RFID Research – Rogue Wallet
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RFID (Radio-Frequency Identification) is a method of automatic identification that stores information in either a microchip or wire enforced label that can be remotely retrieved through radio waves. The RFID system is two parts: an antenna receiver for transmitting the signal and the integrated circuit which stores the information, usually in a solid state which means it cannot easily be rewritten. By broadcasting a radio signal, the receiver is able to able to pick up multiple tags at once. In supply chain management, this is used to maintain inventory since single units do not need to be counted.

RFID tags are made into three primary categories: passive, active and semi-passive. Passive tags have no internal power supply, so the energy from the receiver is just enough to read the tag. These tags can be read from anywhere between 10 cm to several meters depending on the radio frequency broadcasted and the receiver design. This is traditionally used for inventory management as well. Currently, the thinnest passive tag available on the market are made by Hitachi, Ltd and are 0.05x0.05 mm, thin enough to be embedded in a sheet of paper. Active tags have an internal power supply and thus are much more expensive to manufacture. They are also capable of broadcasting their own signal. While the tags are larger, they are capable of having ranges up to hundreds of meters and battery life of 10 years. These are used almost solely in transportation and storage because of their size and cost. Semi-passive tags have an internal battery but do not broadcast. These are traditionally used when the RFID tag needs to hold extra information. Advantages of semi-passive tags are a greater sensitivity to passive tags, longer battery life than active tags and the ability to perform basic functions (such as logging temperature) without a receiver present.

While RFID tags are used primarily in shipping and inventory management, there are many other applications of this technology. Passports, transportation payment, animal identification, library tracking, and even tracking lap time in a relay. Passports use RFID as a back up to ensure that the passport hasn't been tampered, since the information is solid state and cannot be changed as easily as the information on the paper can be. Issues arose once it was proven that the US State Department was wrong about the distance at which the passports could be "read." Many public transportation systems use RFID in their cards

as an easier method than magnetic strips or as a method of collecting tolls on highways. The Massachusetts Bay Transportation Authority (MBTA) introduced their "CharlieCard," which lowered processing time when riding on the T or bus system. RFID chips have also begun being implanted in animals and individuals as a way of storing essential information. If the animal is lost, a scan of the neck (if they have the implant) will state the owner and contact information. For humans, this is used for doctors to draw quick history of the patient, such as allergies or past conditions.

While RFID has great potential, there are a multitude of issues. First, is that RFID does not have an international standard; the USA uses a different frequency than Europe and Japan. The primary issue is about security. While some concerns are more on the paranoid conspiracy obsessed side (such as there being RFID tags in your television), some are grounded in reality. Interception is a serious concern, especially after the UK's encryption was broken in less than 48 hours. This potentially allows for the information to be compromised, but that has yet to happen. There are many methods of protection available though. First is the most basic: smashing the chip. Hitting the chip with a hammer, in most cases, is enough to disable the chip. If destruction isn't ideal, simply wrapping the item with the embedded chip in aluminum foil is enough to block or at least partially shield it from signals (research currently disagrees on which it does), but it does impede the sending of information. Also, there are reports of microwaving the device to overload the chip. Currently, companies are working on allowing transfer protocols being embedded in the chips, which would prevent the ability for non-authorized devices to link to the chip. High frequency chips can be disabled by being placed in an anti-static plastic bag, preventing transmissions.

US Passports are currently protecting by a thin layer of metal in the cover, blocking most unwanted transmissions. However, not all of the passports have this shielding so many items have appeared on the market to fill this void. Almost all of these are made of a tear-resistant paper with metal in middle to act as a shield. I am unsure if these work on all RFID chips, since many products seem to be catered explicitly to Americans. Toppan, a Japanese company, has come out with a shielding paper, but due to language barriers, I am unable to determine if it would work on American RFID chips. Chase Corporation, being both American and relatively local, seems to be the best bet for a potential relationship. Mark Weibel (mweibel@chasecorp.com) would be the contact for this.

While there is potential in using this product in the Rogue Wallet line, I do not believe lining the entire wallet is the way to go. As someone who regularly commutes on public transportation that uses RFID enabled devices, part of the ease is being able to simply hold the wallet (or even just being the right height) to pay is much easier than searching for the card to swipe it. I think the best idea would be looking in the option of lining a pocket of the wallet with the material, or even potentially researching lining part of the wallet with metal, which may cause complications with travelers though. I think the ideal location would be the pocket behind where cards are currently kept as a "safe zone" for sensitive, RFID enabled cards.

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