

# Editors' Introduction: Footprints in the Snow

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## Background

There are many changes happening in the world of computers and communication media. The Internet and the web, of course, have created this vast network of interlinked machines. Computers are becoming increasingly ubiquitous; they are “disappearing” into everyday objects. They are becoming increasingly small, so much so that they are now wearable. They are increasingly able to communicate with each other.

These changes have had a major impact on our understanding of how computer systems should be designed and on what people can and want to do with them. The discipline of human–computer interaction (HCI) has not really kept pace with the changes in technology, and much HCI education still takes the view that there is *a* person interacting with a computer. Courses on HCI will emphasise the cognitive difficulties that people might have in using large software packages. They will present guidelines on how to design screens and human–computer “dialogues” and will discuss methods of evaluating computer systems in terms of the “tasks” that people undertake and in terms of the “errors” that people might make.

In the mid-1980s and early 1990s a new discipline emerged out of HCI and areas of study related to people working together; computer-supported cooperative work (CSCW). CSCW looked at how software systems and communication technologies could support the work that people were trying to do. It shared many of the assumptions of HCI, but also introduced more socially-based ways of thinking. The importance of fitting technology into the workplace was emphasised, or *really* understanding what people wanted to do and of looking at what technologies were required in order to support and enable their activities.

During the 1990s a number of people were becoming dissatisfied with both these approaches. People were using computers for many purposes other than work. Computers were being used in different contexts such as

households, and communities of people existed solely or primarily through computer-mediated communications. People were not simply interacting with a computer, they were interacting with people using various combinations of computers and different media such as video, mobile phones, animations, touching, gesturing and so on. The notion that we could see people as existing in an information space, or in multiple information spaces, grew and was offered as a challenge to the predominant “people outside the information” view of HCI (Dourish and Chalmers, 1994; Benyon, 1998a, 2001). Alongside this came the recognition that using computers needed to become a more enjoyable, social activity. The development of the Internet, particularly for leisure activities, and the emergence of Internet Service Providers that bundled news, chat rooms, web access with remote game playing, shopping and so on, resulted in designers looking outside of “traditional” CSCW and HCI for design principles and appropriate methodologies.

These developments have continued to grow into the twenty-first century informed by emerging theoretical frameworks such as distributed cognition (Hollan, Hutchins and Kirsh, 2002), social computing (Dourish, 2001) and experiential cognition (Lakoff and Johnson, 1999) and expressed through new design approaches such as holistic design (Maxwell, 2002), scenario-based design (Carroll, 2000). Recent times are also seeing a convergence of HCI, CSCW and interaction design that has its roots in the disciplines of creative design (Winograd, 1997).

Social Navigation is part of this movement. The chapters in this volume (and in the companion volume, *Social Navigation of Information Space*, Munro, Höök and Benyon, 1999) capture much of the debate and ideas surrounding social navigation. The chapters deal with concepts of social navigation, ideas of the nature of information, the impact of people working in new environments and with new media and design ideas coming from architecture, anthropology and social theories of interaction. In this introduction we aim to introduce many of the significant characteristics of social navigation and the backgrounds from which it has arisen.

## A Short History

In March 1998 an international group of thirty researchers attended a workshop on Roslagens Pärta, a small island in the Swedish archipelago. The topic of the workshop was “Personal and Social Navigation” of Information Spaces. Although the researchers came from a wide variety of backgrounds – computer science, human–computer interaction, social science, psychology, information retrieval, computer-supported cooperative work – they shared an interest in exploring new ways of thinking about the relationships between people, technologies and information. In

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particular they were interested in the notion of social navigation: how to develop and enrich the experience of dealing with information within the electronic “worlds” provided by computing and communication technologies.

The idea for the workshop arose from discussions within the group working on a research project called PERSONA, a collaboration between the Swedish Institute of Computer Science (SICS) and Napier University, Edinburgh. David Benyon from Napier and Kristina Höök from SICS had developed the project after their experiences working with intelligent user interfaces. Attempts to get the computer to make sensible inferences about what people wanted to do, so that it could tailor the provision of information to their needs, had not been successful. The dream of having intelligent interface “agents” (Kay, 1991) was still a long way from becoming a reality because the techniques used to build agents and other “intelligent” user interfaces ignored a fundamental feature of people; people are social beings. The question for the workshop to consider was how to bring the social into information provision.

When people need information, they will often turn to other people rather than use more formalised information artefacts. When navigating cities people tend to ask other people for advice rather than study maps (Streeter and Vitello, 1985), when trying to find information about pharmaceuticals, medical doctors tend to ask other doctors for advice (Timpka and Hallberg, 1996), if your child has red spots you might phone your mother or talk to a friend for an opinion. Even when we are not directly looking for information we use a wide range of cues, both from features of the environment and from the behaviour of other people, to manage our activities. Alan Munro observed how people followed crowds or simply sat around at a venue when deciding which shows and street events to attend at the Edinburgh Arts Festival (Munro, 1998). We might be influenced to pick up a book because it appears well thumbed, we walk into a sunny courtyard because it looks attractive or we might decide to see a film because our friends enjoyed it. Not only do we find our ways through spaces from talking to or following the trails of crowds of people, we also evaluate the things we find in these spaces through understanding them in a social context. We put them in a framework of relevance.

During a break at the workshop a group of participants were standing in the winter sunshine. They were considering how the results of the workshop could be more widely disseminated and about where the ideas raised during discussions might ultimately lead. A line of footprints led across the snow and into the woods. As a metaphor both for social navigation and for the unknown destination of this work, it seemed perfect: footprints in the snow.

The outcome of the Roslagens Pärla workshop was published in a book *Social Navigation of Information Space* (Munro, Höök and Benyon, 1999).

In addition to papers from many of the workshop participants contributions were invited from others working in the area, resulting in fourteen chapters that explored various aspects of social navigation. At the Computer Human Interaction (CHI) conference in 1999 the issues of social navigation were debated in a panel organised by Alan Wexelblat. These activities resulted in a second workshop held in conjunction with the CHI 2000 conference. At this second workshop, a stronger emphasis on implemented social navigation systems and even user evaluations of these systems was made. Observing that social navigation happens in the world is, as it turns out, quite different from finding ways of designing for social navigation.

The first book was soon sold out and after much discussion a second version of the book has emerged. The emphasis on practical examples of implemented social navigation systems is stronger in this second book. For various reasons of space, focus, etc., some of the chapters from the original book were dropped, some have been retained in broadly their original form and others are completely new or have been completely revised.

The aim of the current volume is to make both the applications and the theories underlying social navigation available to a wide audience of practitioners and researchers alike. We hope that both groups will find a wealth of example systems, concepts and practical ideas. In order to help structure the work, we have organised the book into two parts. In Part I “Systems and Theories” the emphasis is on systems that have been built and on the rationale for the design choices made. Part II “Theories and Principles” puts the emphasis on the underlying, generic principles and theories that drive social navigation.

## Mapping Social Navigation

The concept of social navigation was introduced by Dourish and Chalmers in 1994. They saw social navigation as *navigation towards a cluster of people* or *navigation because other people have looked at something*. Computer systems known collectively as recommender systems (Konstan and Riedl, this volume) have been developed that implement these ideas. By collecting the likes and dislikes of a large number of people, an individual can specify one or two things that they like or dislike and the system recommends others based on the data collected from other people. Later, Dieberger widened the scope (Dieberger, this volume). He also saw more direct recommendations of, for example, web sites and bookmark collections as a form of social navigation. Since then the concept of social navigation has broadened to include a large family of methods, artefacts and techniques that capture some aspect of navigation.

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Social navigation can be seen from several different perspectives and in several different domains, both in the “real” world of human activities and in the “virtual worlds” of information spaces of different kinds. Collaborative virtual environments (CVEs) provide an area where people may interact with each other in various ways. Sometimes these environments will be textual, such as a newsgroup, sometimes they include video and sound, and in others people are represented by avatars. Work on social navigation brings together and occasionally critiques aspects of CSCW (computer-supported cooperative work), IUI (intelligent user interfaces), IR (information retrieval), and CVEs. Accordingly the underlying philosophies and disciplines come from work in cognitive and social psychology, anthropology, social theories of human action, human-computer interaction and artificial intelligence. The concept of social navigation brings some quite unique characteristics into our understanding of information, spaces, places, user interfaces, and the activities of those participating in these various worlds.

Social navigation does not have a narrow focus. Rather, its concerns range widely over “navigation” in different types of virtual worlds. Social navigation considers the creation of social settings and “places” in information space and behaviour in them, the sociality of information creation, people as members of groups and nature of information itself, its location, evaluation and use. We are seen not just as single users, but as members of many different types of information spaces both real and virtual. As is suggested by the term “navigation”, many writers on social navigation draw upon work in architecture, urban planning, the visual arts and design.

The ideas of social navigation build on a more general concept that interacting with computers can be seen as “navigation” in information space (Benyon and Höök, 1997; Benyon, 2001). Whereas “traditional” human-computer interaction (HCI) sees the person outside the information space, separate from it, trying to bridge the “gulfs” between themselves and information, the alternative view of HCI as navigation within the space sees people as inhabiting and moving through their information space. Just as we use social methods to find our way through geographical spaces, so we are interested in how social methods can be used in information spaces. How could the ideas of social navigation change our view on design in this particular context?

Instead of imagining a “dead” information space, one aim of social navigation is to provide people with a lively space where (in some way) they can see other people moving about, can consult or instruct specialist agents and get advice and help from other people. These are examples of *direct social navigation*. Another aim of social navigation is to provide possibilities of providing information about what other people have done: pointing people to choices that, based on the preferences of other people, the system believes would be suitable; providing opportunities to

peek at another's choice; showing which is the most popular choice. These are examples of *indirect social navigation*. Another form of indirect social navigation is for the designer of a space to enable effective navigation and choice-making through good sign posting, showing clear paths through the space or providing clear maps.

The form of social navigation chosen will depend upon an understanding of the properties of the space and people's activities in the space. Social navigation is not a set of ready-made algorithms; it is a philosophy of design. What we can do is to *enable* (make the world *afford*) social interactions and social trails to be revealed to others. We might direct people or point them to areas "off stage", making people aware of others (Dourish, this volume). Social navigation will often be a *dynamic*, changing, interaction between the people in the space, the items and the activities in the space.

A fundamental question which stems from social navigation concerns the methods we use in order to do research in this area, to inform our concepts. Within this book we find a diversity of answers. A number of chapters use ethnographic methods of different theoretical flavours, others more "traditional", cognitivist approaches, others from recent theoretical developments in psychology and cognitive science such as experientialism.

The fact that there are a wide variety of approaches and analyses is unsurprising. Social navigation does not have a single, underlying theoretical framework and we are all learning more about the applicability of different methods in different circumstances. This book is the outcome of an organic process, from the workshop, through the first volume, to the current book. The chapters represent in some ways the networks of researchers which have helped build this field.

It is true to an extent that a number of these researchers have similar concerns: ethnographic methodology and a shared philosophical acknowledgement of (the later) Wittgenstein (though exactly how his writings are interpreted does vary). There is often an influence from the work of the psychologist James Gibson (1986) on the importance of perception to thought, of George Lakoff (1987) and his approach to cognition, and of the sociologist Garfinkel (1967). There are also, as we mention elsewhere, shared concerns about architecture, the built environment and planning.

## Design Possibilities

Using the idea of social navigation will thus bring about a view on information spaces and people's activities in them that enables a whole range of design solutions that are barely exploited in today's systems. With direct social navigation we shall be able to talk directly to other users and

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get their views on how to navigate, which will improve our navigation and understanding of the space. When we talk to someone else, the information we get back is often personalised to our needs. We are perhaps told a little bit more than exactly the information we asked for, or if the information provider knows us, the instructions may be adapted to fit our knowledge or assumed reasons for going to a particular place.

But direct social navigation can also be on the level of interpreting information based on how other people talk about or use information (Harper, this volume). We can judge to what extent the information given can be trusted depending upon the credibility of the information provider. Sometimes, even if it cannot be trusted, it still is of value as we know where it is from.

Social navigation is to an extent dependent on the modality in which one is able to operate, the affordances of it. A text only system can afford fewer social cues than one using graphics, sound or video. We also talk to one another through body language or through the collective visible actions of a group of people. We follow the crowd of people who leave the plane in an airport assuming that they are all heading for the baggage claim. In a virtual environment avatars may be used to express some simple forms of body language that can invite others to join the group, or to indicate privacy. The aura of the representation of a user can enable interaction with other people.

The possibilities for indirect social navigation also allow for aggregation of non-visible user behaviour. Designers can invent novel ways in which these things are displayed such as textures of items or trails of people, or it can be more direct instructions or recommendations: “others who bought this book also bought this one”. We can also alter the way that data about people is collected, shown and mapped on the space in a dynamic way. The dynamics of this change is both good and bad: people shall have to adapt more quickly to new environments and the changed properties of the space. People are intrigued by spaces that do not behave as they expect them to, but they rapidly adapt and figure out new ways by which they can understand the space and the movements of people in them.

Both direct and indirect social navigation provide excellent opportunities to provide the seeker with a sense of security/safety: “since all these people have chosen this route, it must be the right one” or “if this is the way that my friend behaves with these sites, then I can probably do the same”. Human beings are to a large extent behaving like flocks – we enjoy imitating other people’s behaviours, body movements, use of tools, way of talking, etc. We use dialects, clothing, rituals as means to make our group distinct from the rest of humanity. We create a feeling of belonging – it makes us feel good! These mechanisms are efficient ways of learning and still they are largely excluded from spaces like the web (Dieberger, this volume).

Turn to Svensson and Höök, Persson et al., Erickson and Kellogg, Wexelblat, Maglio et al. and Konstan and Riedl (all in this volume) for concrete design examples of how the idea of social navigation can inspire the design process.

## Shifting Perspectives

Social navigation does not just provide alternative design possibilities. It requires people to think differently about the nature of people and their interactions with computers and communication technologies. For example, Dourish (this volume) encourages us to view social navigation as a phenomenon of interaction. If we populate spaces they will offer users “appropriation and appropriate behavioural framing, distinguishing them from simple spaces, which are characterised in terms of their dimensionality”. Dieberger (this volume) opens up the scope of seeing social navigation as a move away from the “dead” information spaces we see on the Internet today and in every way possible opens up the spaces for seeing other users – both directly and indirectly. His claim is that “future information systems will be populated information spaces”. Users will be able to point out and share information easily, guide each other and in general open up our eyes for various ways by which we can “see” other users.

Ideas of social navigation naturally lead us to consider the concept of navigation in real and virtual worlds. We also need to change our view of information from being decontextualised, objective portions of the world, to socially interwoven subjective views of the world. The relationship between space and how it can be turned into “place” where meetings can happen and where social connotations constrain and afford activities is also significant. Finally, we need to reconsider the relationship between the modality of the space and interactions that can take place in it.

Social navigation is not a concept that can be unproblematically translated into a set of particular tools. Instead it encourages understanding of human activities in space and place – both virtual and “real”. People are active participants in reshaping the space. There is a dynamic relationship between people, their activities in space, and the space itself. All three are subject to change.

## Navigation of Information Space

Spence provides a model of navigation that focuses on how people form intentions, browse and evaluate alternatives and then decide which “direction” (or course of action) to follow. In this sense, Spence is quite close to the work of urban planners and architects who have used this

cognitive view of spatial awareness. Lynch (1960) in particular has been very influential in identifying five features of urban environments – landmarks, nodes, edges, paths and districts – and their importance in the design of geographical space. Other influential work from the area of architecture is that of Alexander et al. (1977) who proposed a number of “patterns” for architectural features.

This work is not without criticism, however. The crucial thing missing from the traditional geographies is the failure to appreciate how environments are *conceived* by people as opposed to simply *perceived* by people. People play a role in producing the space, through their activities and practice (Lefebvre, 1991). So the social aspects of exploration and wayfinding need to be taken into consideration. Also important are the ecological aspects of navigation: how information is distributed throughout the people and artefacts in an environment and how that information is picked up and used by people as they navigate. The explorative, browsing behaviour of people needs to be part of our understanding of navigation (Spence, this volume; McCall and Benyon, this volume). It is one of the marks of social navigation and the chapters in this volume that the debate about how best to view navigational activities continues.

If we see the user as within the information space as opposed to outside it the job of the designer becomes one of providing graphical, auditory and haptic cues so that users will be better placed to understand, use and navigate within it; we need to “design for possible user experiences” (Waterworth et al., this volume).

## From Space to Place

The recognition of the importance of the social construction of space leads to the important distinction between space and place; a theme picked up by several authors in this volume (particularly Dourish, Chalmers, Dieberger, Jeffery and Mark, Buscher and Hughes, and Waterworth et al.). Places are seen by a number of authors to be the settings in which people interact. People turn spaces into “places” where social interactions are encouraged and which are visible through the configuration of the space and how people conceive of the various interactions in it. Once again architecture is a significant influence on these ideas. Whyte (1980) in particular, is interesting; the photographic studies of various different configurations of space, showing in a very detailed way what configurations of space “work” and what ones do not, what ones lead to higher crime levels, what configurations lead to sociability. One of his main findings is that what attracts people is people. Something designers of information space should consider.

We must though be careful in our analysis. Particular physical configurations are associated with social situations. The consulting room is of

course quite different from a lounge, and a pub. However we have to bear in mind that these are *reflexively* designed. It is the architect's knowledge of what goes on in these places which conditions how they were built. However it is not true that these places are not mutable (Dieberger, this volume). Whilst certain places encourage and afford behaviours, people can change the use of that place.

To what extent lessons from architecture and the social construction of spaces can be translated into the design of information spaces is something explored in several chapters in this volume (see particularly McCall and Benyon). The difference between information space and information place, however, is an important feature of social navigation.

## From Decontextualised to Social Information

Just as the "space" concept of information space is important, so too is the "information" concept. Chalmers (this volume) aims to provide solid theoretical underpinnings for social navigation, meditating on its relationship to "conventional" approaches to HCI and informatics. He points at Wittgenstein's concept of a "language game" as a better way of understanding information. That is, language and its relation to the world it denotes is not a fixed thing, but something which is negotiated over and over in interactions between people. Information is a social artefact and we should design information systems from this viewpoint: the relevance of a piece of information is determined from its usage.

Harper (this volume) also looks at "information" as used by "information workers" who use it daily. In this setting, it is not just accuracy which is important. In fact, he shows in the context of these peoples' work, how sometimes "accuracy" is not as important as knowing where the information comes from. These people need to place information in a "framework of relevance" for the institution. Information which may be inaccurate and or biased can be more useful than more accurate and "factual" information. The "factual" information is not discarded, but rather for the moment placed aside until required.

There is a danger of taking an "objectivist" account of what information is; of seeing it simply as something in a database which has to be retrieved. The concept of social navigation goes beyond mining some information from large data sets like web pages. It is only when we look closer at information that as an entity it becomes strange. Through the careful study of various types of information work in a number of domains, such as Harper's work and in Chalmers' discussion on language games, we are coming toward a more problematic view of information. It is problematic, viewed as an objective, decontextualised entity.

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## Modalities, Affordances and the Physics of Spaces

A number of writers such as Jeffery and Mark, Buscher and Hughes, and McGrath and Munro discuss various types of virtual worlds in which people can see each other and perhaps informational objects of some type as well. In these worlds, people communicate in a number of ways, textually, visually, through audio channels and through “virtual contact”. These different modes of interaction and the different representations of people and artefacts may have a significant impact on experiences within the information space.

Some suggest that textual or audio communication, because it lacks the cues of the real world, will be “depersonalised” and “antagonistic” compared to co-present communication. Whereas others put more emphasis on places and their influence on our behaviour, and the ways in which different virtual situations can have quite different ways of relating no matter what the modality might be. One newsgroup may require a strong constitution of its members because of the constant and rolling “flame-wars”, whereas another will see such things rarely, if at all. When we regard the “effects of modality” in the encounter, we do so if at all in a way which acknowledges the strong influence of social situation.

The physical laws that the spaces run under may well determine affordances of the space in ways which are more complex than we might think (Buscher and Hughes, this volume). The ways in which media worlds work have an affect on the ways in which we have to communicate. For example, in the media space work (Heath and Luff, 1992b) we began to see how people would inhabit these spaces and orient to these various affordances. In the real world, for example, we might find it easy to get information quickly to a number of colleagues by shouting it, and in certain environments, for example, a City dealing room, this is entirely permissible. The shouted “outloud” is an efficient way to communicate with a number of people simultaneously. This can only be done given that there are certain physical laws which work to afford this. However, in many virtual worlds one only hears who is close to one. In contrast, anything said in a chat room is said to all, unless one explicitly messages someone.

The physical laws of spaces allow and afford certain ways of relating with others. A number of different elements of the navigational space work together. It may be that certain types of direct or indirect social navigation are particularly hard, that other types are afforded as to be effortless. Our creation of functionality in the space can help others, or conversely create systemic and recurring issues which members have to deal with. Just now, for example, it is difficult to know more about the other users of a web page other than the counter of “hits”. On Internet relay chat systems, one can get an idea of the popularity of a channel, but know far less about whether they are attending as well as being online.

We can see therefore how modality of the interface is bound up with representation, how we can visualise others. All these elements are bound up with the social, for example, when we access the channel, the “physical” laws of that space mean that we have the equivalent of everyone shouting their interaction to everyone else. The only way to form a sub-group is direct messaging or explicitly inviting someone to another, sub-channel, and this may be regarded as over familiar and accountable.

## The Future of Social Navigation

As put by Dourish: “The concept of ‘social navigation’ has come of age.” Amazon.com uses the ideas of recommender systems. AOL.com provides a “buddy list” to show friends and colleagues are on-line. As the reader will see when going through the chapters, the design idea(s) behind social navigation bears the potential of helping us to take a step forward from the prevailing interface culture of today’s tool-based view to richer, more social-oriented spaces.

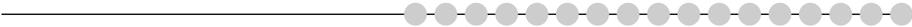
Since the field is new, there are of course numerous problems not yet dealt with. We do not yet understand how to design for social navigation in various different domains. The relationship between spatial metaphors and social navigation is discussed much in this book, but what about spaces that are not spatial in nature and their relationship to social navigation? Are there such spaces which we do not understand as spatial (Maglio and Matlock, this volume)? How do we deal with the issue of accountability and privacy (Erickson and Kellogg, this volume)?

Since social behaviours are by necessity closely tied to the culture of a community, we need to further our understanding of the new cultures we are building through applying the idea of social navigation. Even within western culture, for example, users with a lot of experience of on-line worlds will probably utilise them differently from those with little experience. How will the concepts extend to non-western cultures?

We are seeing more and more applications in the grey zone between tools and games: “infotainment”, “edutainment”, etc. Designers of information spaces have to think about issues such as the natural “flow” of their designs, branding, the use of sounds to communicate “moods”, and so on, much in the way that a garden designer, or interior designer considers such things. New applications may be designed to induce empathy, or use irony to enliven the space. They may encourage users to attribute intelligence and in general anthropomorphic qualities to the system (Reeves and Nass, 1996), they may allow for a more narrative, subjective, interactive experience (Murray, 1997), they may induce both negative and positive affective responses in the users, for example (Picard, 1997).

This is a whole new bag for the field of human-computer interaction, and so we turn to other areas where entertainment is in the focus hoping

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to borrow some of their principles, and learn from their successes and failures. At the other end of the spectrum, technology is making advances, creating completely new spaces that move us beyond the desk-top based “peep-hole” into some created virtual space. We now talk about ubiquitous computers that disappear into our furniture, walls and machines, shared soundscapes where we participate in work places through listening in on sounds of our fellow colleagues, and various augmented worlds where the reality is overlaid with information.

In the end this book is not necessarily going to be successful in answering questions, or giving ready solutions to building systems which will allow “social navigation”. Rather, we wish that any success will be in the posing of interesting and foundational issues and in helping people see new paths to take, to follow the footprints in the snow.

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