Nokia research lab working on nanowire sensing, stretchable electronic skin

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Getting into a Nokia Research Center laboratory isn't easy. The security doors remain open long enough for one or two people to enter and if held open too long, will sound what we're told is an exceptionally loud alarm. Lucky then that we were part of a group taken around NRC's Cambridge laboratory to see some of the latest scientific problems being solved there. We were treated to demoes of three different strands of research; Nanowire Sensing, Stretchable Electronic Skin and Electrotactile Experience. Each one as amazing and eye-opening as the next. Read on after the jump for a lowdown including pics and video.

The Nokia Research Center in Cambridge was set up in 2007 as a partnership with the University of Cambridge. Soon after it was established, the Morph Concept was unveiled, to help build a picture of where the research at the labs was heading. Led by Dr Tapani Ryhänen

the Cambridge team is one part of a two-location European NRC operation, the other location being in Lausanne, Switzerland.

Dr Tapani has a team of about 25 Nokia researchers working in Cambridge (and a further 10 in Lausanne), but they also work closely with the University of Cambridge, giving access to a much wider team. The focus of the research though is very much around nanotechnology and executing what Dr Tapani refers to as “meaningful engineering at a smaller scale”. Nanotech isn’t something which we’ll see appear on a device as a feature. Rather it’s a way of working which offers a whole new world of possibility, some of which we’re previewing below.

Nanowire sensing

The lowdown: The team involved in this project is effectively working on an artificial nose. By placing a nanowire on top of a chip, they can train it to recognise different substances which are placed close to the sensing surface. This all happens at a nanometer scale, where the current passing through the nanowire is influenced by its immediate surroundings. Place a different substance near it and the current running through the wire will react differently. There’s still a lot of work to do on it, but the team were able to show us the nanowire and its accompanying software (which used a sniffing dog as it’s icon) correctly identify a substance.

The potential application: In the future, this kind of technology could be used to monitor environments and measure a variety of things including air pollution, food-based contaminants or bio-chemical processes. Right now it’s restricted to identifying particular molecules but the long term aim is to enable it to identify complex molecular mixtures - similar to how our own noses work.

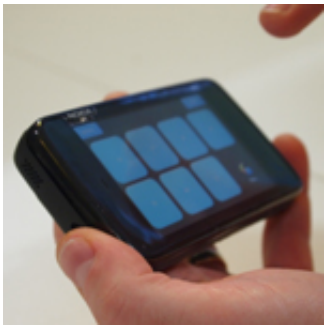
Stretchable electronic skin

The lowdown: Right now, circuit boards are solid. The team at Cambridge however are working on a technology that'll enable them to be flexible, creating something akin to "electronic skin". By using evaporated gold as a conductor, they have created an electronic touchpad which can be stretched like a rubber band, but still respond to touch and pressure. The team has been testing it to stretch by up to 20 per cent of its original length without any drop in performance. The process of creating the material is pretty unique and the results are utterly mind-boggling, when you start to think about the possibilities it offers.

The potential application: This research has at its heart new form factors for devices of the future. The possibilities might sound hard to believe, but working technology which can be twisted and distorted like a rubber band could enable a unique range of wearable devices or even enable technology to feasibly become part of our clothing. After we'd seen it, the talk from the group was of us having completely different ways of us interacting with technology in the future. What is solid and known to us right now, could be flexible and entirely different in the future.

Electrotactile experience

The lowdown: The third of our demoes was also the most realistic, as it was being shown off on a Nokia N900. The team is working on ways to enable touchscreens to offer more realistic feedback. This goes way beyond simple haptics to deliver genuine tactile response. The team are influenced by the belief that the sensation of touch isn't currently well understood so they're trying to work out ways to make it more effective when interacting with technology. Part of the team's research is looking at ways to try and replicate textures, potentially offering users new experiences when it comes to interacting with a touchscreen. Using the concept of electrovibration, which was first documented in the 1950s, the team have been working on the concept for about a year now but have already made tremendous progress. As part of the project, the team has been working with the electrical engineers at Nokia's Research Center in Beijing who managed to miniaturise the required hardware to fit into a modified N900 (using a half-size battery).



The potential application: This technology would enable a new level of feedback from touchscreen devices, taking our way of interacting with them to a whole new level. Of course this is just a concept prototype so don't expect it on your device any time soon. However, given the speed with which the team have reached this phase of research, progress does

seem to be pretty rapid.

Source: Nokia