

RESEARCH FROM THE SOCIO-DIGITAL SYSTEMS GROUP THAT MIGHT BE USEFUL IF YOU WORK ON PRODUCTS THAT RELATE TO SEARCH.

03
ISSUE

THINGS WE'VE LEARNT ABOUT

Search

& Web Use



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This page describes our research group, *Socio-Digital Systems*: who we are, what we do, and what our goals are.

CHAPTER 1 | MOVING BEYOND SEARCH

Much of the technology we use every day has reached a stage of maturity where little alteration is now likely in the future. Search engines are one such technology. Though there will always be opportunities to refine the speed with which search engines deliver content and opportunities to enhance the experience of using search engines, research is now looking elsewhere.

This magazine reports our own explorations of just that topic: what it means to move beyond search.



THINKING OUTSIDE OF THE Search BOX

The search box is an integral part of the ways in which we experience the web, so much so that some modern browsers are primarily designed around the search box. This allows users to type into the top and 'search' at any moment. In this way, search engines and browsers are merging. This allows users to find and view content in seamless ways, and to revisit that same content again and again, often without the need to click on a bookmark or browser history box.

This focus on the search box, whether it is in a search engine home page or embedded in a browser, has led to an on-going effort to make search quicker, the results more relevant, and the overall experience more efficient. The technology hidden beneath the search box, in search engines like Google, Yahoo and Bing, is optimised with this in mind.

Yet this way of thinking about our interactions with web content is also constraining. Search – and thus search engines – have become so central to the way people engage with online content, that it becomes difficult to imagine other ways of initiating interaction with the web. Besides, the effort being put into making faster and more efficient search engines means that other experiences are neglected.

As a way of opening up the design space for search technologies, we take as our starting point not what happens when someone goes to a search engine, but what led them to go to online in the first place. By understanding the wider context of web use, we can begin to understand not only what search engines are used for, but what they are not used for, and also the bigger activities they are part of. We can see too how search engines are deployed in ways that combine their use with other tools, particularly those for content creation and management. Finally, we can see more unexpected uses of search engines, and consider which of these point towards new tools and mechanisms for leveraging what people want to do on the web. In other words, we can start to ask not what would make a perfect search engine, but what would make a search engine more enticing or more personal, what would it be to make search social, and much more besides.

HERE ARE A FEW REASONS WHY WE USE THE WEB

It turns out there are lots of reasons why people use the web. To say they 'always start with' search, or that they go online 'to search' is to limit understanding of what these uses are (or might be). Our research had led us to identify at least five modes of web use. Rather than focusing on particular activities (e.g. fact finding or information gathering), or the use of particular tools (e.g. search engines or bookmarks), these modes are grounded in the idea that web use is an integral part of wider practices. It can be peripheral to, interrupted by, layered upon, or interleaved with, other doings. As such, use of the web, or engagement with it and thus use of search engines and other intermediating technologies, can only be understood by having these activities placed in a wider context. Here we need to consider, for example, why it is that people are gathering information, or what has motivated them to seek the answer to a particular question. Are they preparing for some work task, say, or simply collecting content in a leisurely manner?

SOME BASIC QUESTIONS

- What triggers people to go online?
- What do they do when they get there?
- How do the things they do there fit with their everyday lives?
- How do they combine the use of search with other activities and technologies?
- How do they share their experiences of the web?
- How do search engines facilitate all this, or not?



The following pages outline the five modes of web use we have identified. By 'mode' we mean the kind of mind-set a user has when they go online: their mood, motivations, and their patterns of activity. By understanding these different modes, we can begin to unpack how the web plays a role in the fabric of everyday life.

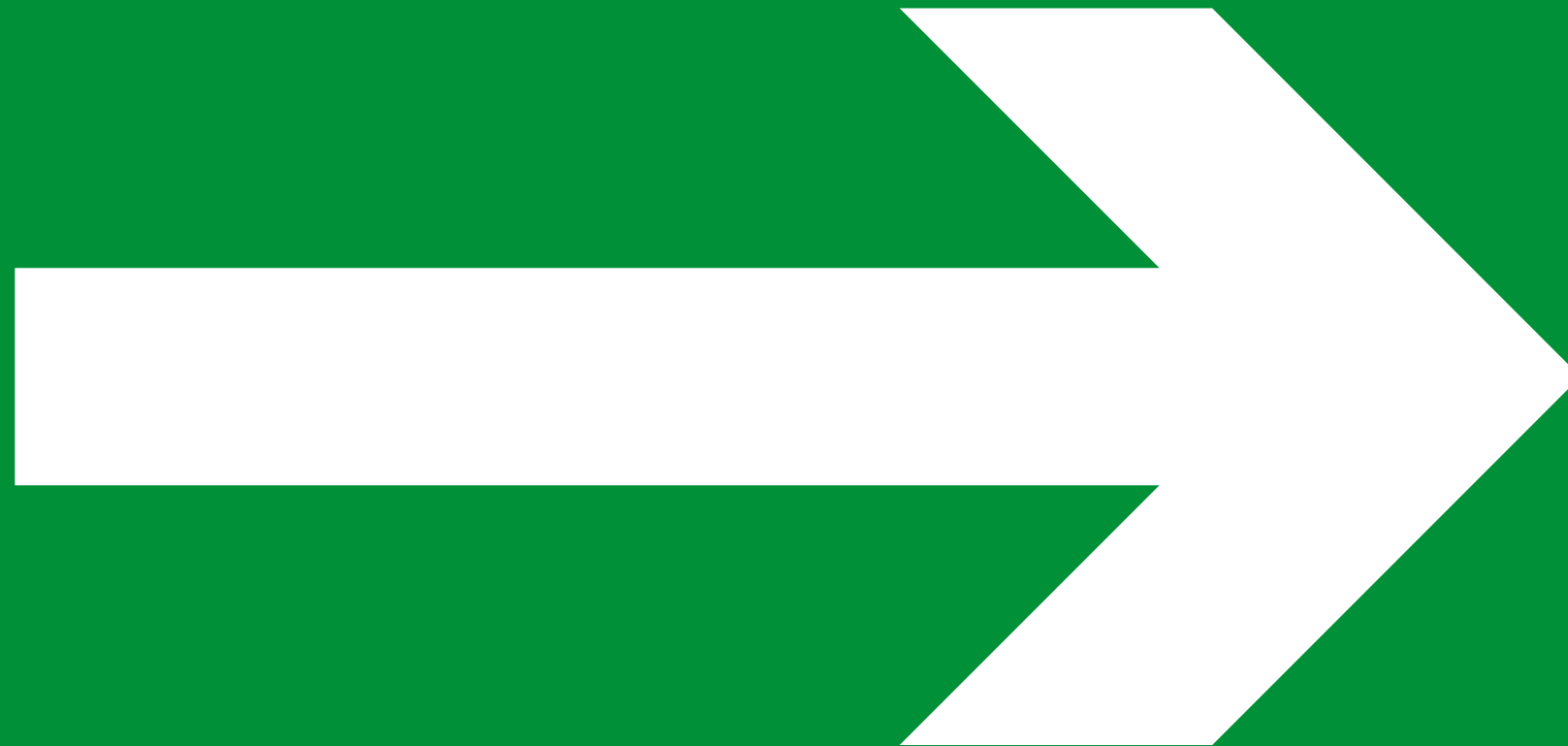
PURPOSEFUL USE

The first mode, purposeful use, reflects the web as a resource for action when people need to get something done in the moment. The user searches for information or seeks to perform a transaction, the outcome of which might feed directly into on-going activities or the wider social context.

People in this mode search to answer questions, including those posed by others, and seek information to help them complete on-going tasks. Timing is important, even if only because the conversation might move on. Therefore, efficiency is key.

“My daughter asked me what’s the largest and loudest animal in the world, and so I went to Wikipedia, Wiki Answers and Yahoo and they happened to be one and the same, which is the blue whale.”

A



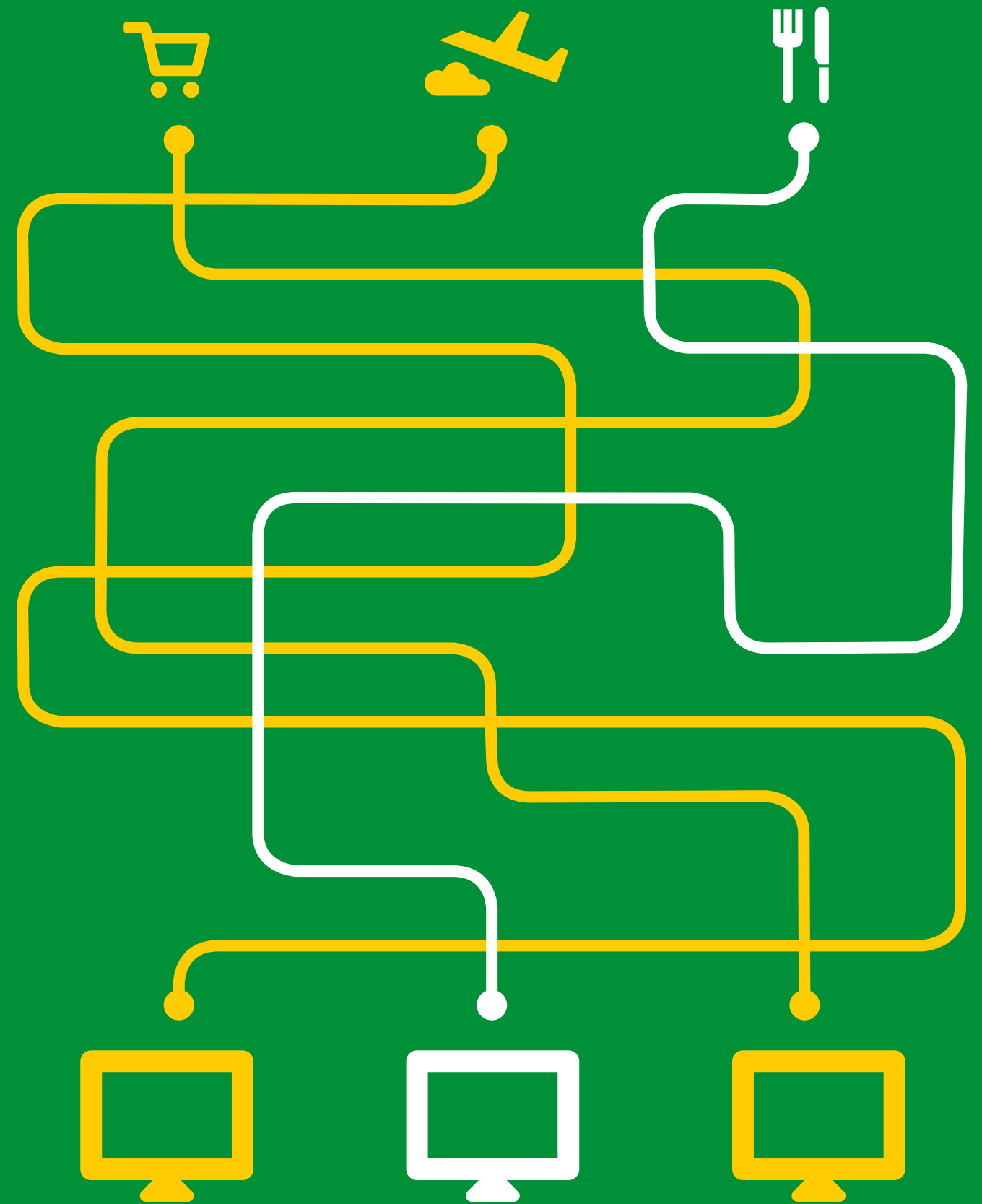
B

OPPORTUNISTIC USE

In contrast, in this mode the web is a means of spending time rather than saving time. Indeed, 'going online' can be viewed as a leisure activity in itself. Once there, people opportunistically look for things to do and seek out ways to entertain themselves 'while they are on the web'.

People in this mode search for and explore new content, call to mind curiosities, do odd jobs, engage in hobby-like activities and seek inspiration for on-going projects. Examples from our data include collecting recipes (indulged in as a hobby), gathering ideas for home improvement, finding possibilities for day trips, and researching potential future purchases.

"That would be my sort of wind down time, I was looking at recipes as I do in my idle way."



ORIENTING

For many people, the web is integral to the ways in which they orient to the day. They check their email, the news and weather, and read a blog or check their bank balance as a way of staying on top of things that are important to them.

This mode of web use is associated with sites that are regularly updated, and is often undertaken at specific points in the day. In particular, it resonates with the concept of role transitions - boundary-crossing activities that are engaged in when people exit and enter roles associated with home and work. Checking particular websites is part of the ritual of waking up in the morning, arriving at the office, or returning home in the evening.

“That’s the sort of activity I’ll definitely do every morning having my breakfast, a bit like opening the paper.”



RESPITE

The web also serves as a brief escape from wider activity, for example when at work or when completing a work-like task on a computer. People briefly flick to a core set of habitually visited sites, such as news, email and social networks, as a means of quick diversion.

This type of web use is somewhat akin to looking out of the window. It represents a distraction that is not too distracting, when users seek a means of respite but cannot afford to get sucked in. Thus, it is characterised by visits to sites that feature predictable updates before permitting a return to work.

“You’ve been concentrating on something and you need to take a break from whatever for a couple of seconds, and you know, clear your mind.”



LEAN-BACK INTERNET

The web can also serve as a conduit for entertainment media. It provides a means for the streaming of radio or video. This type of use resonates with the ways in which other types of media, such as film and music, are consumed.

“I listened to a song a few times. We usually have the internet on in the background, and then somebody will say, ‘Oh I have to show you this.’”



Search is more than information seeking



Of these different modes only one, purposeful web use, relates to the basic premise of search engine research: namely, the idea that users of search engines are information seekers. This focus on information seeking is unsurprising when we consider how people appear through the lens of the web itself. Logs of click-stream data reveal how users move from search engine to result pages, from a desire for information to the finding of that information. When users themselves are asked why they use a search engine, they are likely to report that they are searching for something. Both the answers of users and the data trails that users leave gives credit to this view.

Nevertheless, this view does not reveal how search as an activity entails much more than information foraging. Nor does it reveal how these other kinds of acts differ from each other. Nor does it provide a clear view on the tools that might be designed to underpin a meaningful or rich interaction with activities beyond the canonical model of information seeking.

The problem with viewing users as 'searchers' or 'information seekers' is that these terms encapsulate a range of activities, which have at their heart a very different set of behaviours – from the prosaic task of finding an instruction

manual for a gadget, to shopping for a new dress, to fantasising about a holiday destination, to seeking inspiration for home decorating. Not all of these activities can be described as purposeful, as having an obvious point or intention behind them. People undertaking some of these activities might struggle to describe exactly what prompted them to go online, to answer why they looked at the sites they visited, or even how they knew when they were finished. If one is opportunistically looking for something to do by journeying within YouTube, or spending time online by building a collection of recipes, reference to a well-formed information target is hardly the way to express this.

In what follows we consider different ways of viewing the web user – not as a searcher of information – but as, for example, a wanderer or a collector, as a social animal or as a person who has a long-term relationship with their search results. Search engines underpin all of the examples we provide, but the experiences offered are radically different to that of entering a search term and being quickly presented with the top ten most relevant results. By the same token, how we ought to understand the motivations of the user in each case is different too.

SOME QUESTIONS ABOUT WEB USE

- What other, less purposeful, activities can be identified?
- What is the relationship between those activities and other things undertaken outside of the web?
- Where does search fit into this?
- What other tools for engaging with the web might be imagined?

CHAPTER 2 | SEARCH AS JOURNEYING

Traditional search engines find things for people – things on the web. But searching could be a process that is like travelling, taking the user from one place to another, as if on a voyage. In this case, using search engines is not about reaching some destination, rather, it is about experiencing the voyage itself. In this vision, the web is not a resource, a place to get things from, but a place that one travels through.



There in two Clicks?

Search engines have been designed to provide users with access to the right information as quickly as possible, and to allow them to express their desire in a variety of ways, from typing to speaking to querying with image files.

But what would happen to the design of search engines if their use was to facilitate and encourage travelling across and between information targets, rather than getting somewhere fast? If the goal of using the technology is to travel, then instead of trying to ensure that the user spends as little time as possible with a search engine, design would try and seek the opposite, to prolong use. Moreover, the actual moment by moment experience would also need to delight the user. So, instead of delays in the production of a list of search results (a so-called SERP – Search Engine Results Page) resulting in impatience and vexation on the part of the user, slowness might provoke anticipation and excitement; serendipitous or even capricious selection of targets might even become a source of joy and thrill as new, unexpected places are discovered by the user.

There are many ways in which travelling might be conveyed. For example, browsers already keep ‘histories’ and, despite the odd properties that cached and non-cached data have on user experiences of ‘going back’ through their browser, the flicking ‘through pages’ (including pages of ‘histories’) is an experience that many users are familiar with. In this view, travelling on the web is like the hopping between pages that the early hypertext theorists hoped for. But this metaphor has a number of problems. To begin with, it makes the web a collection of pages, and the experience of using the web an analogue to reading a book. But even the



most cursory study of browser use and bookmarking practices will show that people find these ‘pages’ disorientating and difficult to use. If the web is a book, the pages are unrelated; there is no narrative coherence. Certainly no amount of binding will bring them together. Other metaphors seem more apposite for conveying movement, travel and distance on the web. For example, people wander around beaches by the sea and occasionally pick up pebbles. They gaze at these pebbles, at their colour and shape. But then they toss them aside and walk further, only to halt and pick up another pebble. Travelling on the web can be like this too, with search engines being the vehicle through which one hops from one pebble to another, from one website to another. Pebbles that are near one another will often be very similar, too, with the sea shifting and shaping stones into banks of types – small, large, sharp, smooth; likewise, the web is populated with sites that are similar and a search engine could lead one to a bunch of similar sorts. But as with pebbles on a beach, the effects of the sea are not perfect, with odd shapes and stones sitting more or less alone on banks of other types: so too might a search engine operate in way that reflects this characteristic of nature – by throwing an odd pebble into a beach of otherwise similar stones.

Search is not always about finding the answer, it is sometimes about enjoying the journey.

How can we design an experience that feels like a voyage?

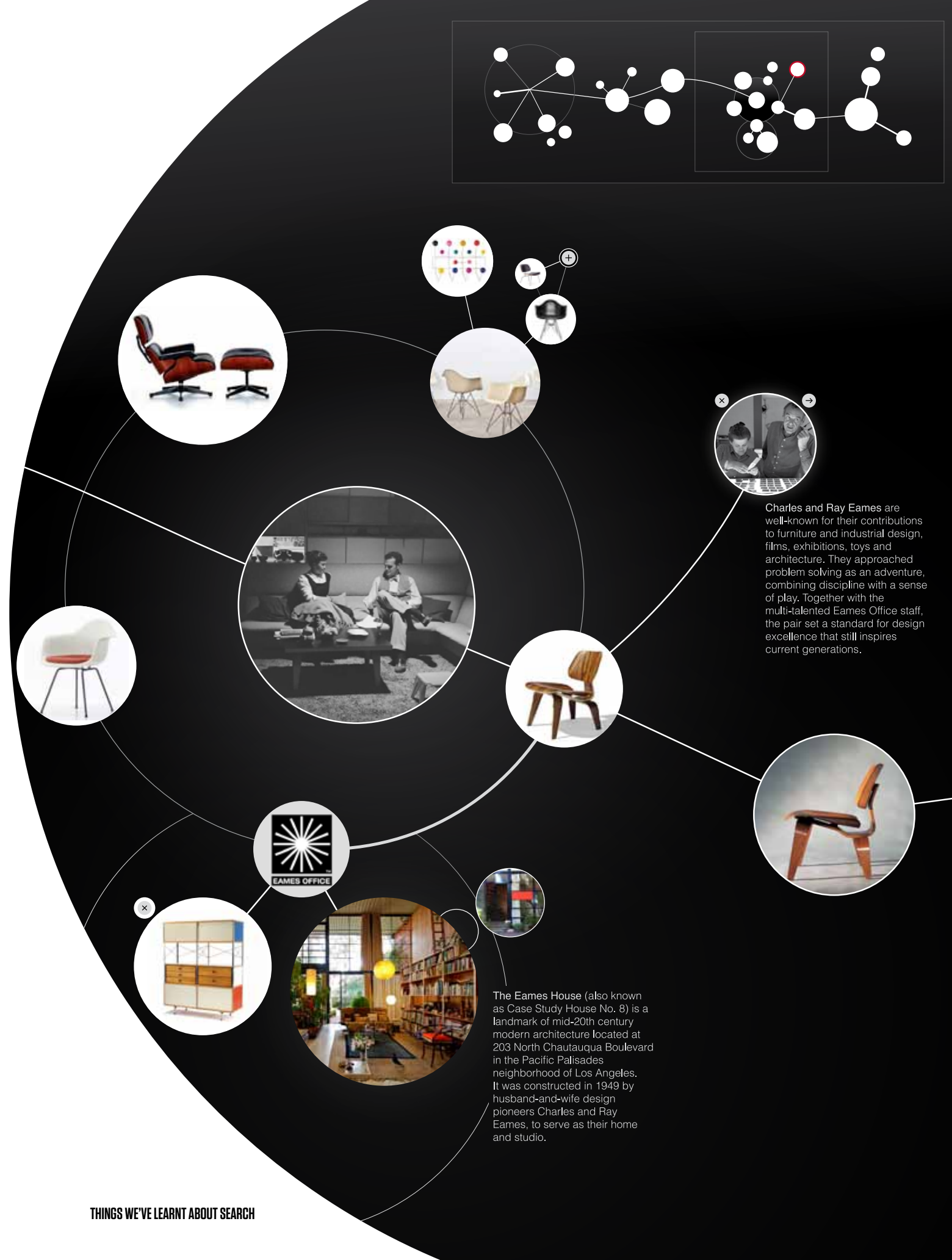


PEBBLES

Clearly there are lots of metaphors that could be used to help convey a sense of travel and voyaging to users. As it happens, the pebbles metaphor became the design concept in one of the probes we developed to investigate new forms of web behaviour made possible with search engines.

From the user's point of view, engaging with the *Pebbles* application commences rather like a standard search does – with the individual entering a search term. In this case, however, the query is entered into a blank pebble, which stands as proxy for a text entry dialogue box. The user request is then sent to a search engine – in this case Bing – and the links that would normally be presented on the SERP are delivered instead to Pebbles. The application randomly selects a link, goes to the website in question, and 'scrapes' text from it. This content is then used to populate a pebble. But before this is presented to the user, the Pebbles application uses that same text as the search term for an image, which again is requested via a search engine. The engine returns a selection of images that are pertinent, and Pebbles selects one of these to append to the scraped text. A pebble is thus created, with text on the lower half and an image on the upper.

Needless to say, a single pebble hardly conveys a sense of travel, nor of a beach covered with stones. Hence the application delivers a handful. These are related to one another. If the user wants to continue their journey, they can click on any single pebble and the same process as above will occur; a new handful of pebbles is created. However, subsequent requests do not produce pebbles on a blank sheet, but combine these with the prior set, slowly creating an ever increasing beach of pebbles. These can then be revisited, allowing the user to retrace their steps, and see their journey as a whole.



Charles and Ray Eames are well-known for their contributions to furniture and industrial design, films, exhibitions, toys and architecture. They approached problem solving as an adventure, combining discipline with a sense of play. Together with the multi-talented Eames Office staff, the pair set a standard for design excellence that still inspires current generations.

The Eames House (also known as Case Study House No. 8) is a landmark of mid-20th century modern architecture located at 203 North Chautauqua Boulevard in the Pacific Palisades neighborhood of Los Angeles. It was constructed in 1949 by husband-and-wife design pioneers Charles and Ray Eames, to serve as their home and studio.

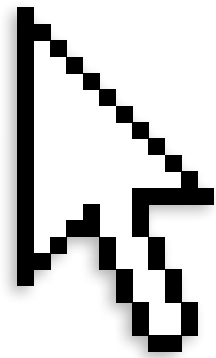
CHAPTER 3 | SEARCH AS COLLECTING

Search engines take the user to content or, to put this another way, they bring content to the user. But this bringing together of the user and content is only treated as a fleeting affair, the interest in some site being in the here and now and soon forgotten by the user. Users transit between content, finding and consuming that content before moving on. But what would happen if search was an act of collecting?



Gathering the net.

Search engines can become entwined in the activities of gathering content and creating collections, often alongside other tools such as bookmarks, and dedicated services such as Pinterest. Users may gather content with a clear goal in mind, when undertaking research, for example. But they also do this simply for its own sake, in the same way that collections reflect deeper interests, or are built for the purposes of entertainment and self-expression, in the 'real', material, world.



In our own fieldwork, we have seen how users collect web content when there is neither decision to be made nor question to be answered. Some of these uses might be better understood as a means of seeking inspiration, for example, one participant who had aspirations to improve her home downloaded images relating to interior design from the web and organised them in a folder on the computer itself, "sort of like a mood board". In other cases, this type of use might be better understood as a form of hobby; content was collected from the web as an end in itself. In one case, a woman who described herself as 'idly' collecting recipes was surprised to discover, when prompted during the interview, that she could not find them ("I've been busily saving recipes and thinking oh that would be nice to make sometime, and they've all vanished"). Leaving the usability of bookmarking tools aside, this suggests that the act of browsing and collecting recipes *in itself* was of value.

Of course, even if the activity of collecting is sometimes valued more highly than the collection itself, it is also important to consider how web content might be made more 'collectable'. It is clear that sometimes users do want to return to their collections, and when this is the case, that the dynamic nature of the web will need to be considered. For example,

when planning a holiday, users may create collections comprising details of flights, hotels, and activities, which need to be kept up to date. Yet this content could be fixed in time later, after the holiday, in the same way that a scrapbook persists after the event. In contrast, when seeking inspiration for a home improvement project, users may appreciate ways to simply snip content from the web, to be amassed as an on-going project, which will continue to persist even if the originating websites change. An apt metaphor here is that of baseball cards, the type that used to be found in cigarette boxes, which show images and facts about the famous player. In a sense, such cards are different from the pins that users can create using Pinterest. While the latter allows for the building of collections, cards somehow constitute an entity in their own right, something that might be gifted to, or even traded with, others. This is not to diminish the evident value and indeed the fun that can be engendered by using Pinterest, but it is to allude to the many things that could constitute collecting on the web.

Indeed, one thing that technologies such as Pinterest do make clear is the transformation of the web from a place where we primarily find information to one where we also collect, share and keep it. We have recently explored how the web is viewed as an archive of sorts. It is a place where people create collec-

tions of their best work, by posting their favourite photos on Flickr, for example; where they curate content that they find online, through sites like Pinterest and Twitter; and where they keep collections that simply emerge through use. Examples of the latter include folders of web mail that evolve over time, but also the social graphs that emerge through social network services. In both cases, the user has made many incremental decisions regarding whether or not to store an email or accept a friend request, and the result is a collection of content that gradually accumulates. It is interesting to note that for social network sites, the social graph is often deemed more valuable than the content on the sites itself. This raises questions for how to make these new forms of content, these new collections, 'keepable'. How can one back up a social network? And can this remain meaningful over time, if the site falls in popularity and a proportion of the user base moves on? Making the web collectable raises issues concerning time, ownership and new types of content, which we are only just beginning to unpack.

Collecting online content can range from downloading music to gathering details of new artists by following them on Twitter.



Search is not just about finding but it can also be about keeping, collecting and owning.

How can the content retrieved by a search engine become the kind of material people would want to keep?



CHAR

DS

We developed an application that takes the metaphor of baseball cards as its starting point. A traditional search engine is used to gather content from web pages, which are chosen according to a user's search query. However, instead of bringing the user to those pages, the *Cards* application takes content from those pages and uses it to produce a set of 'cards'. These cards are separate entities, distinct and independent from the websites used to construct them. Furthermore, they are unique. Due to an element of randomness built into the application, a different user would be unlikely to produce the same set of cards. They are, in a sense, created by the user, and they can be kept and collected by him or her, or alternatively shared with others, by being sent as 'objects' attached to emails.

Charles Eames, Jr (June 17, 1907 – August 21, 1978) was born in St. Louis, Missouri. Charles was the nephew of St. Louis architect William S. Eames. By the time he was 14 years old, while attending Yeatman high school, [1] Charles worked at the Laclede Steel

In the 1950s, the Eameses continued their work in architecture and modern furniture design. As with their earlier molded plywood work, the Eameses pioneered technologies, such as the fiberglass and plastic resin chairs and the wire mesh chairs designed for

Charles and Ray channeled Charles' interest in photography into the production of short films. From their first film, the unfinished *Traveling Boy* (1950), to *Powers of Ten* (re-released in 1977), their cinematic work was an outlet for ideas, experimentation

In 1970–71, Charles Eames gave the Charles Eliot Norton Lectures at Harvard University. At the lectures, the Eames viewpoint and philosophy are related through Charles' own telling of what he called the banana leaf parable, a banana leaf being the most

From the beginning, the Eames furniture has usually been listed as by Charles Eames. In the 1948 and 1952 Herman Miller bound catalogs, only Charles' name is listed, but it has become clear that Ray was deeply involved and was an equal partner

orci, sed euismod velit nibh id est. Morbi pellentesque dui at metus malesuada et accumsan nisi lacinia. Praesent ac rutrum metus. Proin sagittis nisl orci. Aliquam erat volutpat. Pellentesque congue, sapien non tempor aliquam, mi ipsum

From the beginning, the Eames furniture has usually been listed as by Charles Eames. In the 1948 and 1952 Herman Miller bound catalogs, only Charles' name is listed, but it has become clear that Ray was deeply involved and was an equal partner

The Eames fabrics (many are currently available from Maharam) were mostly designed by Ray, as were the *Time Life Stools*, [by whom?] In 1979, the Royal Institute of British Architects awarded Charles and Ray with the Royal Gold Medal

Dramatic demonstration of orders of magnitude by visually zooming away from the earth to the edge of the universe, and then microscopically zooming into the nucleus of a carbon atom. Other films cover more intellectual topics. For example, one

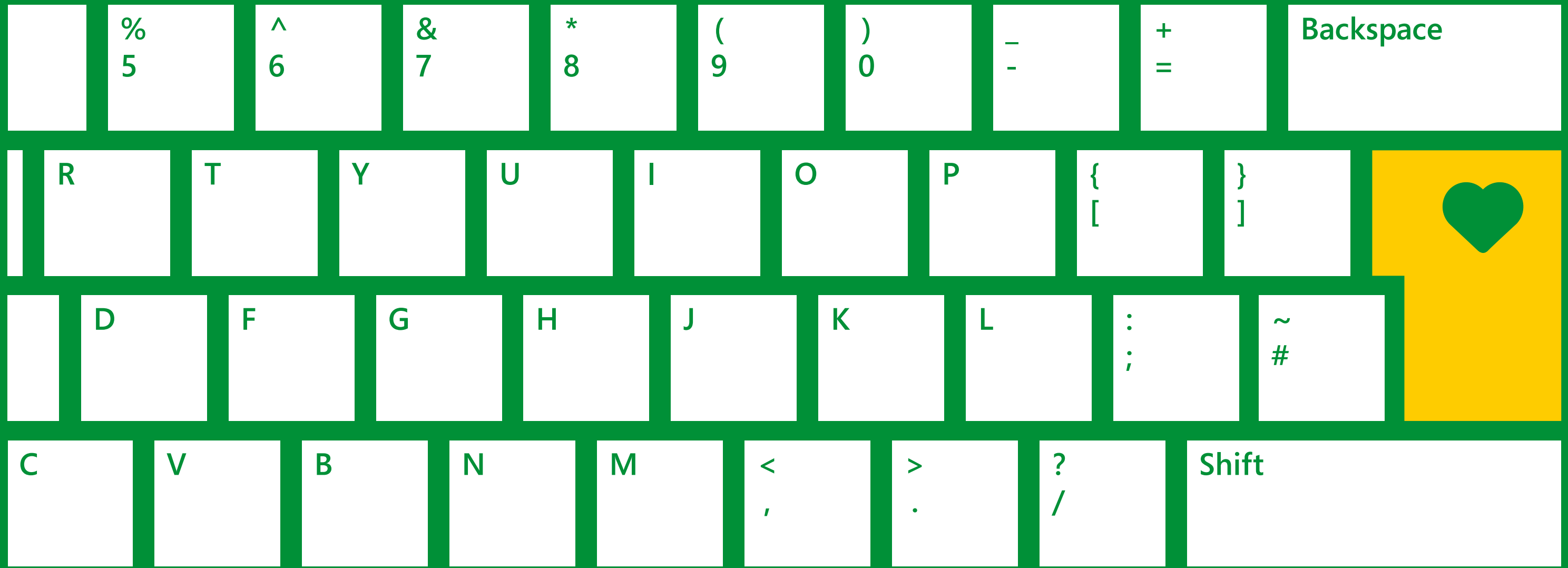
Rare molded plywood sculpture created by Charles and Ray Eames and exhibited at the Museum of Modern Art, New York, *Design for Use*, in 1944.

Untitled sculpture, 1943, by Charles and Ray Eames, Sold at Auction for \$365,500, at Christies in 2008

Curabitur a arcu ac libero dictum sodales. Quisque nibh elit, sollicitudin pulvinar euismod in, convallis vitae ligula. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Curabitur sit amet est et lacus varius

CHAPTER 4 | SEARCH AS PERSONAL

Search technologies are increasingly designed to offer a personalised experience. This is normally treated as a question of fitting a search request to the specific interests of the user. But what would it mean to build a personal relationship with a search engine – one where sentiment about and aspirations towards content were constituted in part through that relationship?



What is personalised search?

Delivering appropriate search results has traditionally been bound up with the notion of 'relevance', which has more recently been recast to consider what might be personally relevant to each individual user. Personal here is defined in terms of a person's needs for information at some moment in time (now) and space (here). But how could we design to support a more meaningful personal relationship with a search engine?



Personalised search results are generally understood as those that have been ranked to take into account the user's history. This history might be obtained in various ways, such as through creating user accounts or by drawing on cookies. Irrespective of how the information is gathered, it is then used to tailor what is contained in the SERP, with the hope that this will reflect an understanding of what is relevant to the individual, rather than to the wider gamut of web users.

To take a simple example, when searching for a restaurant in Cambridge, a person living in the UK will not have their search results muddled with information about eateries in New England. While this seems advantageous, the notion of personalised search has been the topic of some debate. The title of Eli Pariser's book *The Filter Bubble: What the Internet is Hiding from You* expresses much of the apprehension surrounding personalised search, the central concern being that it reduces the likelihood of finding new information, whilst making invisible the reasons as to why search results appear as they do.

Personalised search is sometimes seen as limiting one's view of the world, like a goldfish in a bowl.



One of the principles upon which personalised search is based is that the past can be used to inform future possibilities. However, it is possible to turn this assumption on its head. For example, we might consider that our behaviour in the present moment is done with the future in mind; we draw on the past selectively in order to act. In contrast, in search, the engine relies on data collected through past action, and uses this to shape future possibilities. If we ask the question of what it might mean to have a personal relationship with a search engine, we might then ask how an engine could help us grow and develop our interests, rather than how these can be narrowed down to a set that reflects what we have done before.

Another principle that is bound up with the above is that personalised search reflects the notion that one's personality and interests are stable. If we further unpack what a search engine that knows the user would be like, we might consider how to make it more flexible. We saw in the first

chapter that people adopt different modes of web use at different times – sometimes routinely staying on top of content that is important to them, while at other times wishing to find the answer to a question or explore a curiosity. A search engine that knows a user might know that at times they want to engage with content that is familiar, at other times they want the plain facts, and at yet other moments they want to be enticed into going somewhere new. As part of this it might even know how they prefer to consume information in different circumstances, for example, whether they like to wander through content, building knowledge as they go, or whether they want to go straight to their destination.

Personalisation normally means reducing the ambiguity of a search query. What would it mean if personalisation allowed you to express yourself in new and richer ways, in order to open up the search space?

How can users express themselves through acts of search?

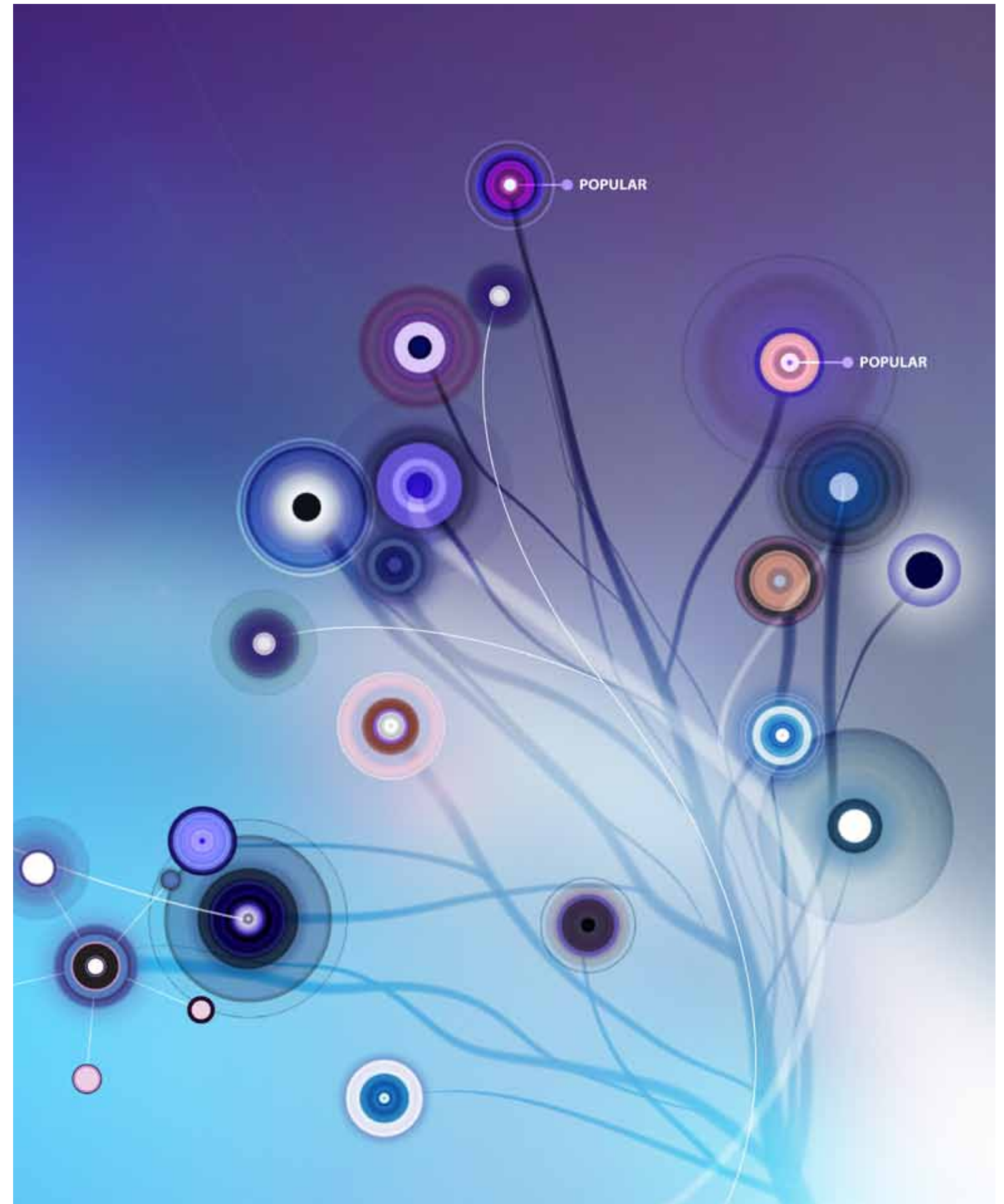


Seeds is a concept that explores what it might mean to choose a search term that represents a long-term interest, and for the search to evolve as the interest flourishes. The user plants a 'seed' representing a search query, which grows and takes an organic form as new content appears. The idea is that for deeply-held interests, about which the user knows a great deal, the top ten links may not be significant. What is germane is content that is new.

We have developed two versions of *Seeds*. The first presents new Bing search results as well as new tweets about a topic on a dedicated page, which can be returned to repeatedly. These are represented as a virtual, organic structure that might grow on an active desktop or on your browser's home page. New search results and tweets appear at the top of the structure, and sink downwards over the course of an extended period – an hour, day, a week perhaps. Thus, the user is made aware of new web content that relates to a topic of interest, or new online discussions that are emerging around it. Because the results can be found on a dedicated web page or on the desktop, users can visit them during moments of respite, or when orienting to the day.

The second version of *Seeds* explores how results might branch and how these branches might be curated by the user. Branches are triggered using Bing's 'related search' and auto-complete suggestions, so as to open up the search space. The user can then tailor the structure over time, so that it becomes curated to reflect their growing and changing interests.

SEEDS



CHAPTER 5 | SEARCH AS SOCIAL

Search is utilised by friends and family for information sharing as well as information seeking. What could it mean to design a web-based experience around the relationships that underpin everyday life?



Connecting through Search

Search can be made more 'social' in a variety of ways, from incorporating Facebook posts to utilising user generated tags. However, the posts and recommendations that search engines draw on are generated for a number of reasons, not all of which make sense in the context of a SERP. This raises questions about the social relationships that become entangled with search results, and what a search engine that drew upon the relationships themselves might look like.

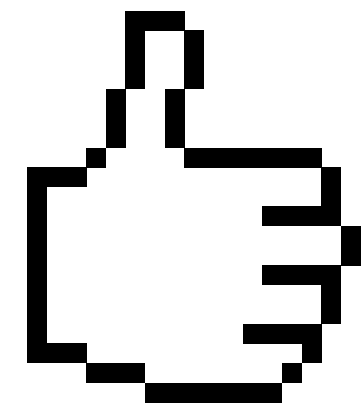
Social search is typically understood as that which draws on the social graph of the person doing the searching. For example, content that is created by others within the user's social network, or that has been accessed by them, might be made more prevalent in the results. This might mean giving precedence to content that Facebook friends are looking at, drawing on social bookmarking sites like Delicious, or attending to user-generated votes or tags.

Drawing on this kind of content is not straightforward. For example, content that is highlighted by Facebook friends may not have been selected because it is interesting. It might offer a light form of entertainment for others, which is in keeping with the experience of using Facebook itself, or it might be expected to resonate with a particular friendship group. In other words, we should expect Facebook content to reflect the fact that it has been posted in a public space, through which people connect with each other and express themselves. Knowing when this content can be taken out of context, and presented within a SERP, is complex.

However, deliberately positioning search as 'social', by enabling it to become a means of self-expression, or a way of performing social relationships, opens up a different set of possibilities for design. For example, search results might be a marker of shared interests when sent from one



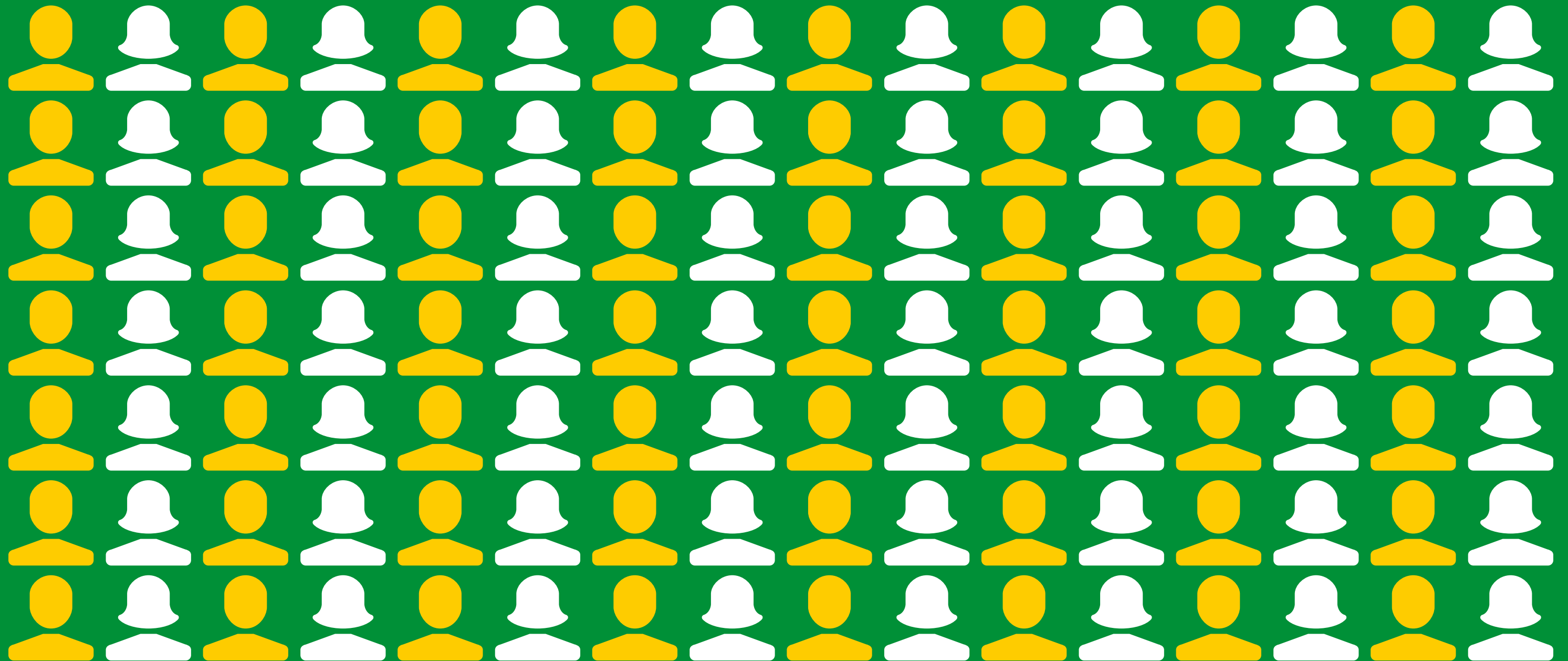
friend to another, or a way of doing the work that is bound up with being part of a family. Couples might need to coordinate activities that involve search results, or finish off tasks that their children begin, such as buying goods from online stores that require a credit card. Designing for the values associated with this type of web use, where searched for content can be a way of showing off, demonstrating care, sharing a task, or trusting in another to do something for you, is not currently well-reflected in search technologies.



Making search social might mean allowing users to deliberately highlight results for others.

Social search normally means using populations to define a search target. What would it mean if the experience of search became social?

How can we make the individual experience of search a social act?



SEARCHING FOR



Tokens is a concept, developed with Aalto University in Finland, which explores what it might mean to embody web content, so that it can take on some of the properties normally associated with physical objects. The 'tokens' themselves are a collection of small ceramic knots, inspired by the notion of a knotted handkerchief, which acts as a reminder of something. Additional tokens include 'bindables', which can be tied onto things, and 'stickers', which can be stuck to them. People can associate a web page with any of these tokens by placing it on an RFID reader, and the content can be read through the use of a similar reader, or by placing the token in a specially designed wooden tray. In both cases, the 'contents' of the token are displayed on the screen.

Scenarios for the concept include placing tokens representing ideas for a day out into a pot, and then pulling one out; coordinating tasks, for example by giving others tokens by way of a 'to-do' action; and gifting, by finding web content that one wants to share, and then assigning it to a token that is given to someone else.

Deployments of Tokens with families has revealed how it was chiefly used collaboratively, in ways that were subtle yet

able to catch the attention of others. For example, a couple who were looking for a new family car were able to share the task by means of passing tokens back and forth. The wife left five tokens, each representing a car that she considered a possibility, on her husband's laptop, knowing that when he woke up in the morning he would encounter them. He then ruled out two, and left her three from which to make her choice. Instances of use by children included associating a selection of wished-for birthday presents to a group of tokens that were left for their parents, or creating tokens to represent items discovered on eBay that they hoped their parents would buy for them. In all cases, by embedding search results into the fabric of the home, tokens became part of a landscape where physical items are often placed to inform, remind, and evoke responses from others.



CHAPTER 6 | LOCATION-BASED SEARCH

Users can search from anywhere, and search engines use location to present results that are pertinent to a person's whereabouts. But different locations also have different qualities, the home being different to work, for example. What might it mean to design search technologies for a particular type of place, such as for the home? How could a search engine reflect the characteristics of the home environment?



At home with the web

One of the strengths of the web is its ubiquity. The proliferation of mobile devices and cloud-based data means that the web can increasingly be accessed anywhere and at any time. But different locations have different qualities, and it is worth considering how the web might be designed to fit a specific place.

The home has a unique set of qualities that can usefully be drawn upon in technology design and which can be easily missed when design places the value of access-anywhere at its centre. For example, the web modes that we outlined at the beginning of this magazine were born out of research that demonstrates how the web has become an integral part of domestic life. Going online is at some times a way of constituting leisure time, while at others it provides a backdrop to, or escape from, the activities that one is supposed to be doing. This suggests a design space that moves away from the notion of web-based activity, and instead considers how we can design for the way that the web is integrated into domestic practices, and domestic spaces, more broadly.

As we have already seen in the case study of Tokens, one way of accomplishing this might be to design physical handles for digital content. Through their intermingling with the clutter that is a part of home life, the tokens can fade into the background or be brought to the fore, they can be targeted for a particular individual, or left for general consumption. This observation can be extended by thinking

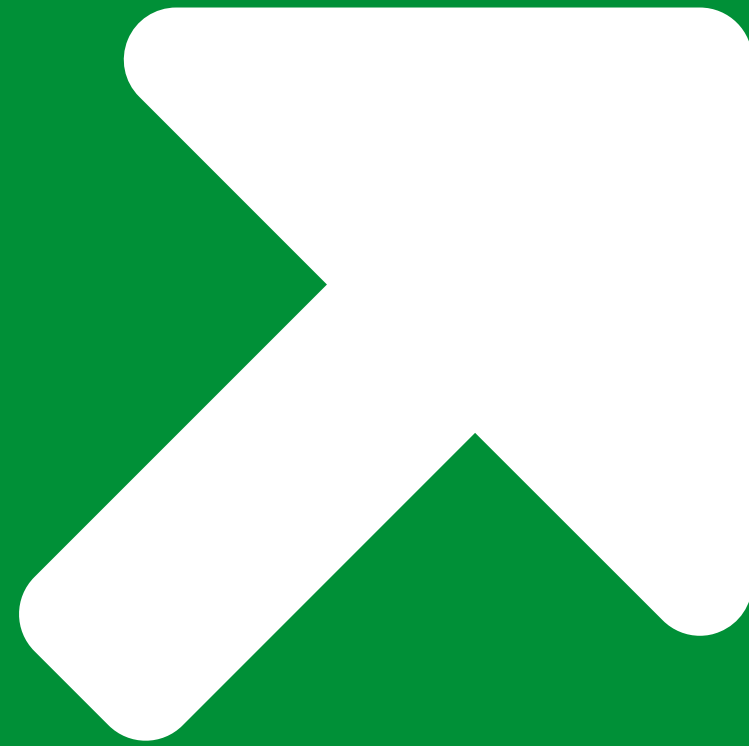
more carefully about what it means for content to be located within the domestic environment. Some of our recent research has indicated the importance of knowing where virtual possessions are, a concept that is increasingly hazy with the advent of cloud-based storage. Yet an understanding of where content 'lives' gives a sense of reassurance and of ownership of it, which is being increasingly undermined but which is especially important for precious content such as photos. Our fieldwork has indicated how easily people lose track of even personally meaningful content when it

is hosted online; some participants were surprised to come across collections of photos that they had carefully uploaded to Flickr only a few years earlier. Relatedly, design research around the concept of technology 'heirlooms' has indicated the value of being able to position digital content amongst other material things within the home, where they are felt to naturally belong over long periods of time. Together, this work suggests the value of designing to enable digital media to find its place in the domestic environment, or in other words, to be at home.



Search engines are normally designed to deliver content to a person. What if a search engine delivered content to or for a place?

How can we look at the characteristics of places to define what search engines might deliver?



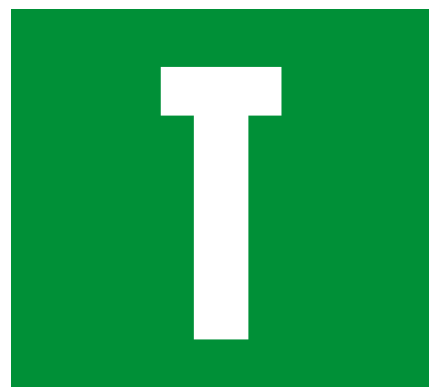
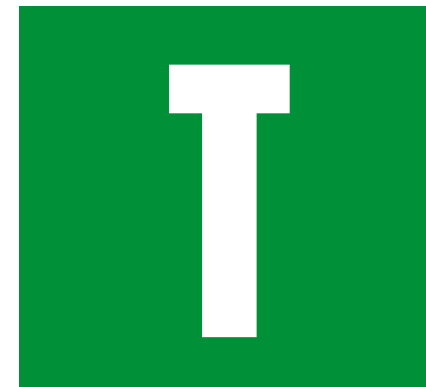
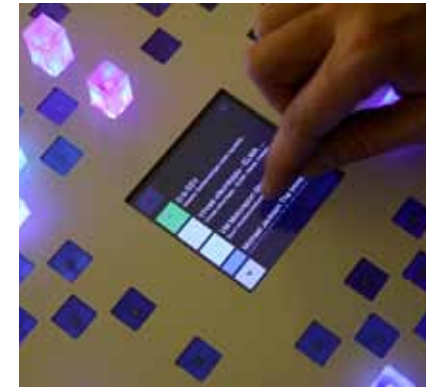
CASE STUDY

Manhattan is a spatial and tangible display, developed in collaboration with Aalto University in Finland. It is designed to convey a sense of what is happening in a particular neighbourhood, through illuminated blocks that function as tangible indices to search results. Each block symbolises what is going on in a specific location around the home, through changes in colour that reflect different categories of event. This allows the user to see at a glance whether an event relating to sports, theatre or music is on the horizon, while the display's overall hue gives an idea of the broader character of local goings-on. When the user presses a block, data relating to the events that it represents are displayed on a touchscreen.

Manhattan is designed to be placed somewhere central within the home, but without being intrusive. Information is updated only once an hour follow-

ing a radar-like metaphor, with a visualisation sweeping through the blocks. When there is new data, blocks rise up and their colours alter; once events have passed, the corresponding blocks sink down. In this way, information can be garnered at a glance, and users can choose to engage more deeply with the details if they so desire.

Manhattan is an exploration of how to represent and embody events around the home, so that they become 'part of the furniture' but can also support individual and collaborative use. Scenarios for the device include being able to collectively explore what is happening nearby while pushing down events that are not of interest, or leaving those that one wishes to attend raised and prominent, for others to come across.



Are search engines good for our minds?

In 1945, Vannevar Bush described the concept of the personal Memex. This was a contraption – imagined rather than built – that would store all the documents that a person had made or used: when one of these documents was needed, all the person had to do was select some buttons or type some query and the system would return the document. Bush thought such a device would supplement the human mind, all the more so as the world was then becoming ever more saturated with information. To succeed in this the system would have to store huge amounts of information and retrieve this quickly, as well as be easy to use.

In many ways, the personal Memex prefigured the web of today. There are important differences of course. The Memex only stored information that the user put in, so that it might then be made available on demand. Today, in contrast, there is a vast amount of content on the web, so much so that the user cannot hope to encounter it all. Not only do users need tools to help them retrieve what they have already seen, they also need support in discovering new content that may be of interest to them. Modern search engines index the heterogeneous stuff presented on websites and use these indexes as the repository that is examined when a user enters a search request. These indexes are digital analogues to the old paper or card indexes that libraries used to keep. Bush had no concept of the search engine then, nor did he have any expectation that the world of the future would provide access to almost anything – from stores of scientific knowledge to commercial product data, from enter-



tainment sites to consumer purchasing services. The modern web really is remarkable for its diversity.

Nevertheless, there are many who feel that there are as many benefits as there are downsides to this. Eli Pariser, for example, complains in his book *The Filter Bubble* that people cannot trust search engines. Perhaps in some distant past search engines were good tools for finding what one needed but today, in the age of the Cloud and massive aggregation systems, he fears that search engine providers can hide things away from us in ways that we could not guess. Doing so is at once sinister and capitalistic, he argues, sinister since it is disempowering, capitalistic since it places the market above the public good. Search engines take you to what companies want to sell, not to what you need to know.

Others are concerned that the information stored on the web and made available through search engines is culturally specific, reflecting one way of presenting and organising knowledge. This is the view from Silicon Valley, not the view from, say, Paris or Beijing. Nor is it a view that reflects time honoured criteria for objectivity and quality: it is the view of Walmart not of the Sorbonne. This is gist of Jeanneney's book *Google and the Myth of Universal Knowledge*. We should not trust in either the web or in the search engines that lead us around it.

School teachers also worry about the impact of the web on

learning. They are concerned that pupils get search engines to answer questions for them, without considering where information comes from, its provenance and hence its quality. Like Jeanneney, they believe that students are losing the capacity to judge. One time capitalist William Davidow is likewise agitated: we don't reason for ourselves and rely instead too much on the pull of the common crowd. We abide by the outputs of social search, not our own, we follow the lead of everyone rather than what is right or well thought out. We are *Overconnected* he argues in his eponymous book, we can no longer trust ourselves to reason properly.

In this magazine, we have tried to point out ways in which this need not be. We have suggested that search can underpin a wealth of experiences, from exploring a new topic to nurturing a growing interest. We have considered how search results might be re-imagined, from card-like entities that can be kept, to tangible materials that can be shared with others. Finally, we have asked what it means to bring the web into the home, and what the unique social and material qualities of this space implies for design. Our explorations highlight that there is much more to the web than the information it comprises. It is a space where people spend time, curate, share content with others and keep it for themselves. It has the potential to not only be good for our minds, but for our relationships too.

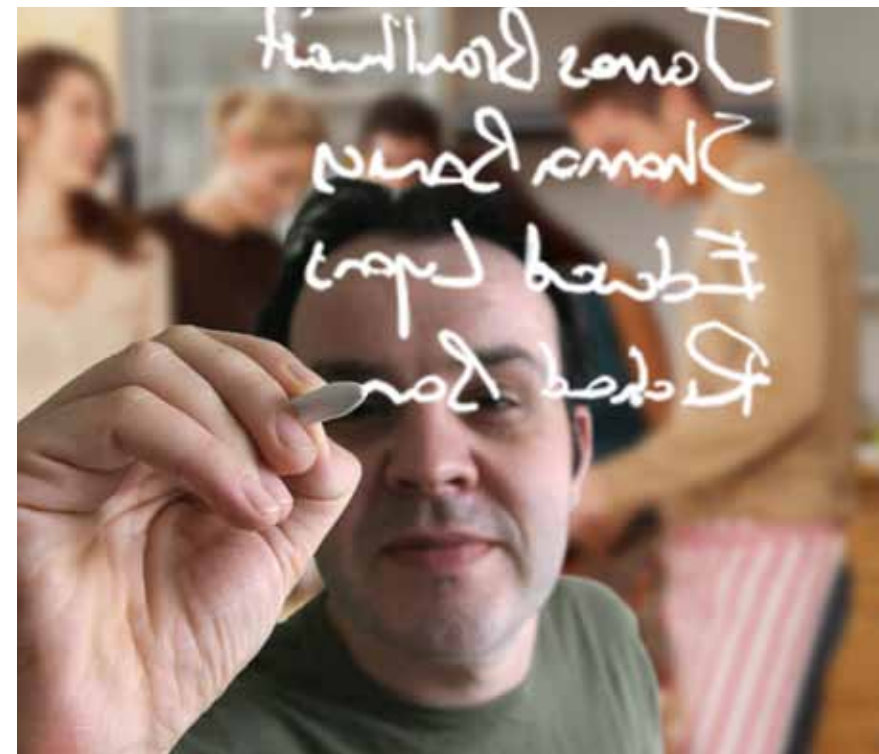
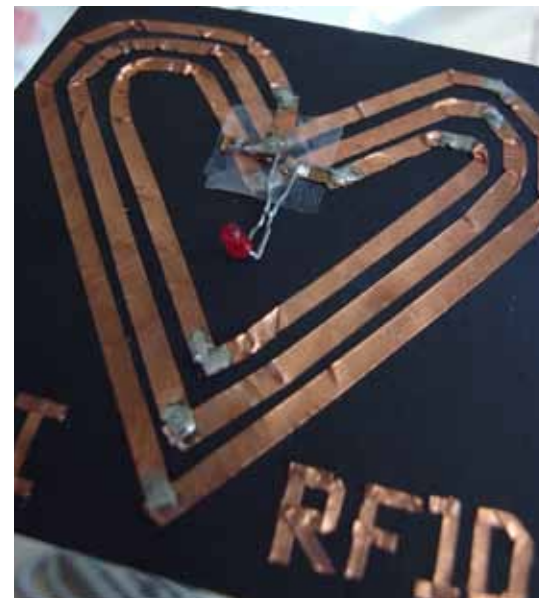
SOCIO-DIGITAL SYSTEMS

Socio-Digital Systems (SDS) is one of the research groups at Microsoft Research in Cambridge, UK. As a group, SDS aims to use an understanding of human values to help change the technological landscape in the 21st Century. Beyond making us all more productive and efficient, we ask how we can build technology to help us be more expressive, creative and reflective in our daily lives.

Our group considers a broad range of human values, aims to understand their complexity and puts them front and centre in technology development. An important aspect of this endeavour is the construction of new technologies that, in turn, we ourselves can shape. In so doing, we may create new ways that help us to actively realise our aspirations and desires, to engage with or disconnect from the world around us, to remember our past or to forget it, to connect with others or disengage from them. Important here are technologies which ultimately make our lives richer, and which offer us choice and flexibility in the things that we do.

SDS does this through the bringing together of social science, design and computer science. We believe that by understanding human values, we open up a space of new technological possibilities that stretches the boundaries of current conceptions of human-computer interaction.

For more information on our group, and our current themes, projects and publications, please visit research.microsoft.com/sds



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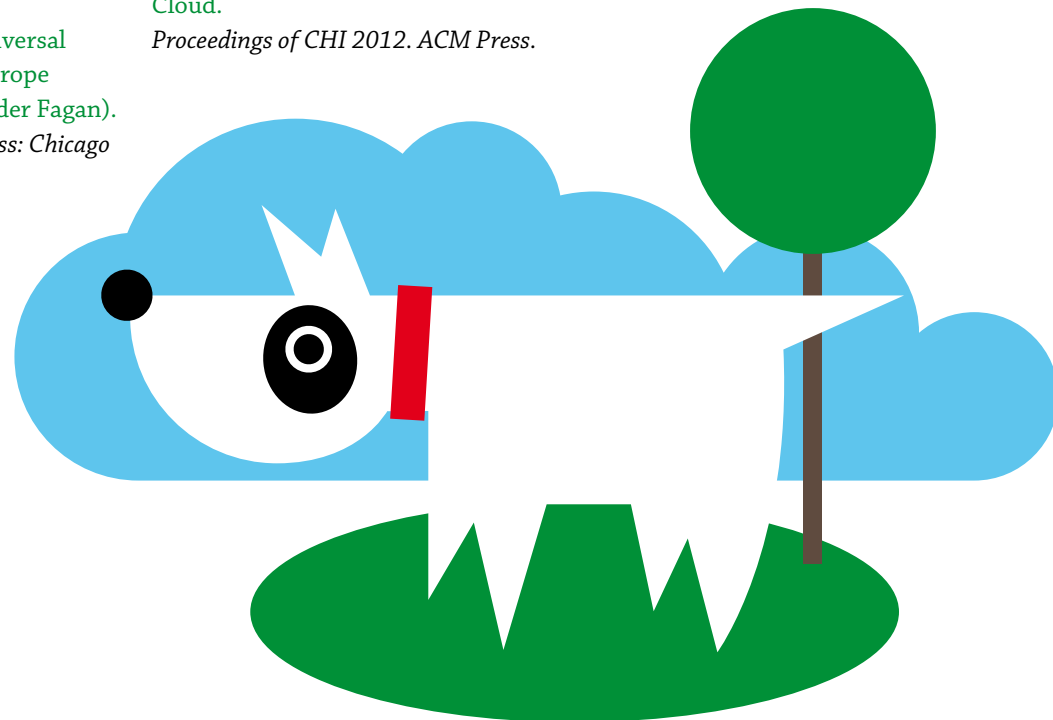
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