# Stanford eCorner

## Envisioning the Future: Microsensor Technology

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**Video URL:** http://ecorner.stanford.edu/videos/375/Envisioning-the-Future-Microsensor-Technology

Kaplan is working on some really "wacky" things. According to him, the next big wave is going to be in Microsensor technology. This will enable people to use technology to do things that don't seem possible. He designed and built a home automation system which narrates whatever is happening. He has basically integrated information from multiple sensors.

**Transcript**

Life is wonderful. I'm having a great time. I'm doing some things that if I tell you about, I would have to kill you. But there's a lot of interesting stuff going on. It's really nice when you don't have classes anymore. You don't have to go to work. It's a personality thing, but I'm very, very busy. And I've always done things that when I'm working on or getting it started, the people around me who know about it, they either tolerate it or they think I'm nuts. And I guess I've gotten to the point where I just think that's OK. So I'm working on some really wacky things.

I'll tell you what the next big wave is going to be. Now, this is true. The last couple of big waves, I said, "This is going to be a big thing." And he went, "You've got to be kidding. That's not going to be a big thing." And it was. One thing I'm good at is calling the waves. I can't tell when they're going to happen. Where did that guy go? He left. But I can't even tell you exactly when it's going to happen. And the timing is critical, as you have now learned from my "on" moments here, my wonderful words. But I can tell you that it's going to happen.

The next big revolution is going to be around what you might call 'sensor technology'. It needs a fancier name. But when you combine wireless transmission with the ability at very low cost to have multiple sensors, lots of different sensors, and then you can build typically software that will integrate that information to achieve a higher level of description, you can do things with a computer--to control or to report or to indicate things--that you don't think about using technology to do them. So systems that would track somebody's walking around today the aisles of Target and what are the chances if they're trying to shoplift something. Or somebody's loitering somewhere they're not supposed to be, or it looks like there's a mugging going on at a particular corner. These are more abstract concepts. And by combining various kinds of sensors in different ways, we will be able to do things that will just be amazing in terms of... Now, I would like on this phone to get a call--my mother lives alone. If she doesn't get up by, say, 11 o'clock in the morning, I'd like to know. It will be possible in five years--I'm guessing on the timeframe--instill a very simple system in her house.

It doesn't invade her privacy. It only does one thing: it phones me when probability that if she hasn't gotten up or hasn't gotten out of the bedroom by 11 o'clock in the morning, did that happen? Probably that goes above 90%. There's lots of amazing stuff. So one of the things I did since I stopped having a formal job is I designed and built a home automation system where I've got cheap sensors around the house. And one of the things, a lot of it doesn't work right, a lot of it does. One of the cool things about it is my house is narrated. Has anybody had experience with the voice synthesis systems that are available today? They are phenomenal. They're so natural you'd swear you had somebody on a microphone, you know, "We need help

on Checkstand 3," wherever it is. You can feed in any text. And it's amazing how good those things are.

So I have speakers all over the house, little intercoms actually. I hooked an intercom system. And it narrates what's going on. "Somebody just came in the front gate." "It's time to put the garbage out." It tells jokes--because I've got a lot of little kids. I've got four little kids and it's like, you know, "Get off the couch and go do your homework." Now my wife tells me that other people think I'm nuts. I'm used to that, remember? But it's great, you know? It becomes sort of subliminal, the voice. You don't really listen to it, but you know what's going on. And there are always unintended consequences of technology, and you have to implement it to see it, find out what those are. This is a great example. If somebody hasn't been in a room--if a room has been unoccupied for a period of time, I think I have it set to 30 minutes, and then I detect, you know, I think there's some activity in the room, it just says, "There's somebody in such and such room." And the kids love this because they could be downstairs watching TV and it would go, "There's somebody in Jordan's bedroom." "Huh? What?!" Up the stairs.

So for them it's kind of a personal alarm system for their own personal space. OK. So that's an example I've been experimenting, how to integrate information from multiple sensors. Because I use a lot of different kinds of things, it's all dirt-cheap technology. It's incredibly cheap, but it totally works. And what we'll see, a lot of systems where we integrate data from multiple sources. They may be different kinds of information or they may be multiple examples of the same kind of information, like 16 cameras here that can count exactly how many people are in the room. And that will be the next big wave. It's going to be all these different sensor systems telling you when the Coke machine is out of Coke, telling you when the parking lot is almost filled, when the line is too long or checkstand free, whatever. You heard it here first.