

Google Glass puts the focus on Parkinson's

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The next generation of wearable computing is being trialled for the first time to evaluate its potential to support people with Parkinson's. Experts at Newcastle University are investigating Google Glass as an assistive aid to help people with Parkinson's retain their independence for longer.

Glass is a wearable computer being developed by Google. Likened to the

kind of technology fictionalised in the Hollywood Blockbuster Minority Report, at first glance Glass appears to be no more than a pair of designer glasses. But the system works like a hands-free smartphone, displaying information on the lens of the Glass. The technology is voice-operated and linked to the internet.

Not currently available outside the US, the five pairs of Glass at Newcastle University were donated by Google to allow researchers to test how they could be used to support people with long-term conditions.

Initial studies by the team - who are based in the University's Digital Interaction Group in Culture Lab, part of the School of Computing Science - have focussed on the acceptability of Glass. They have been working with a group of Parkinson's volunteers aged between 46-70 years.

Now they are working on the next stage of the project, using the technology to provide discreet prompts linked to key behaviours typical of Parkinson's, such as reminding the individual to speak up or to swallow to prevent drooling. Glass can also be used as a personal reminder for things such as medication and appointments.

The team will also be exploring how the motion sensors in Glass can be used to support people with 'freezing', a behaviour caused by motor blocking a common symptom of Parkinson's.

Led by Dr John Vines, PhD student Roisin McNaney and Dr Ivan Poliakov, this is the first UK trial of Glass. Presenting their initial findings later this month at the ACM Human Factors in Computing Systems (CHI) 2014 conference in Toronto, Canada, the team will show how emerging technologies can potentially be used to support people with progressive diseases such as Parkinson's and dementia.

"Glass opens up a new space for exploring the design and development of wearable systems," explains Dr Vines, who along with colleagues in Culture Lab is working on a number of projects investigating how technology can be used to support people in everyday life.

"It is very early days – Glass is such new technology we are still learning how it might be used but the beauty of this research project is we are designing the apps and systems for Glass in collaboration with the users so the resulting applications should exactly meet their needs.

"What was really encouraging from this early study was how well our volunteers took to the wearable technology and the fact that they could see the potential in it."

Parkinson's disease is a progressive neurological condition affecting up to 10 million people worldwide, with onset generally in those over 50.

The condition manifests itself in motor symptoms including rigidity, tremor and 'bradykinesia' or slowness of movement.

These affect balance, gait, arm and facial movements. Motor blocks commonly affect people's legs during walking causing them to 'freeze'; speech and voice are typically affected in terms of volume and clarity and the automatic swallowing mechanism is blocked so individuals often drool.

Aside from the physical signs, there are a myriad of emotional and social factors relating to loss of independence, social confidence, embarrassment and stigma.

Roisin, a speech and language therapist whose PhD has primarily focussed on the use of external cues as behavioural prompts, says one of the big challenges is finding technology that is not only useful to people

but is also discreet.

"People with Parkinson's are already coping with so much and one of the main causes of social isolation is the stigma around behaviours such as drooling and tremor which they have no control over," explains Roisin, who is using discreet prompts to remind people with Parkinson's to swallow to prevent drooling, a common side effect.

"The last thing we want is a system of cueing which is so obvious it adds to people's overall embarrassment. Wearable computing is still quite novel but as more people buy into the technology and start to wear it out and about for leisure then systems such as Glass offer us a real opportunity for the long-term treatment of progressive conditions."

Dr Vines adds: "Technology has the potential to play a central role in the development and improvement of people's lives. The challenge is understanding everyone's different needs and tailoring that technology so that it makes a real impact on society."

Claire Bale, Research Communications Manager at Parkinson's UK, said: "This new study looking into Google Glass is an exciting example of how new technologies could be used to improve the lives of people living with Parkinson's by tackling a wide variety of problems – from freezing to remembering to take their medication on time.

"But to really make the most of the potential of new technologies it's essential that researchers work in partnership with the real experts in the condition – people living with Parkinson's.

"Only people with the condition can tell us if these new approaches will genuinely improve their lives in meaningful and realistic ways."

Case studies:

Partners Lynn Tearse, 46, and Ken Booth, 56, from County Durham, were some of the first volunteers to try out Glass as part of the Newcastle University trial.

Ken, who was first diagnosed with Parkinson's in 1991, underwent Deep Brain Stimulation last year in a bid to relieve some of the side effects of the condition.

"The drugs just weren't working for me anymore," explains the former salesman.

"I'd been offered the operation five years ago but I was too scared and at the time I was managing with the medication. But by last year the tremor had got so bad I couldn't carry on.

"The difference is incredible. It hasn't stopped the episodes completely and I still have to take the medication but it's helping to control the symptoms so I can live my life."

Trialling Glass for a week, Ken says both he and Lynn are complete converts.

"They're just fantastic. The potential for someone with Parkinson's is endless. For me the biggest benefit was confidence. When you freeze your legs stop working but your body carries on moving forward and it's easy to fall.

"Because Glass is connected to the internet you can link it to computers and mobile phones. So if you're alone you just have to look through the Glass and carers, friends or relatives will be able to see exactly where you are and come and get you. Or you just tell it to call someone and it rings them."

Lynn, a retired teacher who was diagnosed with Parkinson's in 2008, adds: "People would probably say you can do all these things on a smartphone but actually, with Parkinson's, negotiating a touch screen is really difficult.

"It's not just the tremor. During a 'down time' when the medication is starting to wear off and you're waiting for the next lot to kick in it can be like trying to do everything wearing a pair of boxing gloves. Your movements are very slow and your body won't do what you want it to."

Lynn says Glass could also be hugely helpful to unlock the brain when it 'freezes'.

"No-one really understands why it happens," explains Lynn, "but it happens when the flat surface in front of you breaks up or the space in front of you narrows such as a doorway. Revolving doors are particularly bad.

"Your legs gradually freeze up and the difficulty is getting started again. The brain seems to need a point beyond the blockage to fix on and people use different things – Ken will kick the end of his walking stick out in front of him but many people use laser pens to create a virtual line beyond the barrier. This is where Glass could really make a difference."

Using it as a medication reminder is another of the applications the Newcastle University team is looking at.

"The drugs don't cure Parkinson's, they control it so it's really important to take the medication on time," explains Ken.

"I was taking two or three different drugs every two hours, different combinations at different times of the day; some with water, some with food, the instructions are endless. Having a reminder that is literally in

your face wherever you are and whatever you are doing would really help."

Lynn adds: "Parkinson's can be very isolating. Ken and I work together – we went away last month and I learnt to ski – but the Parkinson's symptoms and the drug side effects can be frightening and often embarrassing and not always well understood.

"Any technology which promotes confidence and helps people take better control of their condition and their life should be welcomed."

More information: "Exploring the acceptability of Google Glass as an everyday assistive device for people with Parkinson's" Roisin McNaney, John Vines, Daniel Roggen, Madeline Balaam, Pengfei Zhang, Ivan Poliakov and Patrick Olivier. CHI 2014. April 26-May 01.

chi2014.acm.org/

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