a tool to characterise a research space is not new. Works in this area (e.g. [5, 9, 23]) often rely heavily on software to do the data retrieval, preprocessing, network extraction, normalisation, mapping, analysis and visualisation [8]. Publications are extracted from an already existing dataset, and their contents are analysed by an algorithm using quantitative methods (e.g. Visual Text Mining). In contrast, our approach embraces subjective interpretation as an important factor in the characterisation of dynamic and heterogeneous research fields. In our app, it is researchers who are

able to do a qualitative analysis of the publications—both theirs and other authors'. Though our approach requires more effort from researchers than other automated tools, we believe it will be of value to researchers. Our app affords a combination of human interpretation and technology-mediated data visualisation. That enables the construction of a richer dataset that facilitates a closer and more nuanced read of the data.

The web app

Our goal is to allow HFI practitioners to collectively build and maintain a shared repository of their research contributions across the diverse approaches to HFI. We have thus designed the app such that any HFI practitioner can add and edit information in the database, using a user-friendly web form. To ensure quality and consistency, a committee will curate changes to the database.

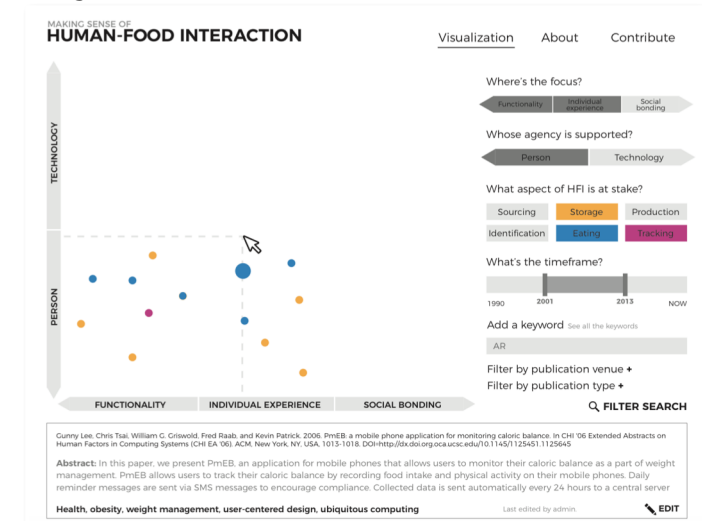


Figure 1: Visualisation screen of the web app.

Building on the contents of the database, the app affords organisation of HFI publications using seven filters to generate unique visualisations:

1. Focus. The focus of each publication is positioned on a continuum between (a) *functionality*, e.g. a chatbot that helps users find restaurants where they can eat despite their allergies [11]; (b) supporting *individual experiencing* of food, e.g. enhancing eating experience by using sound to augment food texture perception [14]; and (c) the *social aspects* of food practice, e.g. support the design of gastronomic experiences that afford rich social interaction between the diners [2]. Mapping along a continuum affords nuanced analysis. Contributors do not have to analyse the data in absolute of terms, which affords a better representation of the—often complex—interplay between functionality, individual experiencing, and social bonding.

2. Agency. The notion of agency is mapped along a continuum between *technology-centric* approaches, e.g. a sensing fork that aims to reduce food consumption [12]; and *human-centric* approaches, e.g. providing information that allows users to make more educated decisions about their food consumption [13].

3. Domain. We identified 6 domains of food practice: *sourcing*; *storage*; *production*; *identification*; *eating*; and *tracking*.

4. Date of publication. This lens enables insight into the evolution of HFI.

5. Keyword search, using authors' keywords.

6. Publication Type, for example: book chapter, journal article, conference submission.

7. Publication Venue: specific conference or journal (e.g. CHI, Interactions, etc).

Discussion

We present this early model of the app to open it up to the scrutiny of the HFI community. Our aim is to gain feedback so that we can validate or rethink our model and how the visualisation might better represent the current state of HFI research. We anticipate challenges to our dataset and look forward to enlarging it to reflect more heterogeneous understandings of the HFI landscape. Following this feedback, we plan to complete our mapping study and conduct an in-depth literature review. Our goal is to characterise and enrich research exploration at the intersection of food, technology, and human life.

Conclusion

In this paper, we presented an online data visualisation tool that affords navigation of HFI literature, which we hope facilitates the cohesion of the HFI research community. Our tool allows HFI practitioners to survey a representative database of HFI contributions according to a conceptual model built around seven lenses: focus, agency, domain, date of publication, author keywords, and publication venue and type. We present it as a work-in-progress, opening it up to feedback from interested researchers. We hope our contribution will help HFI researchers to critically engage with prior work, identify gaps and ensure impact.

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