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By Paul Golden

The Centre for Telecommunications Value Chain Research has furthered its reputation as an international player in intelligent communications research through a series of high profile projects, including designing an international cognitive radio testbed in conjunction with several leading US universities.

Cognitive radio has been an area of particular interest to CTVR over the last few years. The centre has a working testbed that demonstrates some of the core principles of these intelligent communication systems, which are 90 per cent software.

One of the key things that can be demonstrated with these prototype radios is what is known as 'spectrum sculpting', which shows how the signal transmitted can be automatically shaped and sculpted to fit any identified spectrum hole (or spectrum white space). A spectrum hole or white space is unused spectrum that may be owned by what is called a 'primary user'. An unlicensed secondary user could share the spectrum by occupying the white spaces, which is sometimes described as opportunistic radio.

This approach to using spectrum is very different from the current regimes, explained Dr Linda Doyle, who leads CTVR's research in this area. 'Spectrum occupancy measurements made in Dublin by an internationally renowned company, Shared Spectrum Company, show lots of white space.'

CTVR has identified a small number of potential licensing opportunities from this research. These typically involve companies wishing to use the software it has developed to cope with dynamic spectrum to tackle less challenging, but commercially very important issues within existing products sets.

'We are exploring ways in which we can licence parts of our software framework where companies could select only the components of our core system that they need,' added Doyle. 'Our team at NUI Maynooth has developed a very flexible hardware front-end that has huge potential to be licensed and to have specialised variants made to cope with many different radio application domains, for example private mobile radio or space communications.'

CTVR has formed close links with Virginia Tech, which is considered a world leader in cognitive radio and the Trinity College-based centre is leading the design of an international testbed that will also involve Kansas University and University of Colorado.

Doyle confirmed that CTVR and Virginia Tech will be launching an international course on cognitive radio & dynamic spectrum in January 2008, which will deal with technology, policy and regulatory and commercial issues.

'We also do work on spectrum trading. This means that spectrum would become a commodity and be traded like any other commodity. It is possible to imagine smart radios actually automatically buying and selling spectrum as needed - 'just in time spectrum'. We have a major collaboration on combinatorial auctions for spectrum trading with the ICES team in George Mason University led by the Nobel Laureate in Economics 2002, Vernon Smith.'

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