THE VIRTUALIZATION OF THE MARKETPLACE

FOR MAS 714J: EVOLVING CONCEPTIONS OF SYSTEMS AND THE SELF

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1 Marketplace

Marketplaces are an important system in our society. The marketplace is the embodiment of a society's economy, a system whereby objects exchange hands. Marketplaces are also an important social center, one of the primary places in which people casually meet and interact. Marketplaces range in scale from neighborhood garage sales to nationwide mall chains to global commodities markets.

As individuals participating in consumer markets we experience the marketplace not as a whole system but rather as a set of constituent pieces. We understand markets in terms of goods to buy, money to buy with, the places where we perform our transactions and the people we talk to while dealing. The marketplace may be a complicated system but we experience it as a collection of familiar objects, places, people.

But in the past century the marketplace has changed, has become more of a virtual experience. We are becoming removed from the objects we purchase, buying items unseen from catalogs and television shows. The physical space of the market has disappeared into the television screen and web pages. But one aspect of the traditional marketplace largely remains intact: the social process of making a transaction. Buying a commodity usually requires talking to another human being, if not in person then at least on the telephone or via email.

But even the social aspect of negotiation is changing. Making a transaction in person takes time, attention, resources. The Kasbah system being developed in the Software Agents group at the MIT Media Lab aims to replace the process of human to human negotiation with the interaction of software agents, virtual actors who haggle prices on the behalf of the people who created them. Such a system could have broad appeal: agents can make buying goods much easier, more efficient, trouble-free. Is this a desirable goal? What objects can we use to mediate the communications between people and their agents? What will the marketplace become, will it be a system devoid of all familiar physical objects, spaces and interactions?

This paper discusses the future of marketplaces in light of the objects and human interactions that go into the markets themselves. As a framework for discussion several important aspects of people's experiences with marketplaces are considered. A trial run of the Kasbah agent marketplace is then located in this framework, analyzing how the various objects that went into Kasbah shaped participants' experiences. Finally, lessons drawn from this analysis are applied as guidelines for designing the virtual marketplace of the future.

2 Marketplace Experiences

Marketplaces are complicated object-rich systems. They consist broadly of three components: the items for sale, the physical space of the market itself, and the people performing the transactions. The basic marketplace theme is quite flexible and the manifestations of marketplace components changes depending on the medium of the market. Our society is moving from a completely physical real-world market to marketplaces that exist largely without physical manifestation.

2.1 Traditional Marketplaces

The prototypical traditional marketplace is the bazaar, garage sale, swap meet, flea market, farmer's market. These marketplaces are composed entirely of physical objects and real-world interactions. The goods for sale are real physical objects, objects that a buyer can inspect and consider before purchasing. The marketplace is a physical meeting place, a space set aside for the particular purpose of trade. And the actual transactions are carried out in simple real-world interactions between people; the buyer and seller meet, shake hands, discuss prices, and settle the deal. The process is entirely physical and social.

In a typical transaction the commodities sold consists of items whose value is represented entirely by the physical object itself. When a loaf of bread is sold, the value of that commodity is the loaf of bread itself. But (except in barter) the opposite side of the transaction is money, tokens whose value is not in the physical form. The connection between currency and its value is tenuous. Its acceptance is now so widespread that we take it as second nature, but from an object point of view it is curious. The objects of money themselves, the bills and coins have no intrinsic value. Since the end of the Gold Standard they are not even proxies for some valuable object, their value is entirely by consensus. Even in the simplest most physical form of marketplace, we already accept one virtual aspect of the system: the value of currency.

2.2 Shopping in a Store

Modern marketplaces have changed some of the shopping experience but have largely left the physical aspect of the traditional marketplace intact. The commons has been replaced by the mall. We no longer buy our oranges from Farmer Joe, they now come from somewhere else where oranges grow better and are sold to us in a supermarket. The specifics have changed but the marketplace is still largely physical. The purchased items are real objects, the arena of commerce is a physical space, we still make our purchases by talking to real people.

2.3 Shopping on Television

New communications media is making it possible to virtualize most of the aspects of the marketplace. We no longer need to go to the mall to buy a new shirt, we can now order it from a catalog. There is no need to walk down to the shop of a dollmaker, hundreds of porcelain dolls are available for sale on cable TV channels from the convenience of your home. It is now possible to shop from anywhere with a telephone.

Shopping at a distance creates a different consumer experience from the traditional marketplace. The physicality, the realness of the experience changes radically. The objects being purchased are no longer tangible, they are simply pictures in a catalog or on a TV screen. The money used to buy things is not even meaningless physical tokens: credit card numbers that point to some account in the financial networks are all that is needed. There is no longer a physical environment for the transaction, no space. The social aspects of shopping are largely absent other than the brief conversation with a salesperson in a phone call.

But companies that sell items to customers in their home make various efforts to replace the missing realities of the traditional marketplace. Home shopping channels on television, for example, make many uses of the affordances of their media (television and telephone) to create the feeling of a lively, social marketplace. Foremost, the objects themselves are displayed as well as they can be on television, lingering tracking shots on well-lit objects rotating for a full view along with elaborate, redundant physical descriptions. There are bizarre analogs of physical currency such as the “video coupon” displayed on the TV screen that is used for a special discount. The coupon is really just a special numeric code but it is presented as a section of the picture you could cut out and hand to the salesperson.

The sales milieu is carefully constructed to create a feel of place and sociability. The television sets tend towards homey comfort, a pleasant room that feels like an extension of the audience’s livingroom. The salespeople are friendly and personable and address the audience directly: “You’re just going to love these Diamondique earrings, we chose them specially for this sale and you will look wonderful wearing them.” Other people are brought into the home shopping experience in the form of counters showing how many shoppers have bought the object for sale. Even the voices of other shoppers are present, giving long testimonials of how wonderful the products are. The shopper is brought into the television marketplace, made to feel like it is a place inhabited by other people.

2.4 Shopping on the Internet

Shopping is poised to change again with the rise of Internet communication. The characteristics of the Internet medium are still very much undecided. Web pages somewhat resemble printed pages only there are many more publishers and the pages themselves can be hypertext structured and contain multimedia. Email lies somewhere between postal mail, telegraph, and telephone as a personal communication medium but email has unique characteristics of its own. And on the edges of the Internet there are realtime interactive services, chat systems and virtual worlds. All of this technology has the potential to enable many different shopping experiences.

But most of the marketplaces online today are unimaginative phantoms of the traditional private stores, classified ads and auction houses in the impoverished virtual space of the Web. Online stores are typically just a listing of items for sale along with prices and a salesperson contact (via telephone or email) to make the purchase. A buyer’s experience in the online marketplace is removed from the physical reality. The objects are non-present (at best, represented with a picture), there is only the barest of environment (the disembodied world of the Web), and social interaction is limited to the necessary details of making the transaction.

The physical richness of a traditional marketplace or even the simulated marketplace of television shopping networks suggests various ways to augment shopping on the Internet, make it more familiar and comfortable. But before speculating on what shopping online could be like, one more step in the virtualization of the marketplace will be examined: Kasbah, a market where humans do not need to interact to make a transaction.

3 Kasbah, an Agent Marketplace

The Kasbah system is an online marketplace, a way of trading goods mediated by computer systems on the Internet [3]. Kasbah most closely resembles an online classified ad system. When a user wants to sell something (say a used CD or book) he or she registers the object for sale with the Kasbah server via a computer interface. buyers then go to Kasbah to look for something to purchase. But Kasbah adds something new: the use of software agents to negotiate a sale.

In a traditional classified ad a seller lists an asking price along with a description of the item for sale. It is understood that this price is only an initial suggestion — a buyer will scan the ads looking for an item of interesting and then contact the seller directly, entering in a complex social process of negotiating a price. Kasbah removes the search and negotiation process. When selling an item, the seller creates a software agent endowed with the knowledge necessary to negotiate a price. In particular, the selling agent is told what price the seller would like to get for the item, how low to go, and some bargaining strategy for lowering the price over the course of a negotiation. Similarly, buyers create software agents with their own strategies for finding desirable items and getting a good bargain. These agents are then loaded into the Kasbah system where they inhabit a virtual marketplace, find parties who are buying or selling items of interest, and enter into negotiations.

The Kasbah architecture takes the virtualization of the marketplace a step further. Like online classified ads the objects and the space of the marketplace are abstracted from physical reality. The items for sale are visible and there is some sort of virtual place but they are far removed from our everyday interactions with physical objects and spaces. Unlike an online classified ad, the Kasbah system also removes the social aspect of the marketplace, the interaction with another person to make a transaction. The negotiation process is completely handled by the buyer and seller agents, software operating at the request of people but autonomously and out of sight.

The removal of social interaction further virtualizes the marketplace, takes it a step further from the physical world. What are the effects of this extra distancing from familiar reality? How do people react to the virtual marketplace where the objects and spaces are no longer real? How does the virtualization of the negotiation process further change the shopping experience? How do people understand their negotiating agents — are they perceived as objects, or people, or some new category of entity? What aspects of traditional marketplaces can we borrow to better construct a new virtual marketplace? In order to better understand these questions, it is helpful to examine how people have interacted with the Kasbah system as it has been deployed so far.

4 A Trial Run of Kasbah

The Kasbah system has had two trial runs, both one day events inside the MIT Media Lab. A version was run in mid-October 1996 involving Media Lab students, staff, and faculty. This trial was in preparation for a full deployment as part of the Digital Life symposium [2]. On October 30, 1996, two hundred people (largely from technological industries) were given books, souvenirs, and play money to participate in a full-day Kasbah marketplace. Kasbah was one event among many taking place during a day-long symposium at the Media Lab. Participants were encouraged to create agents to sell the items they were given and buy items that they would like. Over the course of the day some 250 transactions were made. A large number of the participants were actively involved in the system, paying attention to the market and how their agents were doing.

This second Kasbah trial had two main purposes. One goal was simply to show off Kasbah itself, communicate the idea of an agent based marketplace. The other goal was to encourage participants to socialize, to have them use the marketplace as a way to meet each other both in sharing a common experience and in particular interactions of making trades. The ways in which the various objects in the Kasbah system succeeded or failed to accomplish these goals, as evaluated based on observation of the participants, yields interesting lessons about how to build an effective virtual marketplace.

4.1 Objects in the Kasbah System

There are numerous components that went into the Kasbah demonstration. A full list of every single object is surprisingly large; here, only the most interesting aspects of the system will be described. Following the categorization above, the foremost objects are the items of trade themselves. Each participant was given three objects randomly chosen nine possible types. The items were disposable cameras, canvas bags, boxes of chocolates, lunch pails, coffee mugs, watches, and three different books. In addition to the items themselves, participants also were given fifty "bits," play money in the form of paper currency.

The trial run of Kasbah was unusual in that it took place in one building during the course of one day. The experiment took place within a physical space shared by a large number of participants. The trial was unlike the eventual plan for Kasbah of an Internet-wide deployment where participants will not interact closely and may not ever meet. Most Kasbah activity took place inside the Cube, a large room in the Media Lab shared by several projects. Some of the activity also spilled out the entrance of the Cube, into the lobby for the symposium. A central bank service was located in the lobby entrance. The bank dispensed items to participants at the beginning of the day and served as a middleman to help complete trades when the two parties could not easily meet.

An important set of objects in a computer mediated market are the objects that comprise the interface to the computer system itself. Traditional markets don't need interfaces, at least not explicitly recognized as such; the world is the interface. A virtual marketplace needs explicit interfaces from the physical world into the virtual. In order to externalize the workings of the Kasbah marketplace a large number of interface objects were deployed. These interface objects included badges for people with barcodes, computer kiosk stations with barcode readers, web pages (virtual objects, not physical), pagers, two large computer screens, a tickertape display and a virtual tickertape on the computer kiosks.

The unique component of the Kasbah system was the computer agents themselves, the programs running in the virtual marketplace to perform transactions. Their status as object is problematic. The agents were certainly not physically manifested and were not even clearly representations of objects. In folk speech about computer agents we speak of agents more like people than objects. Kasbah was designed to help personify the agents. Agents were given human sounding names like"Sherlock Holmes" and "George Smiley" and their actions were described with some degree of intentionality. The issue of personification of agents is a large open research problem in software agents; the role that the interface objects played in that personification is one of the interesting lessons from the trial run. In that the Kasbah agents are replacing the traditional social aspect of negotiating a sale, their status and effect on the social system of the marketplace as a whole is important to understand.

5 Effectiveness of Components of the Kasbah Trial

5.1 The Role of the Objects of Trade

One alternative considered for the Kasbah trial was to not actually give participants the items they traded but instead to tell them what they owned, keep track of their inventory for them, and hand out the items at the end of the day. On the face of it this approach has some appeal: it saves people the trouble of carrying around bulky objects. A similar question was considered for the money in the system: should we give out physical bills to each participant or simply keep track of balances electronically? While keeping the objects of trade virtual would not change the functional aspects of the marketplace it would have had a large effect on the psychological impact, a complete change in the relationship people had with the items they were trading.

In the end the decision was made to choose the physical route, giving out real items and paper currency. This choice seems to have been popular, at least with respect to the items. Participants spent a fair amount of time with the items they owned, flipping through the books, using the cameras and bags. People responded to actually having the objects, they had a sense of direct ownership that would have been difficult to achieve if they were only going to actually receive the items later in the day.

The success of the physical cash was less clear. Participants were not often seen looking through their wallets. The actual physical transference of cash was awkward. A peculiar aspect of the Kasbah system was that because the currency was play money, it not only had no intrinsic value but at the end of the day had no consensus value either. The cash was only good for the duration of the trial. As expected over the course of the day the prices of the items inflated. Participants indicated that the physical cash had little meaning to them. Perhaps this is simply because people are already used to the abstraction of money (via experience with credit cards). If Kasbah had been run with electronic books it likely would have had little impact on people's experiences.

An important goal of Kasbah was to get participants to meet each other and socialize; it was hoped that the trade of objects would facilitate random encounters. The software agents met at random to negotiate a trade. The intention was the agents would notify their owners, who would then meet in the physical world and perform the exchange. The objects of trade would serve as introducers. In practice physical meetings proved awkward. Most people chose to take advantage of the centralized bank that would complete halves of the trade; even when the two people in a particular trade were standing next to each other they often used the bank to perform the transaction. In retrospect it seems likely that the difficulty of finding a person and the lack of incentive to trade in person combined to discourage chance meetings. The physicality of the tradable objects was useful in that it made the Kasbah trial more engaging for participants but other barriers kept the objects from fulfilling the desired role of an introducer of people.

5.2 Importance of Physical Space

The significance of the physical space of the Kasbah trial cannot be overestimated. The impact of people being in the same room affected the entire experience in profound ways. Given that the eventual deployment of Kasbah is intended to be Internet-wide, without physical space, it is important to understand what effects the physical environment had on the use of the system.

Because Kasbah was only one event competing for attention during the day it was important to distinguish participation in the marketplace from other aspects of the symposium. The physicality of the environment neatly did this by dividing the space up into the general lobby area for the symposium and the particular place for Kasbah itself (the Cube). These two physical spaces related directly to the activities of participants. People deliberately walked into the Cube when they wanted to be in the marketplace, changing their physical environment in combination with changing their attention. The ambiguous space between the lobby and the Cube served as a useful intermediary environment, a place where people could participate partly in Kasbah but also stay in the more general milieu of the symposium.

The most obvious aspect of the shared room is that it created a social experience. The Cube was a place where participants were in close quarters, could watch each other, talk about what was going on, and participate in the general buzz of the market that made the event compelling. This sort of community experience depends on having a space, a physical marketplace. Creating a simulation of this experience in a virtual world could be possible but it comes for free in a physical world.

5.3 Interfaces to the Market

Explicit interface objects are a peculiarity of virtual worlds; in a traditional marketplace the objects of the market are themselves the interface. In Kasbah, the interface objects serve as intermediaries between the virtual marketplace inside the computer and the real-world experience of the participants in the market. In designing Kasbah the creation of the interfaces was the hardest part. The lessons learned from observing the participants interactions with the interface objects are helpful in considering how to build effective virtual marketplaces.

The primary interface to Kasbah was a group of kiosks, computers running Web browsers. Participants walked up to a kiosk, scanned their badge with a barcode reader, and proceeded to manipulate a series of web pages that were their primary control interface to the market and their software agents. The intention was to make the kiosks as simple as possible. Only a mouse and a barcode reader were needed for input and the output web pages were carefully designed to be straightforward. In practice participants were able to use the computers with little or no instruction. Given how easily technologically literate people interact with computers it is important to remember how specialized this skill is. Participants had to understand abstract metaphors of action (clicking on text), display (web pages, chunks of information), and presence (logging into the server for their own personal information). The fact that all of these metaphors were accepted without difficulty indicates how quickly our society (or at least, the subset represented in the trial) has adapted to the new paradigms of computer interfaces.

In order for people to be visible to the computer kiosk they had to somehow tell the computer who they are. The traditional way to do this is to type in a username, but this is difficult if you have no keyboard. The solution chosen by the Kasbah team was to give participants name-tags that included barcode representations of their names. For a person to log in, he or she simply walked up to the computer and scanned the tag. Before the trial there was worry that the barcodes were vaguely creepy: barcodes are impersonal, alienating, imply labelling people like products are labeled in stores. Why should people go out of our way to be visible to computers? But during the trial participants did not seem to even notice the barcodes, were happy with the convenience of scanning their badges. Maybe participants were particularly willing to experiment with technology in the context of a visit to the Media Lab, or perhaps barcodes have been accepted in common culture.

In order to give participants a feel for how the market as a whole was behaving two "big board" displays, large computer screens, were deployed in the space. The displays alternated between two kinds of information: a time series of the price of each item over time and histograms showing the current bids and asking prices for each item. The alternation speed was chosen to be slow enough so that the information was comfortably readable but fast enough that it felt like the displays were displaying current information. The primary goal of these displays was to try to summarize the market effectively, give people a sense for the dynamics. As an abstract information display it was a success.

But the physical nature of the displays proved to have important functions. The presence of the monitors themselves focussed attention, gave people a place to direct their gaze when wanting to observe the market and think about how it was performing. Participants were regularly seen standing around intentionally looking at the screen: the display served as a physical manifestation of the abstract virtual marketplace. In addition the displays were social focus points. Participants regularly stood in clusters in front of the screens, pointing and talking to each other about their theories. The displays were therefore useful in facilitating social contacts, more so than the trade objects themselves.

Another market display similar to the big boards were scrolling tickertapes that displayed the current bid and asking price for each item. These displays were a conscious imitation of the archetypical stock market tickertape displays seen in stock exchanges and on the bottom of television programs like CNN Headline News. There were two kinds of tickertapes: Java applets on the web pages at the kiosks and two LED boards in the physical space near the big board monitors. The actual data displayed on the tickertapes did not seem to be used by many participants as there were more convenient ways to get the same information. But the presence of the tickertapes served a useful iconic function. They made a visual statement that Kasbah was a marketplace like other markets people are familiar with. At one point during the day the tickertape display broke so that the text being scrolled was an error message instead of market data. While this was mildly embarrassing it did not seem to disturb participants. At worst they were amused at the clash of contexts between tickertape and computer error messages.

A final important interface were alphanumeric pagers given out to Kasbah participants. The pagers were the way agents proactively communicated with the people they were working for. When a transaction was made or an agent decided it was not going to be able to easily find a deal it would send a message out causing the pager in the participant's pocket to vibrate and display a text message. Pagers proved to be fairly useful interface technology: they were unobtrusive and small although the reading of messages themselves on pager was awkward. The pager objects served as extensions of the agents into the physical world, partially embodying the agents.

5.4 Marketplace Agents, Disembodied Actors

Most of the components going into Kasbah, the trade items, physical space, and interfaces, were straightforward and familiar enough to not present many problems to the users. By contrast the trading agents themselves were new to most of the participants, disconnected and unfamiliar. It was important for the Kasbah trial that the idea of the software agents was communicated as simply as possible. In retrospect it was easy enough to explain the functional role of agents but their ambiguous virtual status made people's interactions with them less than transparent.

The most direct way that people contacted with their agents was via the web interface on the kiosks. The physical characteristics of the kiosks have already been discussed; they were effective if prosaic. However the same familiarity of computer interface that made the kiosks easy to use possibly hampered the interaction between people and their agents. Trading agents are fundamentally dynamic entities: they possess goals, strategies, and behaviors. But the representation of the agents on the kiosks was static, showing only the barest configuration details of each agent. The gulf between static representation and dynamic behavior seems to have made communication between people and their agents difficult.

An added confusion was that while the metaphor of agents is of people browsing a marketplace to make a deal the actualization of that metaphor was obscure. The agents did not seem to be located anywhere, certainly not in a familiar physical space. In a sense the agents were located in the virtual space of the computer marketplace, but the virtual marketplace was too abstract and did not seem to be conveyed well. Participants could see their agents at the kiosks, but the representation there was of the static agent isolated from the virtual interaction space. Looking at the big board display conveyed some information about how the agents interacted but the connection was difficult for people to understand. The location of the trading agents was problematic.

Kasbah agents are intended to be autonomous — a person creates an agent with all the necessary instruction and then sets it free. This autonomy is at odds with tinkering with the agent marketplace Autonomous agents deliberately discourage full hands-on experimentation with the structure of the agents themselves. In practice, most participants in the Kasbah trial had other things to do and did not have the time to play with the market. A few people did make the time to experiment, changing their existing agents and creating new ones to try to find the best deal or manipulate the market price. These people seemed to be somewhat satisfied with their ability to modify the agents but disappointed in the lack of tools and access to really get inside and modify the agent behavior.

Software agents research frequently talks about personifying agents, endowing them with some of the psychological status of people as a way to define a metaphor for their action. The Kasbah agents were quite trivial, acting only in the limited domain of transaction negotiation. As such the status of their personification difficult, more of a cartoon view of what it means to be a person. During the Kasbah trial no one seemed to think of their agents as metaphorical people and the various personifications built into the system were ineffective. It is telling that even though every communication from an agent contained its name, participants never referred to their agents by name. One participant remarked that he "just wanted to know how his agent felt," trying to understand the current status of an agent via an emotional metaphor. The Kasbah system did not make that personification easy.

5.5 Conclusions from the Kasbah Trial

The the Kasbah trial was successful in part because it deliberately tried to evoke traditional real-world markets. Giving users real objects to trade and having them together in a physical room were successful strategies: these aspects of Kasbah were exactly like a physical marketplace. Underlying the physical Kasbah was the virtual agent marketplace. The connection between the virtual and physical was important to make the event a success. The interface objects in the system were effective in bringing the virtual marketplace into the familiar physical world, particularly the big board display and the pagers. The most abstract aspects of the system, the software agents themselves, were successful in a functional sense. People created plenty of agents and made trades. But the particular technologies of Kasbah did not effectively aid people in building a relationship of understanding with their agents.

6 The Marketplace of the Future

If the pundits are to be believed the Internet will revolutionize shopping. Online marketplaces bring a lot of potential advantages: publishing catalogs is cheap, there are many different ways for people to access stores, and merchants can present multiple levels of descriptions of items tailored to the individual customer's interest. The sale itself can be finalized online via credit card or digital cash transactions. The items for sale do not even have to be physical. Virtual objects such as music data, movies, and the text of books can all be sold directly online without every having to transfer a single atom. And software agents can be employed to ease the process of locating items and negotiating a trade.

But virtual marketplaces have a lot of potential for alienation. People like the feel of ownership of physical objects; are representations of objects or purely virtual objects compelling? The physical space of a marketplace is an important functional component of the shopping experience; what happens to shopping when physical space disappears? How can people be made comfortable with turning over the social role of negotiation to software agents? Some speculation is possible based on the analysis of what aspects of existing marketplaces work, the lessons learned from physical markets, home shopping channels and the Kasbah marketplace. The answers lie in the development of more effective interface technologies to better mediate between people and the virtual world of the online marketplace.

A primary way to enhance the online shopping experience is to actualize the objects of trade, make the items for sale and the currency more real. Effective virtual stores present their items using all the richness the media affords. The lush pictures and eloquent descriptions of items on television help sell goods. Similarly, online stores need to make better use of technology to make the objects feel real. Virtual reality technology presents an interesting opportunity for simulating an object instead of just representing it. A buyer could download a three dimensional model of an object and manipulate it in a detailed virtual environment, improving his or her connection to the items for sale. And in the cases of purely virtual objects such as movie data the difference between a simulated object and the real object disappears entirely. Virtual objects are most naturally sold online.

Actualizing the currency a buyer uses to purchase goods is more problematic. There are many digital cash schemes under development now [4]. Most of them use the metaphor of an online "wallet" to store the user's digital cash tokens but the user interfaces to these digital money schemes do not make the digital cash in the virtual wallet feel real. One cannot grasp the bills or riffle through them to count money. It is not clear that grounding money in the online world is necessary. In existing virtual marketplaces consumers seem quite comfortable using the abstraction of credit cards. Perhaps money has become a concept in our culture with no need for physical presence.

Virtual marketplaces currently suffer from a lack of space. There is the vague location of the information source where one finds the item for sale, the catalog or the web site, but these spaces are limited in power and socialability. Television marketplaces solve this problem by presenting a simulation of a social space, creating a sense of a pleasant room and other people through clever use of television sets and the voices of other shoppers.

The medium of the Internet also allows many possibilities for creating a social, spatial experience while shopping. Many online marketplace developers refer to the “virtual mall,” an evocative phrase that suggests that online marketplaces should duplicate the successful features of real world shopping malls. The most important component of the virtual mall is creating a place for shoppers to be, a simulated environment. Other shoppers are present in the virtual mall, creating an air of sociability. Participants can see each other, look at store windows together, have chance meetings, carry on conversations. The beginnings of the technology to do this are already in place in the form of virtual community spaces such as MUDs and social virtual realities. As these technologies become more effective it should be possible to present a simulation of the traditional marketplace entirely in the Internet medium.

Finally, online shopping presents the possibility to remove the necessity of much of the interactive processes of shopping today. People can create software agents to do their bidding in online stores, agents that search out items and negotiate sales without any need for the intervention of people. It is possible that the marketplace could be entirely automated.

Such a future would make shopping more convenient at the risk of alienating consumers. In order for software agents to succeed, some way must be found to make people trust them. A requirement for trust is to make it easier to understand how an agent works and what it is doing. Interface technology for agents is not very developed. Is personalization of agents the way to go, to give people the metaphor that their software agent is of the same status as a human being and can be understood in those terms? Is there some way to expose the inner workings of the software agents, perhaps a virtual object version of GOOP [1] where the behavioral components of agents are directly manipulable? Can agents be located in the same simulated space as shoppers, thereby giving agents more presence? These research questions are crucial to the success of agent-mediated shopping.

As online marketplaces are created the design choices that are made in their construction will shape the experiences of consumers. To make online shopping more familiar it may be useful to try to simulate the physical world, to bring into the virtual world analogs of physical objects and spaces. Software agents have the potential to take on characteristics of virtual people in the new marketplace, but only if they can be made to seem real enough that people understand and trust them. It is both possible and desirable to create a virtual experience that is as rich as a traditional physical marketplace.

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