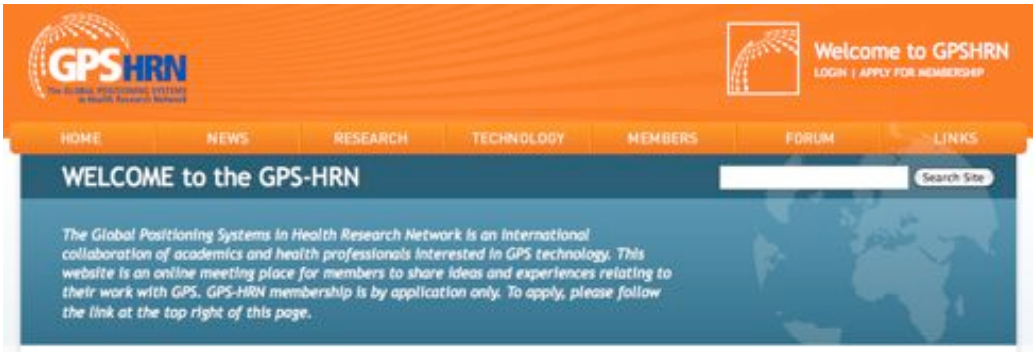
GPSHRN
The GLOBAL POSITIONING SYSTEMS in Health Research Network

NEWS UPDATE

December 2009



GPS-HRN Website Launch

www.gps-hrn.org

Most of you will be aware that the GPS-HRN website was launched in November. This resource was developed to provide an online space for members to post new research and technology articles, and to share ideas and experience via the forum.

The network coordinators are slowly building the content in their spare time, but it would be great to see more content posted by other members. Please feel free to contribute anything that may be of interest to the GPS community. We are hoping that this site will eventually became the first stop for all GPS information relating to health research. If you would like to take a greater role in the network please contact us at info@gps-hrn.org.

There have also been several forum posts, but our replies are few and far between!

Please put aside some time to have a look through and let's get the forum moving. You can also choose to be a 'forum expert' (select on the edit profile page) to receive occasional e-mails reminding you to visit the new forum posts.

We would also welcome any feedback you have (positive or negative!) about the site or the network in general. Please e-mail any comments to info@gps-hrn.org.

Finally, we would encourage you to complete your member profiles. While we appreciate uploading a profile photo can be a hassle, it really does help to identify other GPS-HRN members in conferences and meetings.

At some point we will look for sponsorship to maintain the site, so if you have any ideas or contacts please get in touch with us.

Recent GPS Publications

ORIGINAL ARTICLE

Ingunn Fjørtoft, Bjørn Kristoffersen & Jostein Sageie

Children in schoolyards: Tracking movement patterns and physical activity using global position system and heart rate monitoring

Landscape and Urban Planning, 2009, 93:210-217.

REVIEW

Ralph Maddison & Cliona Ni Mhurchu

Global positioning system: A new opportunity in physical activity measurement

International Journal of Behavioral Nutrition and Physical Activity, 2009, 6(73), doi:10.1186/1479-5868-6-73.

Note from the editor

Hello everyone

I hope you have all had a happy and productive 2009. The GPS-HRN has continued to grow since its launch in June; we now have 98 registered members from 15 countries. Given our rapid increase in membership, we will be looking for one or two additional GPS-HRN network coordinators to help source information for the new website and the triannual newsletter. Please contact me at scott@gps-hrn.org if you would like more information.

This second issue of the GPS-HRN newsletter features an article by Paul Kelly and Charlie Foster from the University of Oxford. Their current research involves the development of wearable digital cameras to continuously monitor individuals' fields of view. This new technology holds much promise for researchers interested in the environmental correlates of health behaviour. Our regular technology update compares the features of three recently released ultraportable GPS devices. Finally, the member profile highlights the exciting work coming out of Dr Phil Troped's research group at Purdue University.

As always, if you come across any GPS-related news, updates, or recent publications, please don't hesitate to post them on the website, or you can e-mail them directly to me.

Have a fantastic Christmas and New Year!

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Using Photographs to Understand Health Behaviours

Paul Kelly
University of Oxford, UK

Dr Charlie Foster
University of Oxford, UK

Over the past few years the Sensors and Devices group at Microsoft Research Cambridge have developed a wearable digital camera that passively takes photographs every thirty seconds. Known as SenseCam, it is fitted with a wide angle lens and is able to capture almost everything in the user's field of view. By a taking two or three images every minute it creates a visual log or diary of an event without any intervention from the wearer. Originally conceived as a 'black box' incident recorder, psychologists at Addenbrooke's hospital in Cambridge soon learnt that it is a powerful aid for memory.

At the British Heart Foundation Health Promotion Research Group, based in the Department of Public Health at the University of Oxford, we have been looking at bringing the camera into public health research. We feel the device may be able to add to our ability to measure physical activity, sedentary behaviour and possibly nutritional habits.

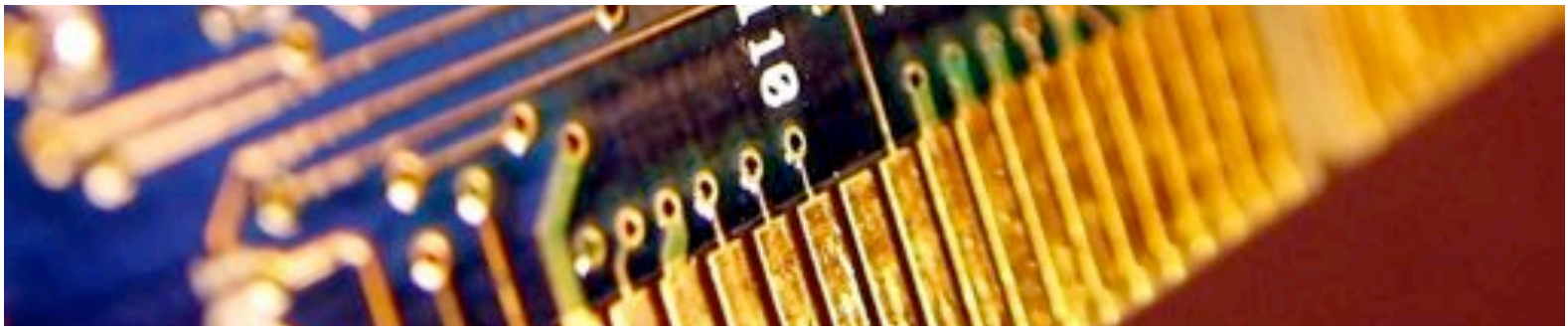
Each image is time stamped and this allows us to see the start and finish time of every behavioural bout to within 30 seconds accuracy, although this can be reduced to around 5 seconds. In addition, each image gives contextual information about the setting and environment of the activity. For example, we get an indication of the 'green-ness' or 'urbanicity' of walking environments (see photographs), information on the number of pedestrians encountered and an idea of traffic levels a cyclist may have experienced.

Our first step has been to pilot SenseCam with volunteers, with the dual aim of learning how to use the device in a public health setting and of developing a protocol for participant use. There are clearly challenges associated with user burden and we are learning how best to solve these. For example, there are settings such as schools and banks where participants have reported feeling uncomfortable wearing the device and others such as airports and swimming pools where photography is prohibited. As previous work has generally involved users wearing the camera for many days or weeks, we are learning to develop a framework for single use; getting it right first time.

We also feel that the ethics of collecting these images, of both wearers' activities and of those they encounter, is a critical issue. We are working in collaboration with Ethox, a multidisciplinary bioethics research centre also based at Oxford University, to tackle these complicated issues.

In this pilot we have also asked our participants to record their journeys in a travel diary. Early indications suggest patterned over-reporting of journey time when using self-report methods. This will be a key aspect of future work.

Microsoft has recently licensed the technology for manufacture as the 'Vicon Revue', so it will shortly be available to researchers to buy. The next generation of SenseCam is likely to include a simple GPS unit, and we are very excited about the possibility of being able to spatially reference each image. We feel that one of SenseCam's many future applications may be in aiding environmental audits, for example the quality of green space or urban walking environments. For more information please see the Microsoft Research Cambridge website http://research.microsoft.com/en-us/um/cambridge/projects/sensecam/ or contact charlie.foster@dphoc.ox.ac.uk.



Technology Update: Portable GPS Devices Get Even Smaller

Qstarz BT-Q1300S Sports Recorder

The BT-Q1300S Sports Recorder is an updated version of the 2008 BT-Q1300 Travel Recorder Nano that now includes the QSports software package, armband, and ability to change GPS sampling rate. It currently retails for US$100.

Key features:

- 62L x 38W x 7H (mm)
- MTK II chipset (sensitivity -165 dBm; 66 channels)
- Rechargeable (USB or AC) Li-Ion battery lasts 12 h in travel/sports mode
- Flash memory stores 200,000 waypoints (MB not provided)
- User-defined sampling rate (1 s to 5 s)
- Data retrieval via Bluetooth or USB 2.0
- Cold start 35 s, warm start 33 s (or 15 s with AGPS), hot start 1 s
- QZSS, DGPS (WAAS+EGNOS+MSAS) support
- Auto Log On-Off function for memory saving

GlobalSat TR-203

The TR-203 is the most recent addition to the Globalsat family of GPS trackers, which includes the TR-102 for personal use and the TR-151 for vehicles. The TR-203 enables users to remotely configure up to five units and display their location via the cellular network. It currently retails for US$200.

Key features:

- 79L x 42W x 18H (mm)
- MTK chipset (sensitivity -158 dBm; 32 channels)
- Rechargeable (USB or AC) Li-Ion battery lasts 12 h in GPS mode
- 32MB flash memory stores 150,000 waypoints
- User-defined sampling rate (1 s to 18 h)
- Data retrieval via USB 2.0
- Cold start 36 s, warm start 33 s, hot start 1 s
- Water resistant (IPX4) polycarbonate case
- Position tracking function combines GPS with GSM/GPRS to locate at preset time interval or one time report
- Geofence function sends report if unit enters or leaves predefined area
- Voice monitoring function enables remote listening through microphone

Telespial Trackstick Mini

The Trackstick Mini evolved from earlier Trackstick and Trackstick II models, combining a smaller size with an improved GPS receiver offering up to seven times more sensitivity. It currently retails for US$290.

Key features:

- 90L x 38W x 10H (mm)
- MTK chipset (sensitivity -158dBm; 32 channels)
- Rechargeable (USB) Li-Ion battery (battery life dependent on power mode; range not provided)
- 4MB flash memory stores 16,000 waypoints
- User-defined sampling rate (5 s to 15 min)
- Data retrieval via USB 2.0
- Cold start 52 s, warm start 37 s, hot start 9 s
- Vibration detector extends battery life
- Weather protective rubber boot and detachable magnetic mount
- Built-in temperature recorder

Research Profile

Dr. Philip Troped, a public health faculty member in the Department of Health and Kinesiology at Purdue University, and colleagues from several different institutions, have implemented simultaneous accelerometer and GPS monitoring in adults to better understand the effects of the built environment on physical activity behaviors. Their first study in this area was funded by The Robert Wood Johnson Foundation's Active Living Research Program. His colleagues include Dr. Jeff Wilson, a geographer from Indiana University-Purdue University Indianapolis, Dr. Charles Matthews, a physical activity epidemiologist from the National Institutes of Health, Dr. Ellen Cromley, a medical geographer from The Institute for Community Research, and Steve Melly, a GIS specialist from the Harvard School of Public Health. Technical assistance with GPS devices was provided by Drs. Jean Wolf and Marcelo Oliveira from GeoStats (Atlanta, GA).

Dr Troped enjoying the sun at Acadia National Park

In a paper to be published in the April 2010 edition of the American Journal of Preventive Medicine, Troped and colleagues found that several objective built environment variables (land use mix, street connectivity, density, greenness) were associated with moderate-vigorous physical activity occurring within 1 km home network buffers (what they call "location-based" physical activity). Alternatively, these built environment variables were not associated with total moderate-vigorous physical activity (accumulated in all locations). Results of this research emphasize the need to more closely investigate the spatial context of physical activity behavior. Dr. Troped and his colleagues believe that monitoring approaches utilizing both GPS devices and accelerometers have great potential to advance the built environment evidence base by more precisely linking environmental exposures to physical activity.

Upcoming analyses of merged GPS-accelerometer data will examine correlates of physical activity occurring within the context of trails and trips to trails. In addition, two of Troped's doctoral students, Heather Whitcomb and Libby Richards, are planning to employ similar assessment techniques to identify environmental influences on transportation-related physical activity and physical activity associated with dog walking.

IPEN was launched by Professor Jim Sallis (USA), Dr Ilse DeBourdeaudhuij (Belgium) and Professor Neville Owen (Australia) at the International Congress of Behavioral Medicine in Mainz Germany in August 2004.

Physical activity habits are determined by multiple levels of influence – personal, family, social, environmental, economic and other factors. Ecological models of health behaviour have been used to synthesize research at these different levels, and to focus attention on relationships of particular physical activities with specific attributes of physical environments, including the built environment.

While physical activity environments will vary within countries, the greatest and most informative sources of variation in the relationships of environmental attributes with physical activity are likely to be between countries. The IPEN initiative seeks to stimulate, inform, and support systematic and rigorous studies of physical activity and the environment, in as many countries as possible.

Please contact Jacqueline Kerr (jkerr@ucsd.edu) or Nicole Bracy (nbracy@projects.sdsu.edu) if you would like more information.

www.ipenproject.org

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