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Big Brother: Fencing Around Fences.

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I have a dog who likes to go outside. I like to go outside as well, but his outdoor appetite is more like an obsession. That's all well and good being a dog, but it gets cold up here in the winter and buggy in the summer, and my trying to satisfy his desire for outdoor time gets old.

I don't have to walk him anymore.

We may have less bonding time, but he can now go out and sniff and survey his domain to his heart's content because I installed an "invisible fence." He wears a collar that listens for a radio signal emitted by a wire that I buried around the perimeter of the yard. When he gets close to the wire (he learned its path quickly) the collar is triggered and emits a few beeps. If he doesn't get the hint and move back, he then gets a shock that reminds him where his boundaries are. He doesn't test this very often.

A good tradeoff (from my perspective, at least.) He gets all the outside time he wants and I get to spend more time reading my Email, or whatever.

It's Not Just For Pets Anymore.

Now let's take this a step further. Let's talk about kids rather than dogs. Many parents impose boundaries that their kids are not supposed to cross. For example, they might want younger children to go straight to school and back, perhaps allowing them to stop at known friends' houses on the way home. They might want young teenagers to have the freedom to bike around, but perhaps not on busy highways. And speaking of highways, the word "concern" is indelibly inscribed on parents' minds once their kids reach 16 and get behind the wheel.

I was a kid once, and following every rule seemed, well, open to interpretation. Although my parents gave me a lot of freedom, in retrospect I remember wandering into places where I probably shouldn't have gone. Of course I learned from these activities, but there were good (from a parent's perspective) reasons why I probably shouldn't have done so.

'What they didn't know wouldn't hurt them' was my internal justification. Besides, how could they know?

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I was lucky. In that 'kinder and gentler time,' at least where we lived, my explorations were unlikely to get me into real trouble. But that's less often the case today. Today, many parents feel an increasing need to keep track of their kids' whereabouts, yet walking them around on a leash might raise a few questions. And running an "invisible fence" wire around the perimeter of each kid's constantly changing 'allowed area' isn't feasible. (Besides, a 'shocking' kid collar would raise a few eyebrows, and more...)

Yet an 'invisible fence' of a very different kind is already here today, with many interesting implications. (Note that I'm not advocating everything that what we're about to examine; we're simply taking a look at 'what already is.')

We're Way Beyond 1984.

In today's connected world, a few seemingly unrelated facts, when combined, change a lot of society's rules:

1. Seventy percent of the U.S. population now carries cell phones.
2. Fifty-five percent of teens now have cell phones.
3. Twenty-five percent of kids under 12 years of age have [cell phones](#).

Needless to say, cell phone providers see their most fertile growth potential in the younger population.

We're clearly a "cell phone society," so some insight into how cellular phone systems work can be helpful. Bear with me for a few important snippets before we get to the point:

4. Every cell phone gives away its location *all the time that it's turned on*.

A cellular system works by establishing many small "cells," or bubbles of space around each antenna. Our very low-power cell phones can communicate with the antennas at the center of the closest cells.

It seems obvious that the cell phone system would have to know the closest "tower" while you're making a call, but it also needs to know the phone's location when it's sitting quietly in your pocket! This is quite legitimate, since without knowing where the phone is, the cellular system would not know where to deliver an incoming call.

So even when you're *not* using your phone it periodically 'checks in' with mama, leaving very clear footprints in the digital sand.

5. Your "footprints" are far more accurate than you might think, for a couple of reasons:

- Most cell phone towers have multiple individual antennas that each scan only a portion of the circle around them. So the system knows generally which direction you are in relation to the tower. If your phone's signal is being picked up by multiple towers (often the case), then the directional information from both (or more) towers can be used for "triangulation," easily narrowing your location to a block or less. Analogues of these techniques raise accuracy even more.
- Newer cell phones contain a GPS chip that defines its location within twenty or thirty feet when it can see the sky.

6. An "off switch" isn't really an "off switch."

In the "good 'ol days" when you turned an appliance off it really was off. No power to the tubes, no glow, no heat. It was off.

But it's rare to find such a physical "off" switch in today's electronic appliances. For example, my Digital Video Recorder (DVR) is most definitely not "off" when I've turned it "off" - its internals really do have to be "on" to record any scheduled programs. My cable box doesn't really go "off" - it too must be alive to feed the DVR, to receive updated program listing information, and perhaps to automatically update its software.

And yes, the "off" button on most cell phones is an electronic rather than a physical switch. In essence when you push the "off" button it tells the phone's computer to shut down. But that doesn't mean that the phone actually *has* to completely shut down; it might only "seem" to be "off" like my DVR and cable box. Similarly, in theory you can disable the phone's GPS chip for all but emergency calls, but like a seemingly "off" cable box can you be sure that the GPS function is truly off regardless its icon?

I'm not implying that Big Brother is generally "out to get us;" most phones probably act as you expect. But knowing these basics will help us return to the subject of our kids and electronic fences.

Specifically, lots of kids have cell phones. Cell phone providers know, and can track, where each phone is. An obvious revenue-generating service opportunity is that, for a

subscription fee, the provider can display your kid's cell phone location on a map you access through a secure Web site, or via Email.

Geo-fences: Shocking -- Not.

But that's just the most basic element of such a service.

Contemporary Web-based technology makes it simple for parents to also map out an acceptable "geographic fence" for their kids. Since the cell phone system always knows where a kid's cell phone is, the system can easily send an Email or Text Message to the parents alerting them if their kid breaks his or her boundaries. The parent can then log-in to the Web site and view a history and real-time track of the kid's movements.

The next step is up to the parent, perhaps deciding to call the kid and discuss the situation or, in extremis, contact the authorities.

For older kids it might be more difficult to narrowly "geo-fence" acceptable areas, but it would be easy for a parent to set up "restricted zone fences" - certain "keep out" geographic areas ("shopping malls" come to mind) that would generate a parental alert.

What They Don't Know...

Of course even younger kids might bristle at their parents knowing their every move, and a teenager's response is predictable. Not to mention that kids are very quick to find holes in any system. For example:

"I don't know how it got turned off..." But these phones could be programmed so that they only *seemed* to turn off, just like my cable box; their locations could still be tracked.

"I forgot it in my locker." An obvious defense against this is parents *requiring* that the phone always be carried as a condition of the kid having his or her (now socially indispensable) cell phone. Kids are, however, eminently inventive, so the system could note if the phone did not move for a given time (as in left in a locker) and advise the parent accordingly.

Potentially taking this a step further, and raising even more privacy and societal issues, the kid could be implanted with an RFID chip (similar to those used as "VIP identifiers" in some clubs). The phone would then periodically "talk" to the chip, confirming that it

was within some radius of "its kid." If, after a reasonable time, the phone still couldn't see "its chip," it could "phone home" and alert the parents that something might be amiss.

Of course there are innumerable other variations for kids and parents to clash over in the ongoing game of technological escalatio...

Big Brother.

What we've just explored is not science fiction, nor even "next year's" potential. Services such as these already exist, such as Sprint's "[Family Locator](#)" service, and Verizon Wireless' "[Chaperone](#)" service (due in June.) Which begs the important question: do people deserve more privacy than such systems provide?

When it comes to kids, that's a parent's decision. But what about for adults? There are already similar services for employer-provided cell phones, such as Sprint's "[Mobile Locator](#)." If disclosed to the employees, this may be acceptable business practice. But such technologies can also be abused, such as by a disgruntled spouse. Or potentially by stalkers. Or by any form of unlawful surveillance.

The march towards a wide variety of "location aware" technologies is turning into a jog. *Really* into a jog, since there's already a service that can provide you with a detailed record of your afternoon jog including route, elevation profile, and even an estimate of the calories you burned. You can also ask a location-aware cell phone service for restaurant recommendations within walking distance. Or how about a "dating" service that advises when you're near someone with a compatible profile? Indeed, the "jog" towards location-aware services is turning into a flat-out run...

Location-aware services are going to proliferate so rapidly because many can be very useful. But as usual there's also a dark side, and we owe it to ourselves to assure that appropriate personal privacy protections are legislated and enforced. Our personal privacy is far too important a thing to leave to chance.

Our actions will, quite literally, define the world into which our geo-fenced kids will grow.

Don't Blink!

This essay is original and was specifically prepared for publication at Future Brief. A brief biography of Jeff Harrow can be found at our main [Commentary](#) page. Other essays



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