

ProteXXion®: New technology prevents trade with counterfeit products

The war on product counterfeiters



Counterfeit products not only cause economic damage amounting to billions worldwide, they can also be dangerous to human life. Bayer experts, in cooperation with British researchers, are now marketing a technology that identifies forgeries in seconds with absolute reliability, making it superior to watermarks, barcodes and other security features.

Be it counterfeit drugs, imitation MP3 players or copied car parts, no brand-name product is immune to forgery any more. Cheap mass-produced goods are flooding the retail market; product counterfeiters are totally ignoring copyrights on video and computer games, shoes and textiles. "There even have been reports of an entirely counterfeit gas station," says Lennart Röer, representative of the German Business Action Group Against Product and Trademark Counterfeiting (APM). "But nothing surprises me anymore in my work," he concludes. Illegal products can have far-reaching effects. For example, according to experts, some 300,000 jobs a year are lost in Europe alone as a result of product counterfeiting. The European Commission reports that forgeries cause economic damage amounting to several hundred billion euros every year around the world. Counterfeit pharmaceuticals can even threaten the health or life of duped customers.

In response, many original product manufacturers have been defending themselves for some time now by equipping products with "identification papers": holograms, watermarks, barcodes and safety labels are designed to definitively answer the question of whether an item is real or fake. In some cases, these security features also make it possible to track a product on its way through the distribution chain. However, even these product IDs generally can be forged. The only thing that scares off product counterfeiters these days is the financial means needed to forge a product, which they must offset against the potential profit. "Unfortunately, none of the marks used currently provides absolute protection against unauthorized imitation or copying," explains Dr. Martin Friedrich of Bayer Technology Services (BTS). The anti-counterfeiting expert is working together with Ingenia Technology of the United Kingdom to change all that. In cooperation with the British, Bayer

Tracking down counterfeiters with digital means: Dr. Martin Friedrich (right) wants to use the new Internet-based ProteXXion® technology to minimize the immense economic loss caused by product counterfeiting around the globe.



Interview



Enormous loss of sales and image

Lennart Röer represents the German Business Action Group Against Product and Trademark Counterfeiting (APM). *research* spoke with him about the damage caused by counterfeit products.

What is so bad about imitation brand articles or forged products?

First of all, companies suffer enormous financial loss as a result of product and brand forgery. Last year alone, German customs agents seized forged products worth €1.2 billion. That's only the tip of the iceberg, but it shows how high the damage to companies is. Moreover, forgeries are bad for the image of a company or brand: the consumer makes a mental connection between low-quality forgeries and the brand name. Ultimately, it's the manufacturers of the originals who bear the product liability risk. It's sometimes difficult for them to prove that a forged product caused the damage, and not the original.

What industries are most concerned about stopping product counterfeiters?

All industries are basically affected. Textiles, luxury goods and software are the classical targets of product counterfeiters, but toys, drugs and machines are copied as well.

Why don't companies like to talk about how much they are affected by product forgery?

The companies are at risk of distressing customers. A lot of times, an entire industry will release statements on the subject rather than a single company. The goal is to prevent consumers from associating one company with the issue of product counterfeiting.

Technology Services is now marketing a unique method for authentication without any additional marking or tagging: "ProteXXion®" is the name of the new system that can determine the authenticity of a product with absolute certainty in a matter of seconds.

The fundamentals of the system were developed by the research team headed by Dr. Russell Cowburn, professor of nanotechnology at Imperial College London, United Kingdom. The team discovered that objects have microscopic surface structures, comparable to the ridges on your fingertips. Numerous materials, including paper, metal and plastic, have an individual pattern on their surface, like a totally unique fingerprint. If the surface is illuminated by a laser, the patterns can be made visible. Several sensors register how much light the object reflects. The recorded signal may look to the observer like a tangle of lines, but it can be used to identify a scanned object with one hundred percent certainty. "We found that the scattered light contains information, and that this information is always the same for one and the same section of a surface, like a DNA structure, or a fingerprint," Cowburn explains.

Identifying feature: unique surface structure

Modern criminologists are not the first to use fingerprints to convict criminals:

Sherlock Holmes and his assistant Watson knew about the unmistakable nature of this absolutely distinct characteristic, with which even twins can be told apart. The formation of the ridges on the fingertips through the fourth embryonic month depends not only on genetics, but also on random factors. No two people have ever been found to have identical fingerprints. When it comes to products, the uniqueness of their surface can even be expressed in numbers: "The probability of two objects having the same fingerprint is in the region of 10^{-20} to 10^{-100} ," Friedrich says.

Russell Cowburn and his team set up the company Ingenia Technology. They designed laser scanners and computer software to store and reliably identify product fingerprints. Then, in mid-2005, the young business introduced its Laser Surface Authentication (LSA™) technology to the public for the first time. Not long after, Ingenia Technology and Bayer established initial contact and quickly realized that a partnership would be of great benefit to both.

Already the partnership between the two companies has been successful on the international stage: the developers of ProteXXion® won the Hermes Award at the 2007 Hanover Fair, one of the most prestigious international technology prizes with an endowment of €100,000.

To advance the technology, Bayer Technology Services plays a key role at

Shedding light on the truth: ProteXXion® scans the surface of a product with a laser. This unique information is compared with the pattern of the registered original to prove beyond doubt whether a product is real or fake.



the interface between inventor and user, because the variety of products on the market is great and the laser scanning process must function reliably, for example even on objects of unusual shape. In addition, the authentication of a product is only worthwhile if it is possible to make a comparison with billions of scans within a few seconds. Therefore, Bayer researchers and their colleagues at Ingenia are optimizing the technology for specific applications. High-powered computers are already capable of testing 100 million entries within seconds.

Reliable protection against counterfeit drugs

ProteXXion® is suitable for the complete surveillance of entire retail chains. System

variations include mobile scanners that access a common database from different locations. "Six hundred million scans can be stored on a conventional 300 GB computer hard drive, because the signal data are compressed by a special software program," Friedrich explains.

For example, ProteXXion® can help pharmaceutical companies to determine where, in their complex distribution networks, product counterfeiters are introducing their forgeries. And that can save lives: some 40 percent of fake drugs contain no active ingredient at all, meaning that they don't help the patients who depend on them. Others contain doses that are too high or too low, or even the wrong substance altogether. Even the imitation of everyday objects is not as harmless as it would appear at first

glance: dolls that catch fire too easily or cosmetic articles contaminated with harmful microorganisms. "In the event of complaints, companies can determine whether or not an object originates from their own production facilities," Friedrich says. Equipped with the new technology, product testers worldwide will be able to put a stop to the activities of product counterfeiters.

www.ingeniatechnology.com

➔ More information on the basic principles of ProteXXion® can be found on the Bayer partner's website.

Total surveillance

With ProteXXion®, products can be monitored all the way from manufacture to delivery. For this purpose, a precisely defined spot on the surface of a product is scanned by laser immediately after production. This pattern serves as a unique identifying feature for each and every item and is stored via Internet on a computer server. At any point in the supply chain, the surface structure of the product can then be scanned by the ProteXXion® system and compared with the stored profile, enabling wholesalers and distributors to verify the authenticity of their

goods. Similarly, using simple tabletop scanners, retailers can confirm the authenticity of a product right at the cash register. Going back a step to the import process, customs agents can use the new technology to test the legitimacy of MP3 players, shoes, textiles and watches. In this way, ProteXXion® helps to track down dangerous forgeries all over the world. For instance, the supply channels for spare car parts, such as brake pads, are often highly complex and the consequences of forged products very serious: they can even endanger human life.

