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Locating Customers and their Cards

by [Luc Darmon](#) on December 11, 2014 - 15:29



The festive holiday season brings with it the yearly boom of holiday shopping. Store aisles that are usually relatively calm are suddenly crowded; customers reach around each other to get to the products they want, and the usually serene scene of shopping is replaced with mayhem.

Along with the boom in shopping, unfortunately, comes a boom in fraud. Shoulder-to-shoulder crowds make it easier to steal wallets and credit cards and to use them quickly before the overwhelmed customer knows the card is missing. Who watches their wallet when faced with the challenge of shopping while dealing with kids, competing with other customers and remembering who you need to buy a present for? Unfortunately, the number of stolen credit cards and other fraud peak at the same time as the holiday shopping frenzy.

In many cases, the potential for fraud is even higher as newer technologies are adopted. Contactless cards are much harder to copy, but in some cases can have their card numbers read and copied by a high-end smartphone. Copied card details can be sent to the thief's partner, who can use it for a purchase by swiping a second smartphone at the register.

Mobile technology and micro-location open up the opportunity for reducing fraud by checking a customer's location whenever their card is used. A card that's used in Connecticut when the cardholder's smartphone is in New Jersey is at the very least worthy of additional scrutiny, and is likely to be a stolen or forged card. A card that's used in a department store while its owner's smartphone is in a shoe store in the same mall may be legitimate if the cardholder gave their credit card or their smartphone to someone else to use, but is equally likely to be a card that was just stolen and is being used quickly before the theft can be noticed and reported.

A current challenge in mobile location systems, however, is that GPS technology only works outside, when phones have very little between them and the satellites in the sky. A thin car roof or a glass skylight lets GPS signals through, but a typical shopping mall's roof will prevent smartphones from knowing their locations as long as they're indoors. In general, smartphones inside malls know that they're in the mall, and might know which store they're in from the Wi-Fi signals that they receive, but will not know their precise location. This means that an anti-fraud security system as described above cannot know whether a cardholder's smartphone is at the register or in the fitting room, or whether the cardholder is holding their smartphone near the register at which their card is being used.

A new area of technology, indoor location systems, are using a wide variety of technologies to track smartphone locations when GPS is not available. Many stores and malls are running trials of indoor location applications using beacons or Wi-Fi-based approaches. But most beacon systems can only measure whether a phone is in the vicinity of a beacon, and cannot measure the precise distance. Most Wi-Fi-based location systems can only determine location to within eight to ten meters, which is not accurate enough to confirm that the customer is at the register. The indoor location systems that have been deployed to date in stores and malls are not accurate enough to detect fraud reliably.

Ultra-wideband (UWB) radio technology is bringing very precise indoor location tracking to the market. UWB systems can track locations indoors to within 10 centimeters, more than accurately enough to confirm that a shopper's smartphone is near the register where his card is being used.

DecaWave, based in Dublin, Ireland, is selling standards-based chips, which can be integrated into point-of-sale (POS) systems - cash registers - and into smartphones and other mobile devices. These chips use UWB radio to track locations to 10 centimeter accuracy. A system based on these chips can confirm exactly how close the customer's smartphone is to the register, and raise a red flag if the customer isn't right there.

Unfortunately, UWB based indoor location tracking is only in the early stages of deployment, and is not likely to be in the market for the 2014 Holiday season, so we are likely to read about another yearly recurrence of credit card thefts and fraud. But if today's UWB technology is installed in stores, 2015 can be a safer holiday season for us all.

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