Cancer Research UK's first early diagnosis sandpit workshop

Harnessing technology to detect cancer earlier

Research Challenge

Cancer Research UK's vision is that three in four people will survive cancer by 2034[1]. Detecting cancer earlier, when it is more likely that optimal and curative treatment can be offered, will play a major part in helping us achieve this.

Diagnosing cancer earlier needs a multi-faceted approach - the discovery of early detection biomarkers, developing and implementing new screening techniques, understanding how cancer progresses through stages with and without symptoms, investigating and influencing human beliefs and behaviour, and optimising clinical practice and systems.

This workshop aims to bring together a broad and multi disciplinary group of innovative thinkers with the aim of catalysing new approaches to detecting cancer earlier using technology.

Advances in technology are allowing people to interact with the world in a different way; collection of personal data is omnipresent through our use of the internet and monitoring devices. Smart use of technology from other disciplines has demonstrated tremendous potential in healthcare, whether from a prevention, diagnosis or monitoring perspective – all of which could be utilised to help diagnose cancer earlier.

Social media analysis has already been used to predict the onset of disease, for example, current research is looking into whether use of social media can be used to characterise the onset of depression[2]. Could there be patterns in the way people use social media and other online features such as search engines that could indicate experience of symptoms that could be cancer?

In 2013, seven out of ten people in the UK owned a smartphone and smartphone apps are being developed for a wide range of diagnostic situations[3]. Smartphone technology is being used by the University of Cambridge, who have developed the "Colorimetrix" app, which uses the phone's camera to measure colour based tests (e.g. urine tests). The data can then be stored and sent to a healthcare professional for diagnosis[4]. What are other ideas using technology that could target groups who are less in touch with their health?

Vast amounts of personal data are collected daily – such as supermarket loyalty cards, wearable technologies (e.g. Google's "Study kit", Nike's "Fit Bit"[5]) and routinely collected healthcare data sets. There is also growing interest in companies providing people with their genetic information. Google is currently developing the "cancer sensing pill" that aims to detect cancer earlier by releasing

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1 http://www.cancerresearchuk.org/funding-for-researchers/how-we-deliver-research/our-research-strategy

2 http://research.microsoft.com/apps/pubs/default.aspx?id=192721

3 http://mobilemarketingmagazine.com/7-10-people-uk-now-own-smartphone/

4 http://www.colorimetrix.com/

5 http://www.fitbit.com/uk

nanoparticles that bind to cancer cells and then send messages to a wrist-worn sensor[6]. How might data like this be safely used to better understand how cancer develops over time, providing a reliable signal to the public or healthcare professionals that there is a problem?

This workshop is specifically interested in facilitating fresh new thinking to identify areas where technology could be used to change people's behaviours and detect cancer earlier. The aim is to bring together a diverse range of expertise to generate innovative ideas for how available technology can be used or re-designed to:

1) detect the presence of cancer at an earlier stage

 or

2) to influence the behaviour of the public, helping them recognise symptoms and/or engage with the health system.

Research conducted in response to this call will be relevant to a range of contemporary issues surrounding technology and early diagnosis, including (but not limited to):

- The use of social media and networking to influence beliefs about cancer

- Opportunities for technology to impact on individual decision making and behaviour (e.g. in relation to taking part in screening programmes or visiting the doctor/other health professional)

- How technology can be used to extend the reach of information and influence to a wide range of social groups

- Learning from technological applications in other disease areas that could be applied to early diagnosis of cancer

- Supporting healthcare professionals to use collected data to diagnose cancer earlier

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6 http://www.bbc.co.uk/news/technology-29802581