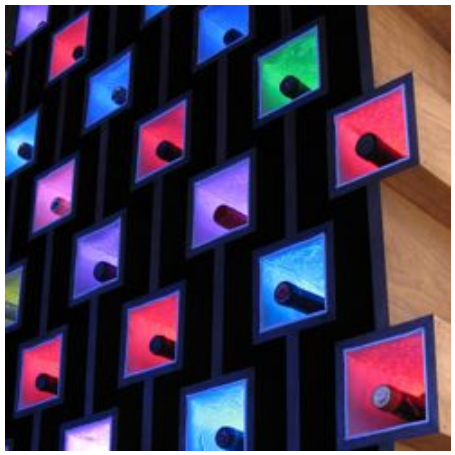
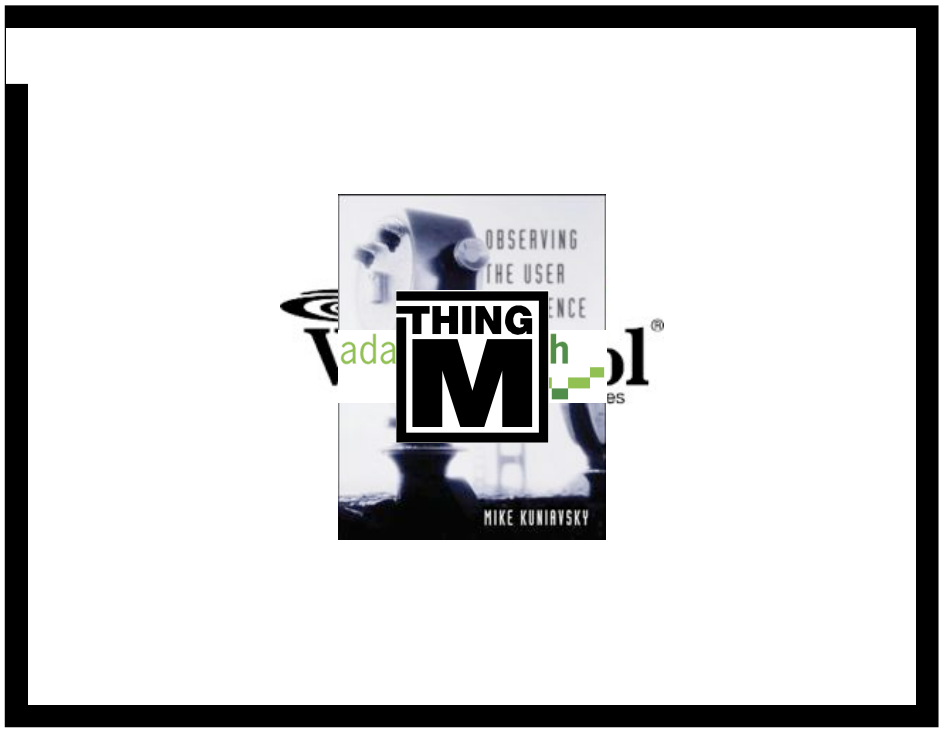
ThingM makes a smart object



Mike Kuniavsky
IDEA
October 5, 2007

Hi. Thank you, Peter and the IA Institute for inviting me. I apologize in advance if my voice is flat, I'm fighting off laryngitis right now. Today I'd like to show you a case study of a user experience and information design project that my company completed a couple of weeks ago.



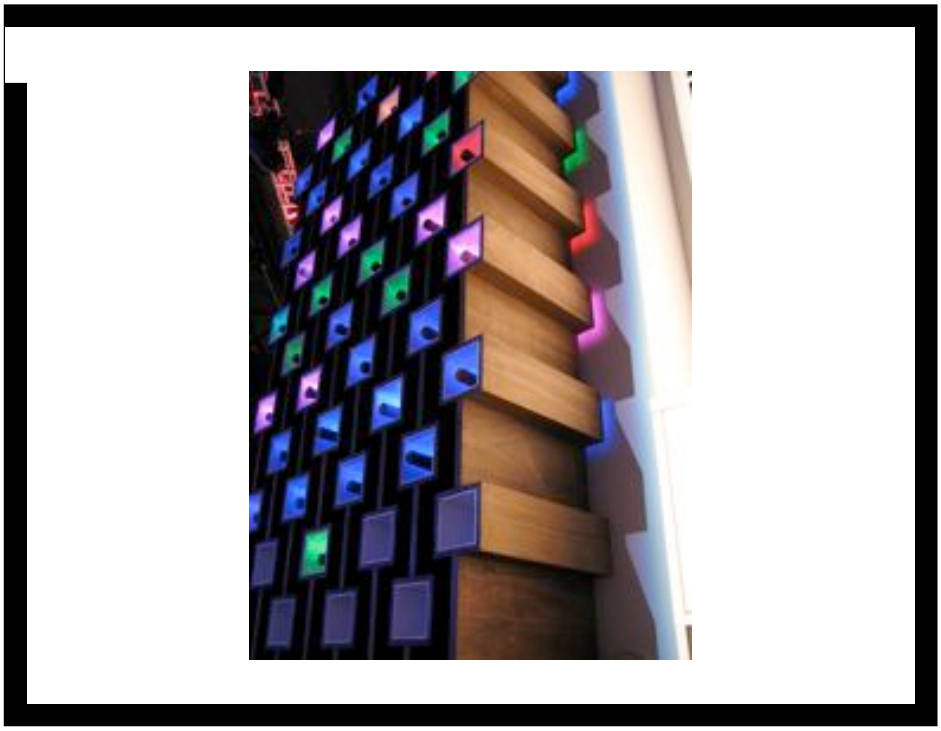
I'd like to start by telling you a bit about who I am.

I specialize in user experience design and user research. Over the years, I've worked with a wide variety of organizations to help them develop technology with people in mind.

[click]

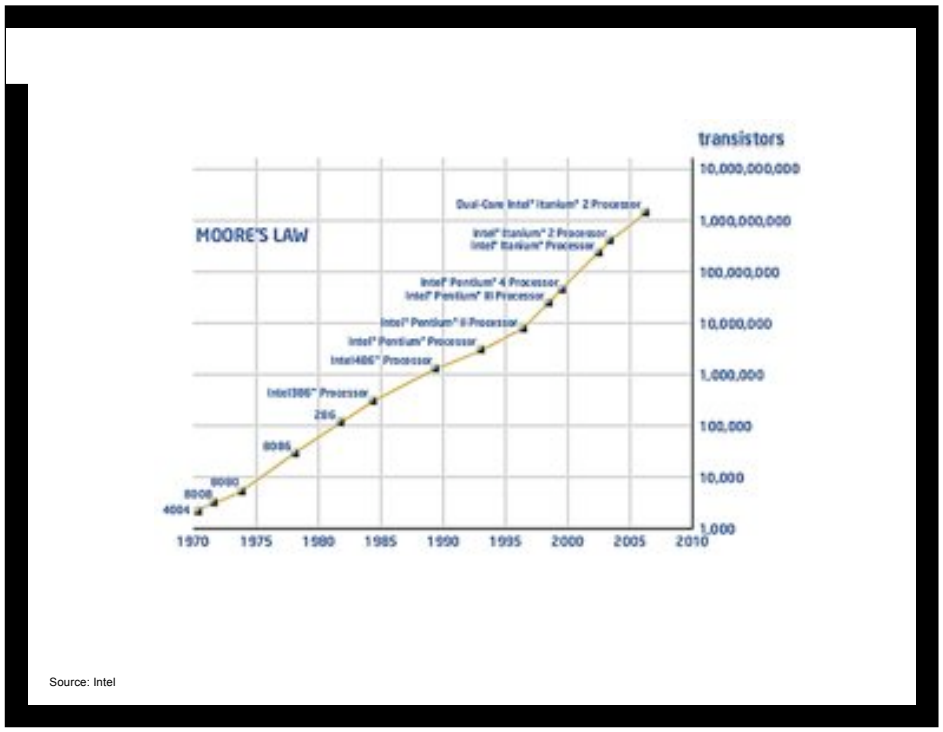
As part of this practice, I wrote a book, a kind of cookbook covering a wide range of user research techniques. I also co-founded a design company called Adaptive Path with Peter.

Last year I started a company called ThingM. We specialize in the design of ubiquitous computing appliances.



A couple of weeks ago we premiered our first product, an RFID wine rack, at WIRED Magazine's NextFest in LA. In this rack, each bottle has an RFID tag on it, and there's a reader in every cell, so the rack knows exactly which bottle is in which cell. There are also 4 RGB LEDs in each cell that can light up in a broad range of colors. Thus, we can project different kinds of information about the wine directly onto the the bottles.

So why did we do this?



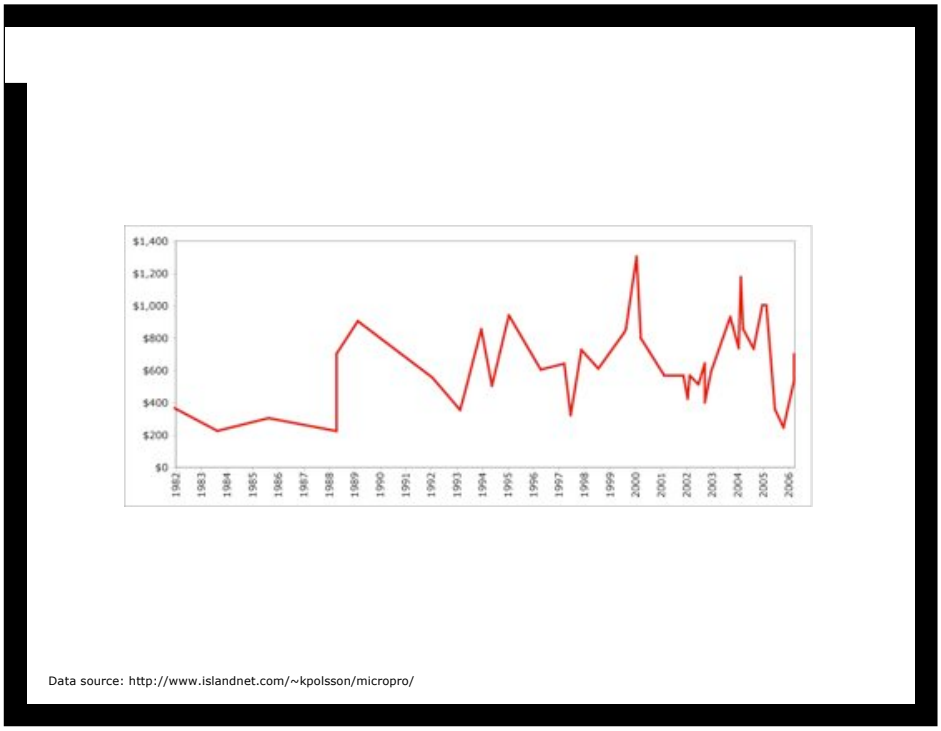
Source: Intel

Let's back way up and let me tell you about ubiquitous computing and why I think it's really important. I'd like to start with everyone's favorite, Moore's Law!

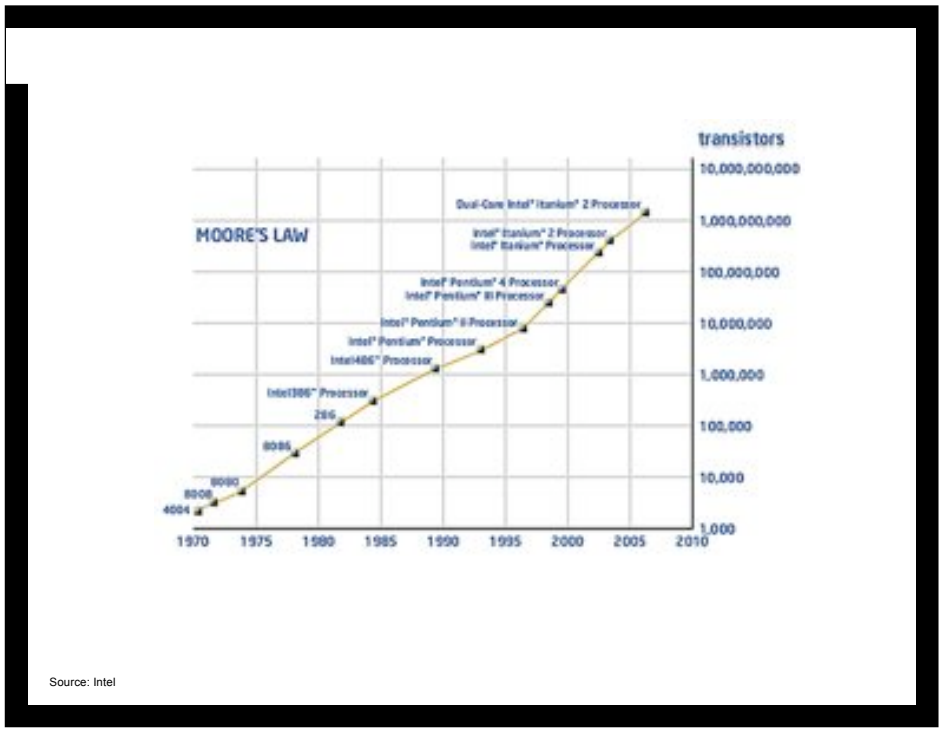
You've seen it a thousand times, but let's look at it again. People typically read this chart as a trend focusing on the number of transistors.

What's implicit in this trend, however, is that this is happening within the context of a marketplace.

This is not just the theoretically largest number of transistors that's possible to put on a on a CPU die. It's the number of transistors that can be sold at a specific price point.



And if you look, the prices of new CPUs has stayed roughly the same. This is a graph of the price of major personal computer CPUs over the last 25 years, at the time of their introduction. Even with fluctuations because of market positioning and competition between Intel, Motorola and AMD, the price of a new chip has remained pretty steady, generally between $500 and $1000 at the time of introduction.



Source: Intel

Taken in light of processor prices, the other way that you can read this chart is that the PRICE of older processor technology decreases proportionally to the increase in transistor density. People tend to concentrate on the right side of the curve, but I'd like to draw your attention a little to the left, to what I call the Hidden Middle of Moore's Law. I think it starts right around the 486. These processors can do an immense amount and correspond roughly to the beginning of the modern, internet-connected computer.

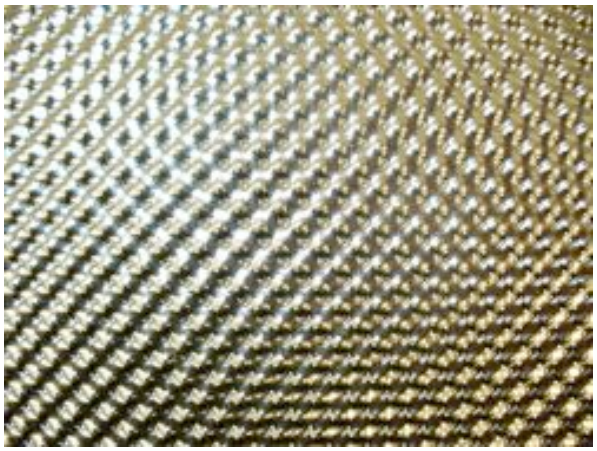
1989: $900

33MHz, 20MIPS

2007: $0.53

20MHz, 20MIPS

Sure enough, you can see that the actual chip prices reflect that price drop.You can get roughly the same processing power today for 53 cents that cost $900 in 1989.



Source: Flickr, ShutterCat7

This means is that embedded information processing and networking starts behaving like a material.

Let me explain. When a product designer can include information processing in a product for very little cost, the calculation becomes not one of engineering complexity, that's relatively cheap, but one of competitive advantage. Including a CPU becomes a line item in the competitive analysis of making an object, just like the calculation about what to make it out of. Of course, as any brand new material, adoption doesn't come all at once, it trickles in first in one industry, then another. Think of nylon going from being a molding material in 1941, to panty hose, to cogs in sewing machines by the 1960s. You can already see it happening with information processing. All kinds of toys now depend not just on their physical appearance, but behavior created by electronics, for their competitive advantage.

Source: Flickr, jurvetson

Information as material is the heart of ubiquitous computing. Information processing can be in any object, not just things designated as “computers,” and because of this new material, these objects now have a range of new properties. What does that mean for design? We don’t know yet. Collectively, we just kind of figured out how to make Web pages not totally suck, and this is a whole new game. There are no best practices yet.

Tod Kurt and I founded ThingM last year because we believe that ubiquitous computing holds amazing promise for making the world a better, happier and more interesting place. Maybe, as Michael said yesterday, even to save us, provided that it’s designed with people’s needs, desires and abilities in mind. We want to reinvent everyday objects in light of the capabilities of these new technologies. However, ubiquitous computing is today where the Web was in 1992, and there are a lot of unknowns.

But you have to start somewhere. We decided to start by augmenting everyday things.

Every material object casts an information shadow. It exists simultaneously in the physical world and in the world of data. That information shadow has a life of its own. Sometimes that life is pretty simple. But it can also be complex, maybe as rich as the physical object's life. Like Frank said yesterday, the border between the real and the virtual is becoming more porous. This is also where IA comes in: the information architecture of these shadows IS the information architecture of objects.

With this project we wanted to unify the informational and physical aspects of a common object. We looked around for objects with rich informational lives, and after discussion about books, clothes, and cars, we settled on wine.

In picking wine, we're certainly not the first to recognize its interesting rich informational properties. Virtual Vineyard was the first ecommerce site. Bruce Sterling talks about wine extensively in Shaping Things, his book on ubiquitous computing, and wine is of course been a long favorite example for information architects.

Source: Queens' Isetan

We're also far from the first to attach RFID tags to wine, which is the technology we settled on to unify the information and physical aspects of wine. Here's a Japanese project that tracked wine buying in a store and would produce a bunch of information about the wine when the tag was waved over a reader with a screen.

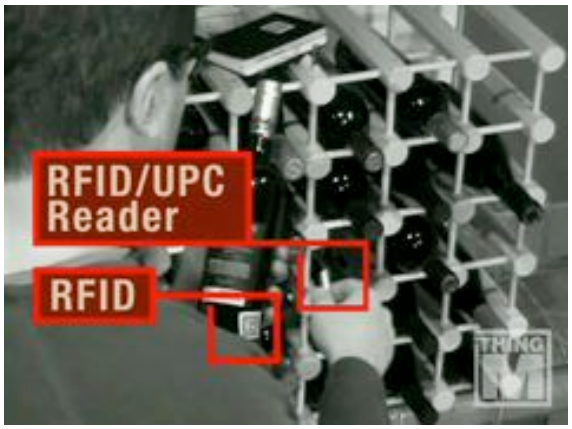
Queens' Isetan RFID wine rack:
http://itpro.nikkeibp.co.jp/article/COLUMN/20060702/242271/

Source: Tagstream

Here's a project that tracks wine during the manufacturing and distribution process.

However, we're not particularly interested in the logistics of wine making, distribution and sales. We're interested in rich end user experiences that put people in direct contact with the information in their everyday environment. For us, physical proximity to people's daily activities is critically important.

http://www.tagstreaminc.com/products/index.cfm

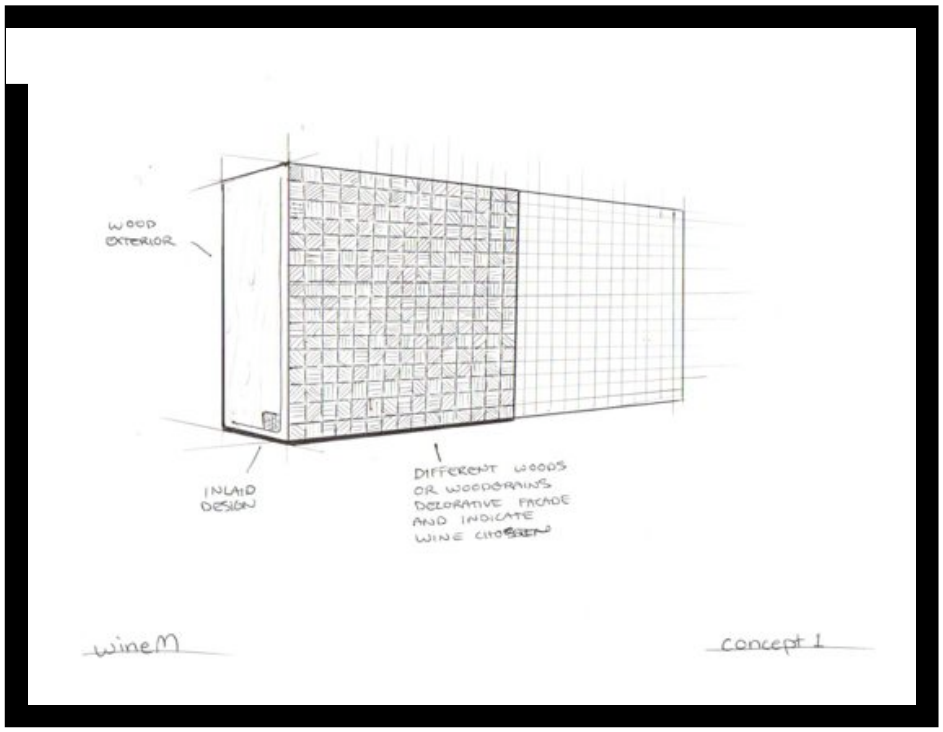


Developing ubicomp devices touches on hardware engineering, industrial design, interaction design and information design. That's a lot of stuff to be thinking about at once, so our process usually begins with what we call a Technology Sketch, a video that helps us imagine how a technology could work, without actually having to make it.

We made one for the wine rack.

[Start video and talk over it]

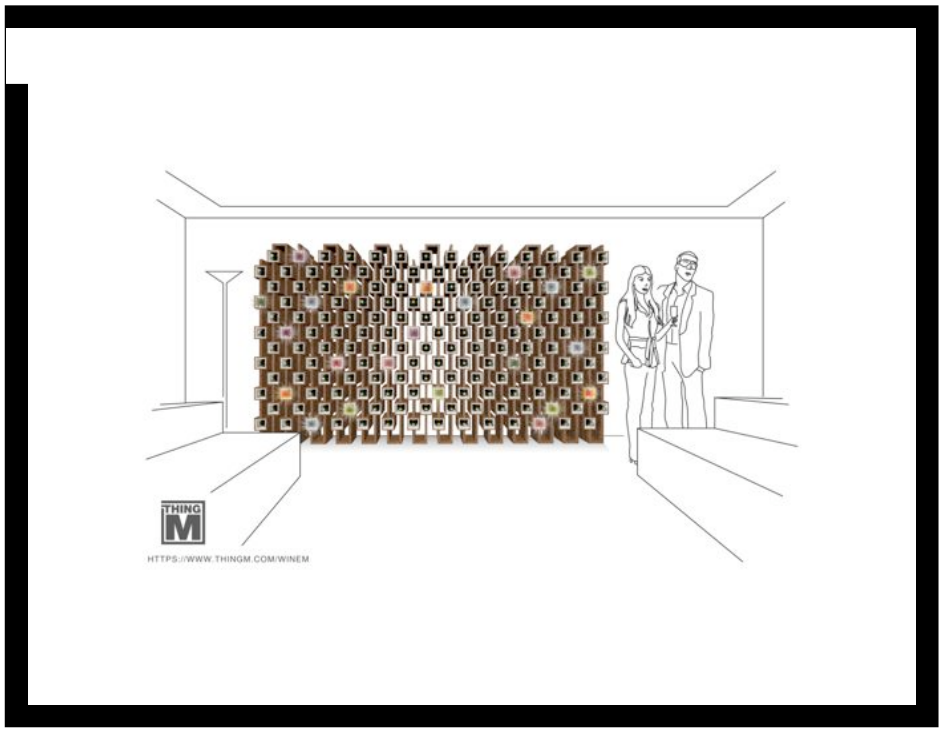
Having made this, we looked back and thought "this is nice" and were kind of done with it. We liked the video enough to put it on Revver, and moved on. But the blogosphere didn't let us get away that easily. For the next couple of months the video kept showing up on various blogs and people kept sending us "Hey, where do I buy this?" messages. Two months after we put the video out, Wired Invited us to exhibit it at NextFest and we gave in and agreed. The problem was that it didn't exist, it was a video.



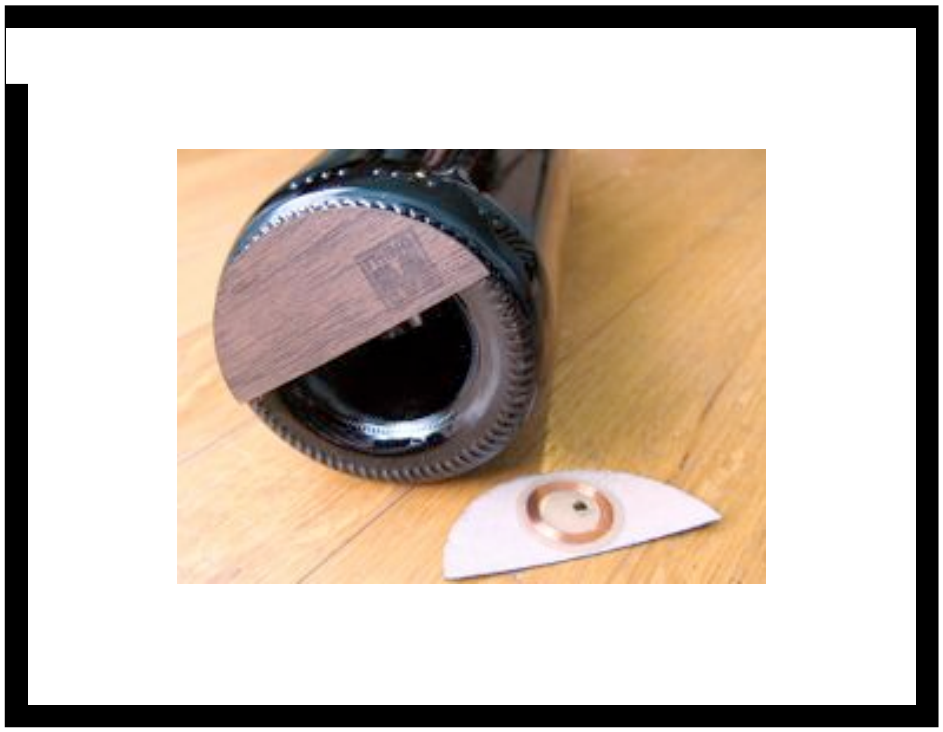
So we actually had to make it. Tod focused on solving the RFID engineering problems while I designed the user experience. I started by developing several personas with Ryan, the industrial designer we work with. Jack was the person we thought would be the primary buyer, but we didn't designed this wine rack for Jack. We designed it for Vince, the Wired NextFest visitor, who had a very different set of needs and a very different esthetic. It needs to instantly communicate to Vince that this is a fundamental rethink of what a wine rack is.

[Go to video, start talking]

Here are some of Ryan's ideation sketches for a physical design of the rack that would work for Vince.



And here's the final design. This is number 38 of 60.



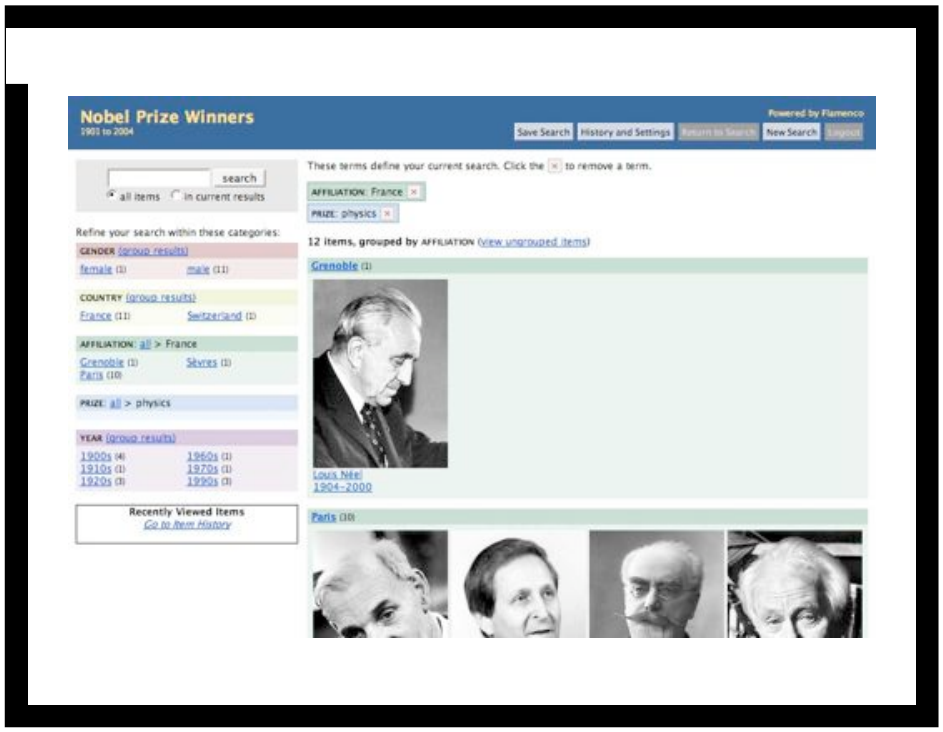
This is our RFID bottle tag. We wanted every piece of the design to communicate a set of values with the way it looked and worked. It's made of the same walnut veneer as the rack, sits flat, isn't visible when the bottle is on a table, and leaves enough space so that you can put your thumb in the back to pour the wine.

We also didn't want to go the home automation technofetishism route and make "a wine rack that lets you see your wine inventory from anywhere on Earth with your phone." Whatever. That's easy, but not interesting to the person standing in front of it. The rack is an appliance that happens to use a bunch of computer, network and wireless hardware to achieve the desired experience, just as it happens to use walnut veneer.

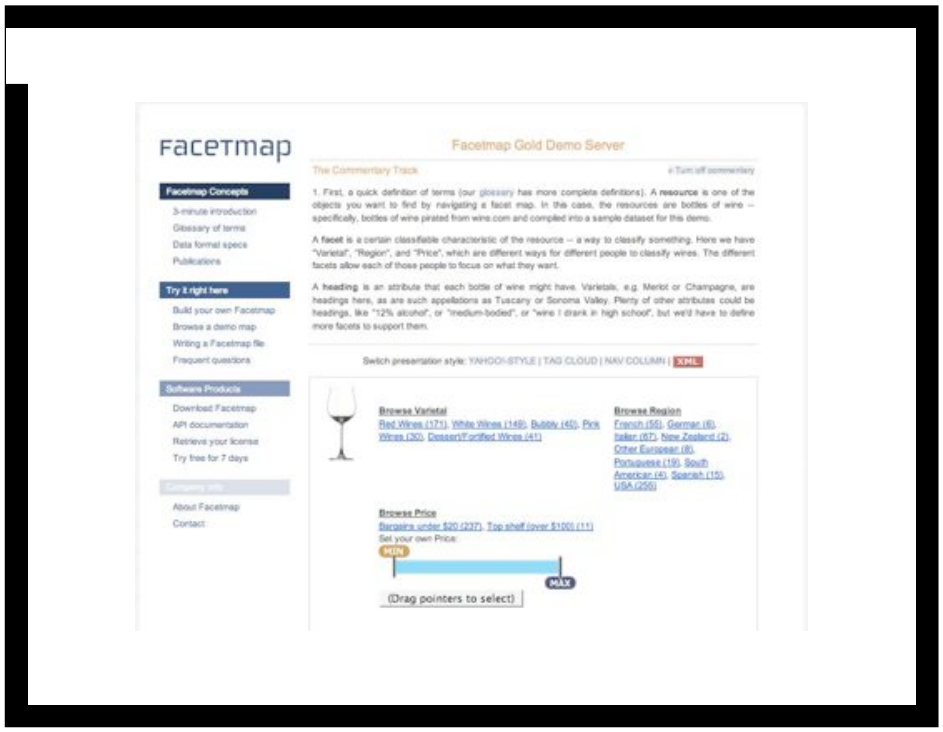
We tried to get away from using a screen entirely, but couldn't come up with a workable solution, so we decided to make a control panel that detached from the main unit. We used Nokia touch tablets to do that. These Nokia tablets make great control panels. They have beautiful high resolution touchscreens, connect to the Net over Wifi, they have decent Web browsers, and they run Flash. The problem is that there's not that much screen real estate…

Source: Qliktech

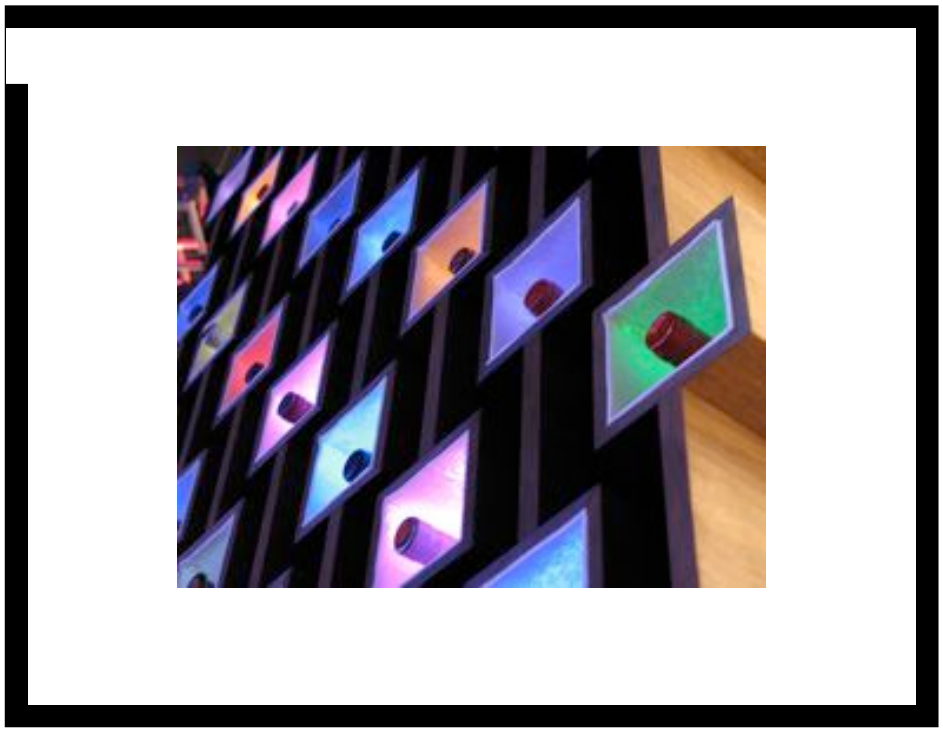
…and there's a lot of wine information. To deal with this I decided to use a faceted classification system. I felt that facets would allow people to explore the information they needed to choose a bottle of wine given a limited amount of screen real estate, and only using their index finger.



But faceted classification systems typically use a lot of screen real estate, with lots of little things that would be impossible to click on with your fingertip on a small screen.



Even the venerable facetmap demo, as great as it is, wouldn't work for that reason.



This was a pretty big challenge. But this is where what we do diverges from traditional UI design, and I think to our advantage. This is not our display. [click] This is. [click again] This is a control panel, so it doesn't have to show all the relevant information all the time and can focus on navigation.

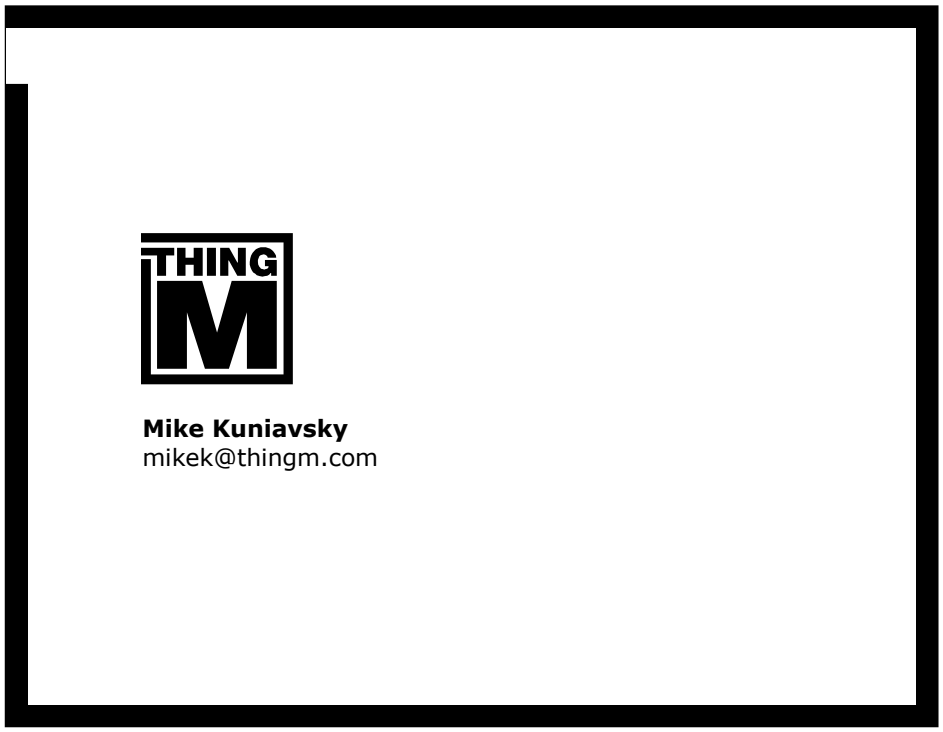
So we implemented this as a kind of tabbed interface. The tabs are facet categories and they do two things: they navigate the information space on the control panel and they project corresponding information on the bottles in the rack. When you click a tab it lights up all of the bottles in different colors that match the facets. Maybe that's all Vince needs to choose a wine. The interface does not assume that he has to narrow down to one answer until something is displayed on the rack. It's a decision support tool at every action.

Let me show you how it works. [go to demo]

When a facet is selected, it's added to the shelf on top, that's that empty area above. You select a facet, the facet appears on the shelf and the wines that match all the shelf constraints go white, while the ones that don't, turn off. If you then select another category, just the ones that are currently lit stay lit, but in the colors of the selected category.

Now let's put all of the pieces together. Let me show you the system in action. [show video]

So that's it. Our plan is to figure out how we can put this into production, and we should know that and have prices by the end of the first quarter of 2008. We're also working on several other projects, mostly unrelated to this, but I hope equally as cool.



Thanks!