Green Hackathon

Hacking for Sustainable Food

Jorge Luis Zapico

KTH Centre for Sustainable Communications, Stockholm, Sweden
Linnaeus University, Växjö, Sweden
zapico@kth.se

Abstract— **The ICT4S Green Hackathon was an event exploring the use of information and communications technologies in sustainable food production and consumption, where developers, designer and problem owners met for creating prototypes and applications for a whole day. This article presents the concept, implementation, results and lessons learned from this event.**

Keywords— hackathon, food, sustainability, sustainable HCI.

I. INTRODUCTION

A hackathon is a portmanteau of "hack" and "marathon", an event to hack for an extended amount of time. In these events, enthusiasts meet and work with software and/or hardware projects for a limited but long period of time, e.g. 24 hours without rest. The reference to "hack" is not to hacking as in computer crime [1], but to the hacker ethic [2], which defines a hacker as someone who "programs enthusiastically", who believes that computing and information sharing is a positive good and who believes it is an ethical duty to facilitate access to computers and computing resources [3,4,5].

These events have gained popularity in later years and many hackathons are organised both by companies and other organisations. Some are focused around a technology or application (like Facebook [6] or Linux [7]), while other events focus around a specific problem area or topic (like Random hacks of kindness [8] or Hack for Sweden [9]). A key idea of these events is a hands-on approach, focusing on producing workable functionality, prototypes or applications at the end of the event. Many times there can be a competition component, where the results are presented at the end of the event, winners are selected and prizes may be distributed. The focus of the event in the prizes and competition can vary between different hackathons, in some the prizes the main driving force while in others the competition is only symbolic.

Green Hackathon is a series of hackathons that started in Stockholm in 2011 focusing on using information and communication technologies (ICT) with a sustainability purpose [10]. After the first event in 2011 there has been a number of Green Hackathons and associated events organised in different cities, e.g. in London, Helsinki, Berlin, Athens, Zürich, Fukushima, and a coming one in Tokyo. These events have been sometimes organised with help of the original organisers and other times independently by local groups, but the events shared the common concept umbrella, graphic profile and name. The main restrictions of a Green Hackathon is that the results created need to focus on sustainability, and for the most part involving some kind of ICT solution. There is

also a de-facto focus on developing, meaning that the results cannot be only a neat idea in a powerpoint, and code and working prototypes are more highly valued. This is part of the aforementioned hands-on approach which is central in the hacker ethic [3].

During the ICT4S 2014 conference, a Green Hackathon was organised as a workshop activity the 23rd of August, located at R1, a dismantled experimental nuclear reactor underground at KTH in Stockholm. This time the event was focused on sustainable food production and consumption, and organised by the Centre for Sustainable Communications at KTH, as part of the project From Data to Sustainable Practices, in collaboration with COOP Sweden and supported by OKFN Sweden & Open Sustainability WG [11].

Fig 1.Picture of the Green Hackathon

This text documents the concepts and ideas behind this Green Hackathon and its results, and it will present and discuss some of the lessons learned from the event.

II. FOOD, SUSTAINABILITY & ICT

The focus of this hackathon on food was due to several reasons, but the main motivation was that while food production and consumption is one of our main environmental impacts, in previous Green Hackathon the focus has been mostly in energy (electricity, transportation, etc), while food has been for the most part neglected.

Food production and consumption have become a major driver behind environmental degradation, such as climate

change, biodiversity loss and degradation of land and freshwater. According to Foley et al [12] agriculture must be transformed to be sustainable and must deliver sufficient amounts of food for the growing population (both through increased efficiency and dietary changes) and also cut greenhouse gas emissions by at least 80%; counteract biodiversity loss; reduce water use and phase out pollution from agricultural chemicals.

The research area of ICT4S and sustainable HCI has focused mostly on electricity and energy, but there is a growing interest in the area of sustainable food [13,14]. For instance, researchers have been looking at the possibilities of increasing sustainability by using technology to help changing users food behaviour, wanting to close the intention-behavior gap existing between the attitudes and values around sustainable food consumption and the actual consumption practices [15]. Examples of efforts include using technology for visualising the carbon footprint of food [16] and food-miles [17]. An especially interesting topic of research is the reduction of food waste in households, as it is estimated that around one third of food produced is thrown away [18]. ICT has been used as a way of making this waste visible. Ganglbauer et al [19] created an intervention where a camera was installed in the fridge in different households to record food use and stimulate reflection. Thieme et al [20] present a study on an augmented waste bin that takes pictures of the waste disposed and upload them to an application to motivate reflection on the users waste practices. Farr-Wharton et al [21] present a prototype that aims to reduce food waste by increasing the knowledge and awareness of the existing food stock at home.

III. THE HACKATHON

Based on this background and existing applications, the idea of this hackathon was to explore new ways of using ICT to mitigate the problems and find new solutions. The hackathon had two main rules for the results:

- To use information and communication technologies.
- In the topic of food and sustainability.

Some more concrete topics were provided as inspiration:

- Using technologies for helping farmers with organic growing practices.
- Promote more sustainable food practices (organic, local, seasonal, vegetable-based..)
- Communication of added value of organic food, creating connection between food producers and consumers.
- Use of new technologies for interventions at supermarkets promoting more sustainable food practices.
- Reduce food waste (both at homes and in supermarkets and supply chain)
- Calculating and communicating environmental impacts of food products.

A main value of a hackathon is the focus on developing, and in most cases in coding. In this hackathon we wanted to broaden participation and have also space for more design prototypes, without losing the focus on creating prototypes and going beyond discussing ideas. Four types of results were suggested:

- Software tools, such as a website, mobile application, visualisation, etc.
- Hardware applications, such as Arduino based electronics.
- Tangible design prototypes, that demonstrated a use of technology in a physical context.
- Stories and new knowledge, gained from the collection and visualisation of data (data journalism).

The event was a one-day activity, starting in the morning with a keynote and the presentation of the event. Afterwards there was an exercise for networking, where the participants did a round of "speed-dating", introducing themselves and discussing possible ideas. Then the participants could pitch hack ideas and based on these pitches they grouped themselves into different teams. This hackathon was different than previous ones in that most of the participants had not a clear idea of what to develop nor were part of an existing group, so the networking process was very active. The hackathon had 23 participants, 5 women and 18 men, from diverse (mostly european) countries. Roughly around half of the participants were part of the ICT4S conference and working as researchers, while the rest were coming mostly from the local community of designers and developers.

Fig 2. Team working during the hackathon.

After the groups were formed, they moved to the sitting areas to keep developing the ideas and start working in practice. The "hacking" time was around eight hours. This time was shorter than in previous hackathons, for instance the original Green Hackathon ran for 24hours.

After the hack time was over, the groups presented the results to the public. There were five projects that finished the hackathon. The jury that decided the winners was formed by:

- Louise König, Sustainability Manager at The Co-operative Group Sweden, COOP
- Marko Turpeinen , Director, EIT ICT Labs Finland
- Patricia Lago, Associate professor in software, services and sustainability, VU University Amsterdam
- Maja Brisvall. Manager, Stockholm Resilience Centre

IV. The Results

There were five final projects that were presented in the Hackathon:

A. Eat Exchange

The first winner was Eat Exchange, a mobile application which allows a local community to share food that would have been wasted. The application idea is to enable individuals to advertise the food that they wouldn't be able to consume. Then the supply of spare food would be collected by the members of the community who would otherwise need to buy it.

Fig 3. Screenshot of Eat Exchange.

The prototype was a combination of mobile app mockup and a live test using jQuery, HTML and CSS. Created by: Christopher Weeks, Daniel Schien, Pernilla Hagbert, Friedrich Chasin, Ole Schultz, Tipa Stefan, Theodorou Sophy-Emmanouela.

B. Last Minute Food

The second winner is a prototype application that proposes gathering information from COOP supermarkets about the food that is about to expire and allows the users to explore recipes based on those ingredients and facilitates the purchase in the store.
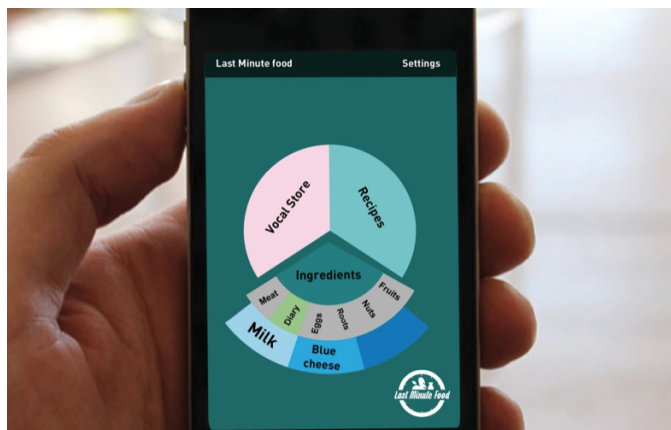

Fig 4. Screenshot of Last Minute Food.

The mockup mobile application presented different functionality, including a way to navigate the store using voice.

The prototype was created by: Sotiris Salloumis, Gaye Georgia, Johan Zetterquist, Jacky Bourgeois, Sophie Uesson, John Chang.

C. Urban Fruit Initiative App

A web interface for urban fruit initiative, an existing project which connects homeowners with apple trees with pickers willing to pick apples, and produces apple juice which then gets distributed between the different stakeholders.
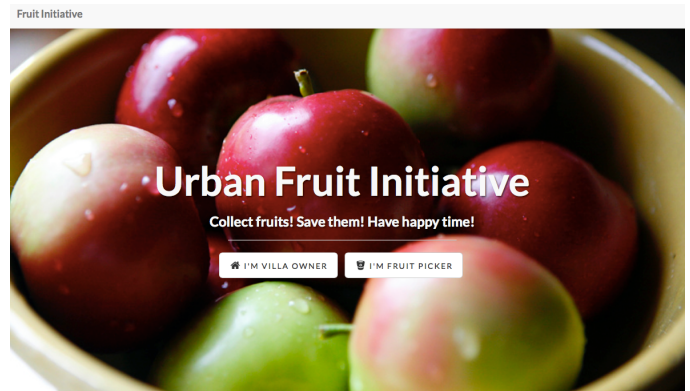

Fig 5. Screenshot of Urban Fruit Initiative.

The prototype provides an easier way to register and broker the connection between the two groups, allowing the registration of new tree owners and fruit pickers and providing a map interface.
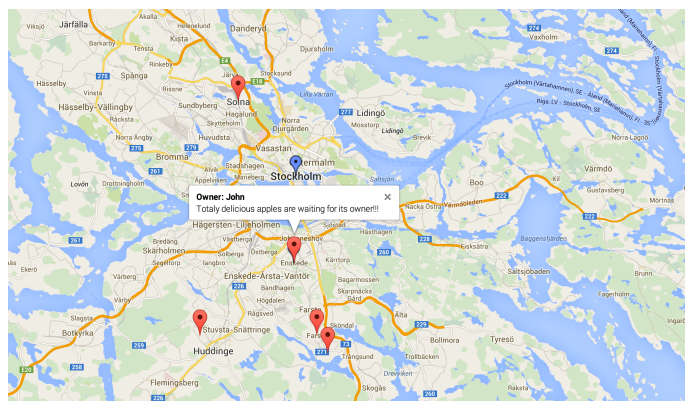

Fig 6. Screenshot of the map interface.

The prototype is open source and made using Firebase, Bootstrap, jQuery and Google Maps API. Made by: Richard Blume, Mrhetab Kidane, Andrew Kobylin.

D. Cosecha

Made by the author and outside of competition, Cosecha is a planning tool to calculate the amount of different crops to grow in a given field connected to yield and revenue. The idea is to be able to calculate the need for seed purchases (row-meter) based on production goals (kilograms of produce and earning)

The prototype was made using jQuery and HTML by: Jorge Zapico

Fig 7. Screenshot of Cosecha.

E. Eat Seasonably

A web prototype application which try to tackle the the gap in consumer awareness by recommending recipes based on seasonality.
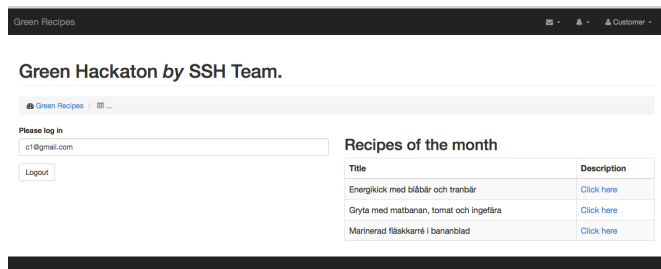

Fig 8. Screenshot of SSH team.

Made by: Sevag Balkorkian, Samuel Chinenyeze, Haftom Tesfay

V. Conclusions and Discussion

The ICT4S Green Hackathon explored the use of ICT for sustainable food consumption and production. Participants spent eight hours developing prototypes and bringing ideas forward into more concrete form. This short deadline with a limited, but uninterrupted, amount of time is instrumental in the productivity of the hackathons. The quality of the prototypes produced in hackathons can be considered quite high for this short amount of time, as the results above show, even in this event where the time was much shorter than in previous hackathons.

A main theme that emerged from the hackathon was food waste. In the keynote it was mentioned that a third or more of the food produced worldwide ends up as waste [18], this challenge was taken up by the participants and three of the five contributions focused on how to reduce food waste. Eat Exchange explored how mobile technology could connect the local community to share resources that would otherwise be wasted; Last Minute Food explored how supermarkets could market food that is close to expiration data and in risk of being thrown away; Urban Fruit Initiative looked at how IT can empower local initiative that connect people with extra fruit with pickers so the fruit does not go to waste. This focus in food waste is in line with the existing projects in the sustainable HCI community presented before, and maybe a natural low-hanging fruit for increasing sustainability of the food system.

One intention when planning this event was to broaden participation to better include skills outside programming and developing [10]. This was successful as the event attracted a broad range of participants, and the teams had mostly a balance between technical competence and design competence. There was many of interesting conversations and brainstorming and good team dynamics.

Fig 9. A team discussing during the event.

On the other hand, the results were all mobile applications or website, which has been the standard also in the rest of the previous hackathons. In this hackathon we tried to explicitly open up for other contributions such as data journalism, tangible design prototypes and hardware-based hacks. It can be argued that only "allowing" these type of contributions is not enough. Web and mobile prototypes are easier to work at a hackathon scale, as there are many off-the-shelve solutions to facilitate development, allowing faster creation of working prototypes. For promoting other type of results such as physical design prototypes or hardware tests, a more proactive approach should be taken, facilitating workshop materials and components from the organisation side, to provide affordances and but also to inspire.

The use of ICT for promoting sustainability in food production and consumption can be an interesting topic for research for ICT4S. This topic has not been as widely explored as other areas such as electricity and energy consumption. Hackathons events can be a good way of generating and testing ideas, as it can be seen from the presented event, creating prototypes as proof of concepts that could be developed further as applications or in research projects after the hackathons.

REFERENCES

1. Nissenbaum, H. 2004. Hackers and the contested ontology of cyberspace. New media & society Vol6(2):195217.

2. Himmanen, P. 2011. The hacker ethic. Random House, NY.

3. Levy, Steve. 1984. Hackers, heroes of the computer revolution. Dell/ Doubleday, New York NY. ISBN 0385312105

4. Raymond, E.S. 2000. A Brief History of Hackerdom. Available online at: http://www.catb.org/esr/writings/homesteading/hackerhistory/

5. Wark, M. 2006. Hackers. Theory Culture Society 23: 320

6. Facebook Hackathons: https://www.facebook.com/hackathon

7. See for example: https://lists.debian.org/debian-events-na/2014/01/msg00000.html

8. Random Hacks of Kindness: http://www.rhok.org/

9. Hack for Sweden: http://hackforsweden.se/

10. Zapico, J.L. Pargman, D. Ebner, H. Eriksson, E. 2013. Hacking sustainability: Broadening participation through Green Hackathons. Fourth International Symposium on End-User Development. June 10-13, 2013, IT University of Copenhagen, Denmark

11. See more information at http://ict4s.greenhackathon.com

12. Foley, J.A., Ramankutty, N., Brauman, K.A., Cassidy, E.S., Gerber, J.S., Johnston, M., Mueller, N.D., O'Connell, C., Ray, D.K., West, P.C., Balzer, C., Bennett, E.M., Carpenter, S.R., Hill, J., Monfreda, C., Polasky, S., Rockström, J., Sheehan, J., Siebert, S., Tilman, D. and Zaks, D.P.M. 2011. Solutions for a cultivated planet. Nature 478, 337–342 (20 October 2011) doi:10.1038/nature10452

13. Blevis, E. and Morse, S. C. 2009. SUSTAINABLY OURS Food, dude. interactions 16, 2, 58-62.

14. Hirsch, T. Sengers, P. Blevis, E. Beck, R and Parikh, T. 2010. Making food, producing sustainability. In CHI '10 Extended Abstracts on Human Factors in Computing Systems (CHI EA '10). ACM, New York, NY, USA, 3147-3150. DOI=10.1145/1753846.1753939

15. Vermeir, I., and Verbeke, W. 2006. Sustainable food consumption: Exploring the consumer "attitude -- behavioral intention" gap. J. Agricult. Environ. Ethics 19(2), 169-194.

16. Clear, A. and Friday, A. 2012. Designing a Food 'Qualculator'. DIS 2012 workshop on Food for Thought: Designing for Critical Reflection on Food Practices. Newcastle, UK. June, 2012.

17. Kalnikaite, V. Rogers, Y. Bird, J. Villar, N. Bachour, K. Payne, S. Todd, P.M. Schöning, J. Krüger, A. and Kreitmayer, S. 2011. How to nudge in Situ: designing lambent devices to deliver salient information in supermarkets. In Proceedings of the 13th international conference on Ubiquitous computing (UbiComp '11). ACM, New York, NY, USA, 11-20. DOI=10.1145/2030112.2030115

18. Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R., & Meybeck, A. (2011). Global food losses and food waste. Food and Agriculture Organization of the United Nations, Rom.

19. Ganglbauer, E. Fitzpatrick, G. and Comber, R. 2013. Negotiating food waste: Using a practice lens to inform design. ACM Trans. Comput.-Hum. Interact. 20, 2, Article 11 (May 2013), DOI=10.1145/2463579.2463582

20. Thieme, A. Comber, R. Miebach, J. Weeden, J. Kraemer, N. Lawson, S. and Olivier, P. 2012. "We've bin watching you": designing for reflection and social persuasion to promote sustainable lifestyles. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '12). ACM, New York, NY, USA, 2337-2346. DOI=10.1145/2207676.2208394

21. Farr-Wharton, G. Foth, M. and Choi, J.Z. 2013. EatChaFood: challenging technology design to slice food waste production. In Proceedings of the 2013 ACM conference on Pervasive and ubiquitous computing adjunct publication (UbiComp '13 Adjunct). ACM, New York, NY, USA, 559-562. DOI=10.1145/2494091.2497311