

The Engineer Online

Tuesday - 30 October 2007

Child minder

Published: 29 October 2007 08:00 AM

Source: The Engineer

Researchers have adapted technology that alerts drivers to obstructions while reversing to create a non-contact monitor that observes a baby's breathing.

Resembling a typical baby monitor, the product, developed by University College Dublin spin-out Biancamed, contains motion sensors so it can detect an infant's breathing from up to 1.5m away. It can also record the sleeping pattern of a child and tell parents in real-time the baby's status.

When placed on or near a cot, the device can detect breathing through most materials, including bedding and wood, and processes the information before sending a signal to a parent unit.

'The core technology has been used a lot in cars for back-up systems that beep if something comes too close,' said Prof Conor Heneghan, Biancamed's chief scientific officer. 'It detects breathing by transmitting very low-power radio frequency waves, the same as those used in motion sensor burglar alarms or outside lights. It basically looks at the reflected radio waves from the environment and then analyses that to figure out what was causing the movements.'

The device's processing software looks at the raw movement signal recorded, and distinguishes between a breathing and a movement signal by analysing the frequency and amplitude of the reflected waves.

The baby monitor concept was developed from previous research by Heneghan on a condition known as sleep apnoea, where sufferers stop breathing at night because muscles in the airways relax to the point of closing in on themselves, causing blocking.

When this happens, the body tries to keep breathing, and if it does not succeed a person wakes up momentarily. This results in constant tiredness, and can eventually cause cardiovascular problems, such as high blood pressure.

Heneghan and his colleagues developed a technology to detect this condition by looking at a person's electrocardiogram (ECG) readings created by heart signals gathered from electrodes on a patient's chest.

'By doing that work we realised that it is quite clinical. It's an on-off test at the doctor's that does not tell you much about your sleep or breathing on a regular basis,' said Heneghan. 'So we thought it would be interesting to find a technology that could monitor sleep and breathing in a non-invasive fashion.'

He explained that the baby monitor processes the information collected by the part of the device near the baby and communicates the readings to a parent unit. This, he said, has a two-icon display — one of a sleeping baby and the other of an infant jumping up and down, to show whether the baby is asleep or awake.

'It also displays the breathing signal by a blue light ring on top of the device, so as the baby breathes in and out, the light goes alternately brighter and darker. If no movement is detected for 20 seconds, it sounds an alarm for the parent to check that all is well.'

According to Heneghan, Biancamed's monitor will be the first to have the sleep/wake monitoring function built into it.

'A trend in parenting these days is the concept of sleep training. A novel feature of the

monitor is that it can be used to keep a record of your child's sleep pattern. We have a sleep timer function so that when the baby has a nap, you press a button, and when you come back two hours later, it tells you that, for example, the baby actually slept for one hour 45 minutes,' he said.

With a planned commercial release date of next summer, Biancamed is already looking to further advance the device.

'In the lab, we have demonstrated a sensor that can detect heart rate, but one of the issues with this is that it is a much smaller movement than breathing and so requires a more sensitive sensor,' said Heneghan.

In addition to this, the company plans to adapt its non-contact technology for neonatal care, so that premature babies can be monitored without infection risks, and for pervasive healthcare.

'A lot of chronic diseases, such as heart failure, cause breathing problems, and as these are chronic conditions you don't want to take the person to hospital every day. What we're working on is showing that our technology can monitor breathing patterns and highlight when there are specific issues that need to be addressed,' said Heneghan.

The existing method of monitoring heart failure patients is for them to weigh themselves daily and notify their doctor if there are significant changes.

'It's a very crude measure, so we are after a more robust way of detecting problems early,' said Heneghan.

Latest Jobs

| | | |
|--|----------------|-----------|
| HYDRAULIC SYSTEMS ENGINEER... | The Midlands | Permanent |
| CONTRACT MANAGER... | South East | Permanent |
| Graduate Development Schemes for... | United Kingdom | Permanent |
| Technical Development Programme... | United Kingdom | Permanent |
| Professional Engineers and Scientists... | United Kingdom | Permanent |
| Telephone System Installation Engineers... | Leicestershire | Permanent |

Copyright Centaur Media PLC Registered No 4948078 England.
Registered Office St. Giles House, 50 Poland Street, London W1F 7AX
All rights reserved.