An EU project involving ICT research is producing visual and touch apps to help people with Down’s syndrome become more independent in their daily lives.

Many people with ‘Down’s syndrome’ (DS) face barriers to taking part in community activities the rest of us take for granted. Whether it’s travelling on public transport, paying for items in a supermarket or getting to appointments on time, there may be times when they need help, especially if they get into difficulties.

"Many people with DS cannot take advantage of the standard functionality, since it is not adapted to their skills and abilities."

The EU-funded POSEIDON project (PersOnalized Smart Environments to increase Inclusion of people with Down’s syndrome) is an exciting three-year project running until November 2016. Its aims include using information technology to help people with DS achieve: a greater level of independence in their lives; more autonomy at home, at work, in education and during leisure time; and increased opportunities for socialising.

The types of technology being developed in the project include apps for tablets and smartphones, virtual reality programmes and interactive tables.

Tools for learning and travelling safely

Knut Melhus, a young Norwegian with DS, will be one of those users testing some of the apps POSEIDON produces. He confesses to being a bit of a technology nut: He owns a tablet, a smartphone and a PC, and regularly phones, emails and sends SMS messages to his friends. “Technology is awesomely useful,” he says enthusiastically. “I use the calendar a lot for appointments and birthdays. Then I can see what I’m supposed to do, like remind Mum about something, or send someone an SMS when it’s their..."
ALL-OPTICAL INFORMATION PROCESSING

EU-funded scientists have set out to develop an all-optical ‘Liquid-state machine’ (LSM) based on a complex network of lasers. This should allow machine-learning computations to be carried out at unprecedented speed and using low energy consumption.

Reservoir computing represents a new paradigm in information processing, based on the idea that computational power can emerge from system complexity. The central part of the setup is a vast non-linear network — the reservoir — with nodes needed for information exchange. The connections to the output layer are trained to read the state and map it to the desired output.

The EU-funded project NOVALIS (A novel architecture for a photonics liquid state machine) aimed to develop a novel photonic approach to reservoir computing based on an LSM, which is a major type of it. The idea was to replace the network by lasers, acting as nodes. These nodes were highly non-linear in order to provide the complex dynamics necessary for computations.

Implementation of these nodes was achieved by using ‘semiconductor lasers’ (SLs) with delayed feedback. Optical information injection with 5 Gsamples/s sample rates revealed impressive single SL information-processing capacity. Coupling and feedback were then established for a two-SL system by using polarisation-maintaining optical fibres. However, scientists could not obtain computation results because of slowly varying modulation at the output intensities.

Another implementation of LSMs was a ‘Vertical-cavity surface-emitting laser’ (VCSEL) array that was embedded in a cavity, delay-coupling several laser diodes. Consequently, a...