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Week 6

DiamondHelp: A Collaborative Interface Framework for Networked Home Appliances

I smell a serious scoop by the paperclip, despite claims to the contrary. They correctly point out that collaboration requires a mixed intent (much like the shared goals metaphor discussed in a previous paper). However, they fail to note that this sort of interaction is not the norm in the world of interfaces because one really does not need a need a wizard/agent/paperclip every time one uses a washing machine. A VCR is a somewhat more reasonable choice (don't ask me… I know how to set the clock). The underlying fault is that the user often has intent when interacting with an appliance (thus the term appliance… a device with some fixed purpose), whereas the appliance generally has no intent to mix at all, and therefore only provides guidance, which pretty much lands us back in wizard-land despite claims of a direct flight to interaction nirvana. In the new design, the user is beaten over the head with the conversation metaphor, while the reality is that the user is giving a fixed set of commands in a well-written wizard (non-trivial task, to be sure), and there is context sensitive help, a back button, and a cancel button during the entire process. As a last negative, the very fact that they felt it necessary to reinvent the wheel (in Flash!), instead of adapting one of the approximately 264 wheels already invented before, is indication that as again, someone is writing without looking at the reality of their work, which is that they are begging for yet another GUI toolkit to add to the rampant consistency that is stifling our interaction freedom today.

That said, I believe that they make some interesting points about the underlying way of thinking that should go into an interface. Shared goals are definitely a major (but not the only) part of collaboration, and indeed, there is much need for more thought into how to portray this shared goal in GUIs. The problem, in a nutshell, is that GUIs are so general that without something constraining the scope of possible intents the user may have. This is easy by definition in embedded systems, but difficult in general-purpose systems. Additionally, I completely agree that there is need of a framework for better design of wizard interfaces, which I insist on classifying this one under. I would gladly use their backend for the task, because it takes away a lot of the common structural padding. I will also agree that their method is "better" than Clippy jumping in. However, the real estate cost of keeping the thing on screen pretty much bans it from all except embedded interfaces. In fact, as the number of interactions increase (think word processor), the decision tree system itself becomes untenable, which is further indication that this is just another case of using the wrong hammer for the rather difficult job of coming up with the successor to direct manipulation.

Collaboration in Human-Robot Teams

I would disagree slightly with one of the first things that are said in the intro, insofar as I think the control and communication are some of the most serious obstacles to a human-robot team. A team implies many things; one being that the partnership is of equals in

terms of mutual respect. However, if the robot is constantly fumbling with tools and stumbling across words, it is difficult to consider it equal in light of mutual respect. Because we know who built the robot (we humans did), the robot automatically starts at a lower rung in the respect ladder. However, when it cannot communicate or act well, it becomes so much more the servant, because they are "seen and not heard". That said, I still feel that understanding the teamwork between a human and a robot is essential, simply because what I say above is related to inner mental state, while performing a task is often a function of outer mental state (ie, it is part of the job that needs to be done), and that can be modulated with somewhat less effort than the inner thoughts and feelings.

One of the things that I see as implicit in teamwork is the maintenance of concordance between the internal models that the human and the robot have of each other. Part of this, of course, is based on trust. The human should be able to trust the fact that the robot will carry out its shared tasks while they do their own, and vice versa. This is of course not always possible, and to maintain the contract of the team, communication then becomes vital in keeping the internal models and shared trust in sync. Closure and goal evaluation, which are in some sense implicit forms of communication, also help to maintain this concordance. I think the paper covers all these issues very nicely. It is interesting that the robot uses gestures alone to carry out communication. I tend to believe that body language is the primary means of communication in a close-knit team. This is indicated by the fact that much of this communication simply does not have good translation into language (for example, we do not say "good job" after every subtask… a glance or smile is enough), simply because people have generally never needed those translations of internal state in interacting with other people. At least initially, it is important that robots also take care to use these same forms of communication to improve their acceptability to humans.

As a side note (probably not relevant to this project where tasks are highly structured) is the issue of concurrency. The task model examined in this paper is basically a conditional tree. However, when humans carry out tasks, they often switch contexts, even while remaining committed to the common goal. If the robot is to be part of such an environment, I believe that a different sort of task model would likely become necessary, most likely based on stateful context switching triggered by current projected goals. While it remains a far off thing, I still find it interesting to consider how we would go about modeling such everyday conditions.

Collaborative Systems: the1994 AAAI Presidential Address

It's sort of implicit in the paper, but in reality communications between agents is not the same as communication between humans. The crux of the problem is that agents in fact do completely know their own internal state, while humans do not. Moreover, humans are not uses to being as explicit about such things as machines can be. As a result, it is never entirely possible to capture or convey said state. This is not a very serious issue, but it does imply that eventually, machines will have to get as good at dealing with such partial information as humans are today. I just hope it doesn't take quite as long, because a good number of AI researches are still barking up the infinitely tall tree of reasoning about

things using tools like predicate logic, and as far as I am concerned, it's not that the tree is infinitely tall, but the cat isn't even in that tree of complete knowledge. Ideas like common sense reasoning are the beacon of hope for me in this case, because it's not simply a mater of "non-monotonic reasoning" as the author puts it.

I suppose much of what she talks about has been covered elsewhere (it is sort of a review, after all). I think that negotiation and intention-conflict resolution, as she puts them, are very interesting topics between humans and machines, especially since those sort of situations require so much more awareness of the sub-verbal communication channels and emotional states of the human being than mere co-action. In particular, as pointed out in class, humans tend not to take too well to robots calling the shots (here we go inventing a new improved form of racism… I wonder how long this will take to live down…). Even when the human is clearly at fault, this sort of response makes it difficult to negotiate effectively, especially since this is hard even with just humans. Conflicts in intents are even worse, because now the machine must defend not only action, but also intent, and area humans alone have held till now. As again, this is in fact a social problem (the overarching problem of with racism is a part, in fact), and will have to be dealt with as such at some point. However, I have no good opinions about what researchers are supposed to do till then.

Lastly, as I read this, I realized that I have only said what I am about to write down piecemeal in class, and it might be good to express the entire idea. One of the things that struck me as important while reading this speech is that the author presumes that we want computers to be more than tools. Actually, many of us here at the media lab also want that (perhaps because we find it interesting, or perhaps other more general reasons), but discussion in class often skirts around this issue. When we ask "Is it ok for your computer to say 'I love you'?" we are really asking, "Is it ok for the computer to be more than a tool to you?" My answer has always been yes, but it is the provocative core question, and many will find the answer murkier. Truthfully, the answer is definitely murky… I just have an opinion on it other than the opinion that it is murky. But it's not a question that we have ever been very good at answering. For example, is your assistant a tool? How about your janitor? How about a librarian? They definitely have tool-like aspects, many of which can be emulated by machines. We are, of course, loath to call humans tools, because of the connotations, but the dictionary states that a tool is, most generally, "something used in the performance of an operation." Well, assistants and janitors and librarians are tool users, so perhaps they are not tools. However, if the tool required no users (a Roomba, for example), then we are in a bit of trouble with that definition as well. And besides, there are many machines that can use tools. In the end, as far as my examination has shown, such escapist redefinitions will get us nowhere. This is a point where we have to seriously re-examine what we define to be human, and even to be alive, because the alive/not-alive distinction is more of the same rejection of the core question. Moreover, if we are going to start caring about machines, then we have to worry about the burdens that we will shoulder as the creators of such machines, machines that we may well call alive someday.

Teamwork

This reading reminds me somewhat of the rather technical description of inter-agent collaboration we read in a thesis earlier. However, the lack of relatively pointless (for my purposes, at least) notation is appreciated. It is again interesting that they attempt to create requirements that are good over both human and computer agents. However, this model seems to account for that fact by treating the computer agents as less deterministic than they likely would be. As I pointed out earlier, this lack of deterministic predictability of both the environment and the agents makes communication necessary. The overall ideas presented about what is required for cooperation seem to be in step with the other papers (and with previous readings), rather rendering any scope for commentary moot. The scope of what the communication must cover (ie, that it doesn't need to be a heartbeat signal) is a good point as well, because it expects the fact that the agents will have their own agendas, and that saying "working on it" 50 times is about as useless as it is among humans (though some humans do feel a great need to hear it anyway). On the other hand, there are some things that really must be known between co-acting agents who cannot really "observe" each other. They do go into how this happens, and what each agent shoots for, in great detail, but the overall notion of bare minimums, and especially the importance of an ever-present secondary goal of making state knowledge known, is the take away message to me. Lastly, it's rather interesting that in the conclusion they imply that this sort of a goal fulfillment plan does constitute a social contract. If that is so, then it opens up some rather interesting avenues of discussion about what the co-action of agents really implies.