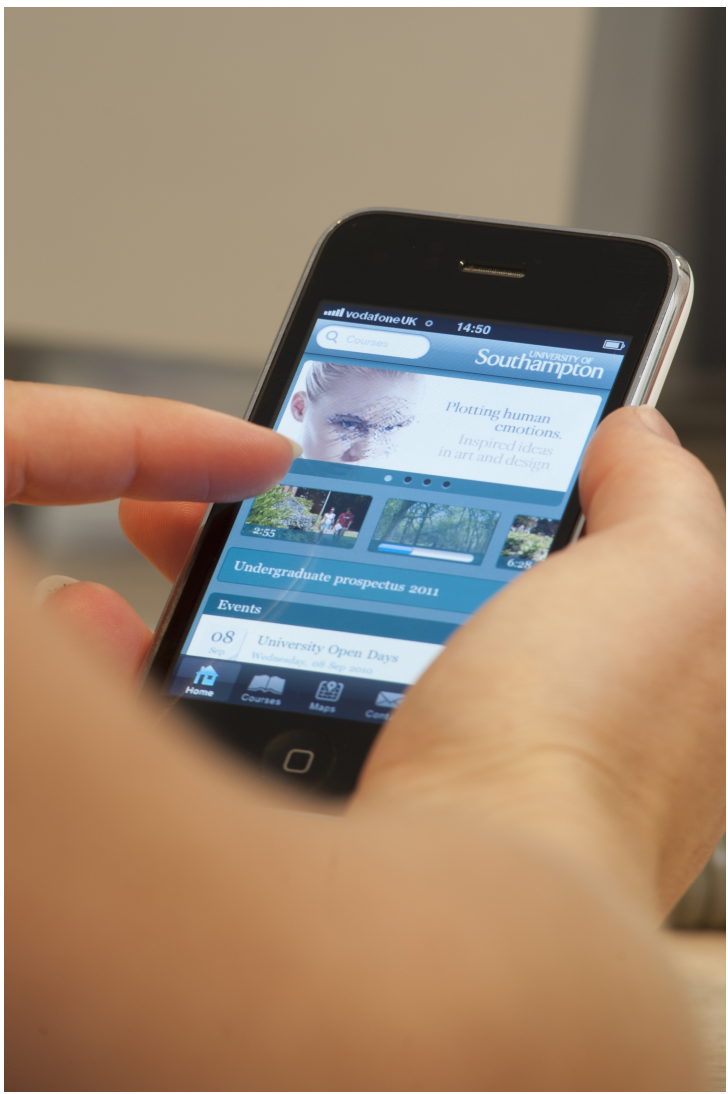


Can Pervasive Computing Make You Happy?

Pervasive Computing



Higher-education students' behaviour will be inferred from smartphones

Pervasive Computing differs from traditional computing because of the *implicit interactions*, i.e. users do not need to be aware of interacting with computers. Instead of being the focus, the computers recede into the background, where they can support users in their everyday life, as in Weiser's 1991 vision. Pervasive computing is booming because of:

- ▶ inexpensive processing power,
- ▶ widespread use of sensors, and
- ▶ greater connectivity,

resulting in affordable sensor-rich mobile devices like smartphones.

With pervasive computing, tailored services can be offered to users based on their *context*. In education however, much of the existing interest in pervasive computing has focused on the delivery of learning resources and virtual learning environments rather than on discovering *what successful students do*.

Happiness and Success in Higher Education

The measure of academic success is not only high grades. Even if it were, any intervention after academic grades were available could have only a limited impact. Continuous monitoring of the general well-being of students is essential for a timely intervention. I want to model successful student behaviour by measuring 'happiness', because it is both a contributing factor and a proxy for success.



Success: not only makes us happy, but a positive outlook attracts success.

My hypothesis is that an intervention in students' behaviour to increase their happiness will impact positively on their academic success. I aim to

- ▶ identify what successful students do (using pervasive computing), and then
- ▶ use this knowledge to prompt ("nudge") them into positive behaviours.

The greater affordability of smartphones and Internet access not only means that all students *can* access learning materials anytime and anywhere but, more than ever before, we can discover more about student habits and context.

Existing research tend to focus on the technology, and do not address the use of contextual information in order to predict or even understand student behaviour. To address this shortcoming, I will use context-aware computing methods and techniques that have been applied successfully in the areas of healthcare, assisted living and social networking, and apply them to higher education. For example:

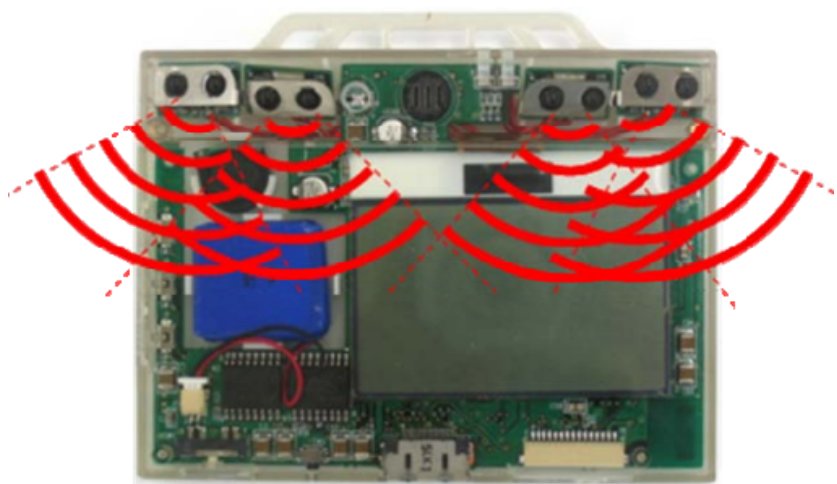
- ▶ using context acquisition in general, and
- ▶ on the discrimination of human activity in particular.

Sensing human behaviour

Information about human behaviour can be gathered via sensors, as with the Hitachi's Business Microscope (HBM). The HBM is a smart badge that has been used in research mainly within organisations. Given the wide availability of smartphones, we are interested in measuring certain behaviour characteristic variables from smartphone data, as well as using traditional questionnaires in order to study the correlation between the measured behaviour characteristic variables and personality traits. The focus is on higher education students, and the data hence collected could be used to discriminate behaviour with a similar approach to that used in activity recognition.

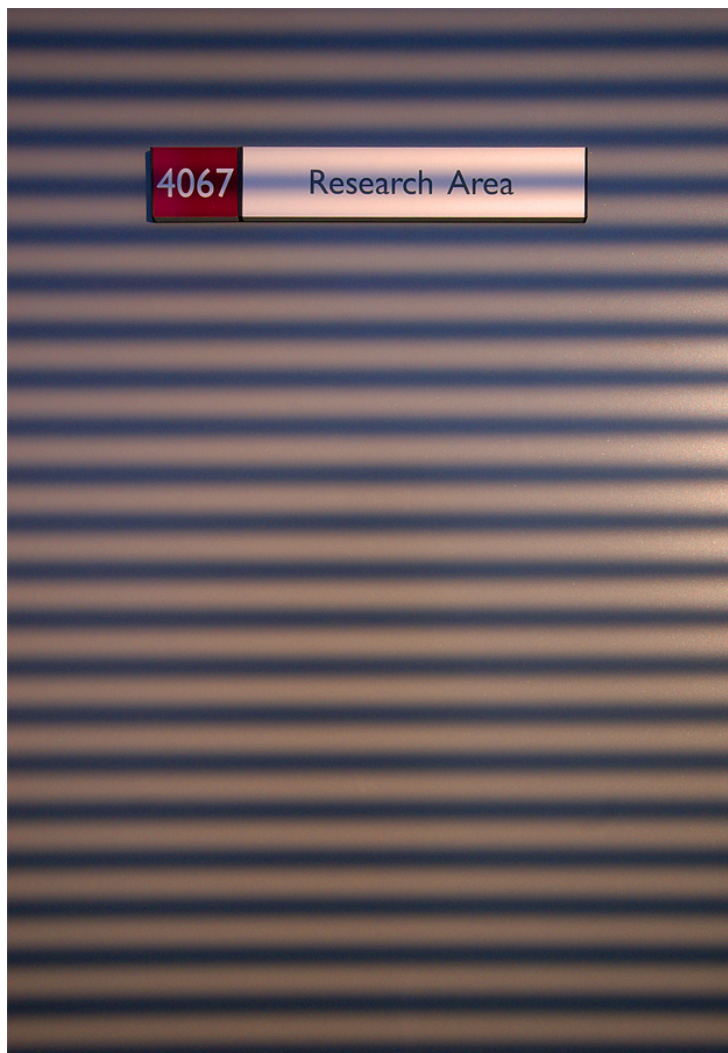


The Hitachi Business Microscope (HBM)



The HBM has a number of sensors

Current hurdles



Closed doors (for now!)

Collecting the data required for this study is still a major problem. In the literature there are robust, large datasets from which human behaviour can be inferred but these are not easily accessible due to privacy and legal concerns. I am seeking collaborations with organisations which have built datasets that could be used for this research.

We have identified a new area of research not yet well explored which is combining contextual information (to be gathered via smartphones)

with educational analytics in order to understand students' behaviour and then to use this analysis to prompt students into positive behaviours to increase their chances of academic success.

We then formulated two specific research questions:

- ▶ **how to infer the behaviour of successful students** and
- ▶ **how can pervasive computing improve students' success.**

and intend to raise behavioural self-awareness via a personalised smartphone app, and to provide information about what successful students in their community do.

'Take aways'

- ▶ Today's students have had unprecedented access to digital technology: they might welcome its use to better achieve to improve their achievement of their goals.
 - ▶ Human behaviour is highly predictable given what we know of our history and that of our peers.
 - ▶ "Nudges" can be an effective guide and enabler for behaviour change.
- This research has a potentially wide impact (beyond higher education), as findings will improve our understanding of human behaviour in general and the links to well-being, happiness and success.

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