

# LIFELOGGING

## A NEW BIG DATA CHALLENGE

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03rd October 2014

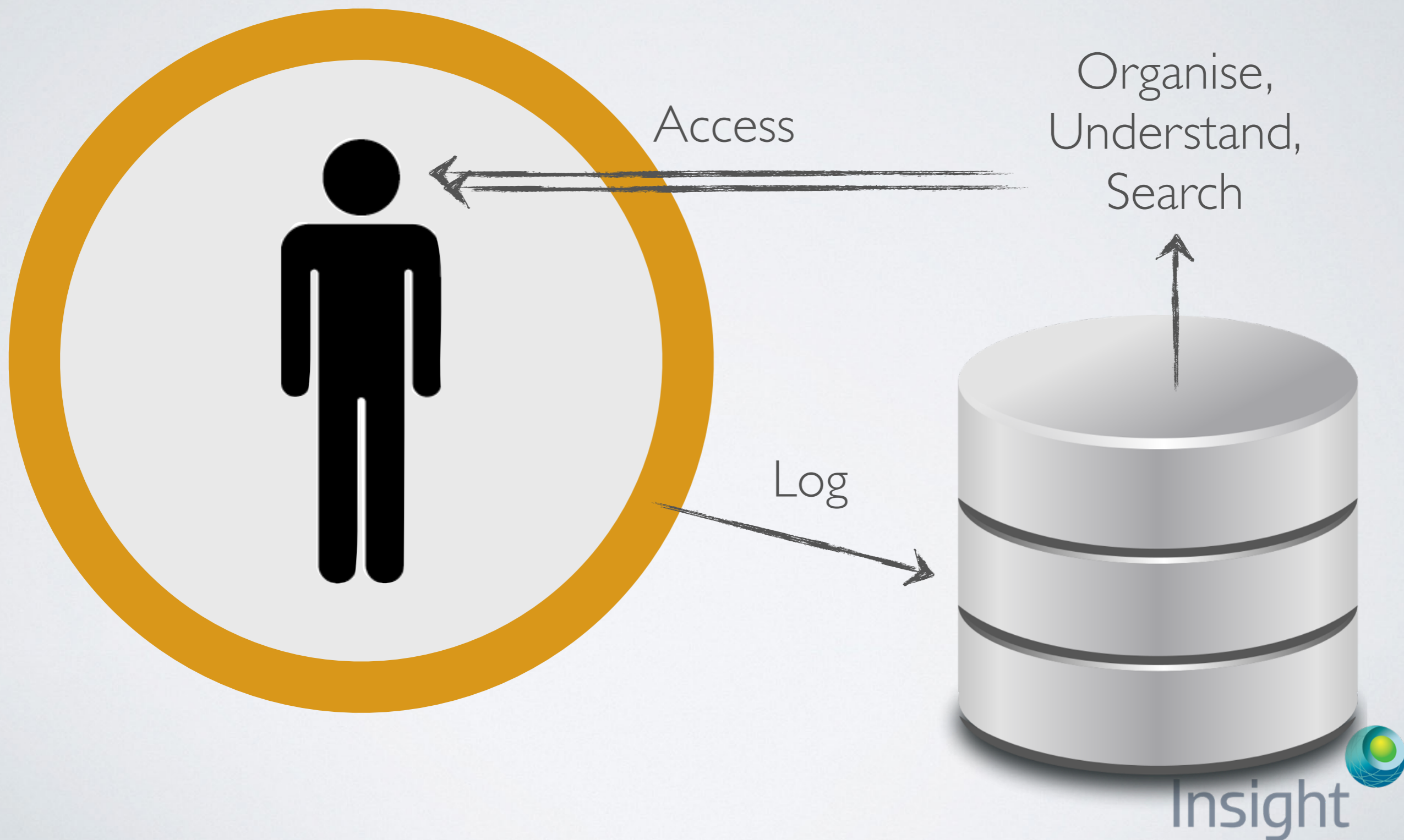
# BIG DATA

Data so large and complex that it becomes difficult to process using traditional data processing applications.

My research group looks at personal (little)-big data.

Active in the area since 2006.

# DID THE PERSON



## Extreme Lifelogging

A Personal Awareness Engine (a second memory) that knows everything about you. It is there to help you, but never to replace an organic memory.

Using body-worn and external sensors.

# A ONE YEAR LIFELOG

Assumption: All data is potentially useful.

- 2 million wearable camera images
- Video / audio (hundreds/thousands of hours)
- 3.9 million location points
- Hundreds of millions of sensor readings (accl, WIFI, bluetooth, etc...) to understand the person better
- Information access, creation and communication to model semantic memory

? Semantics ?

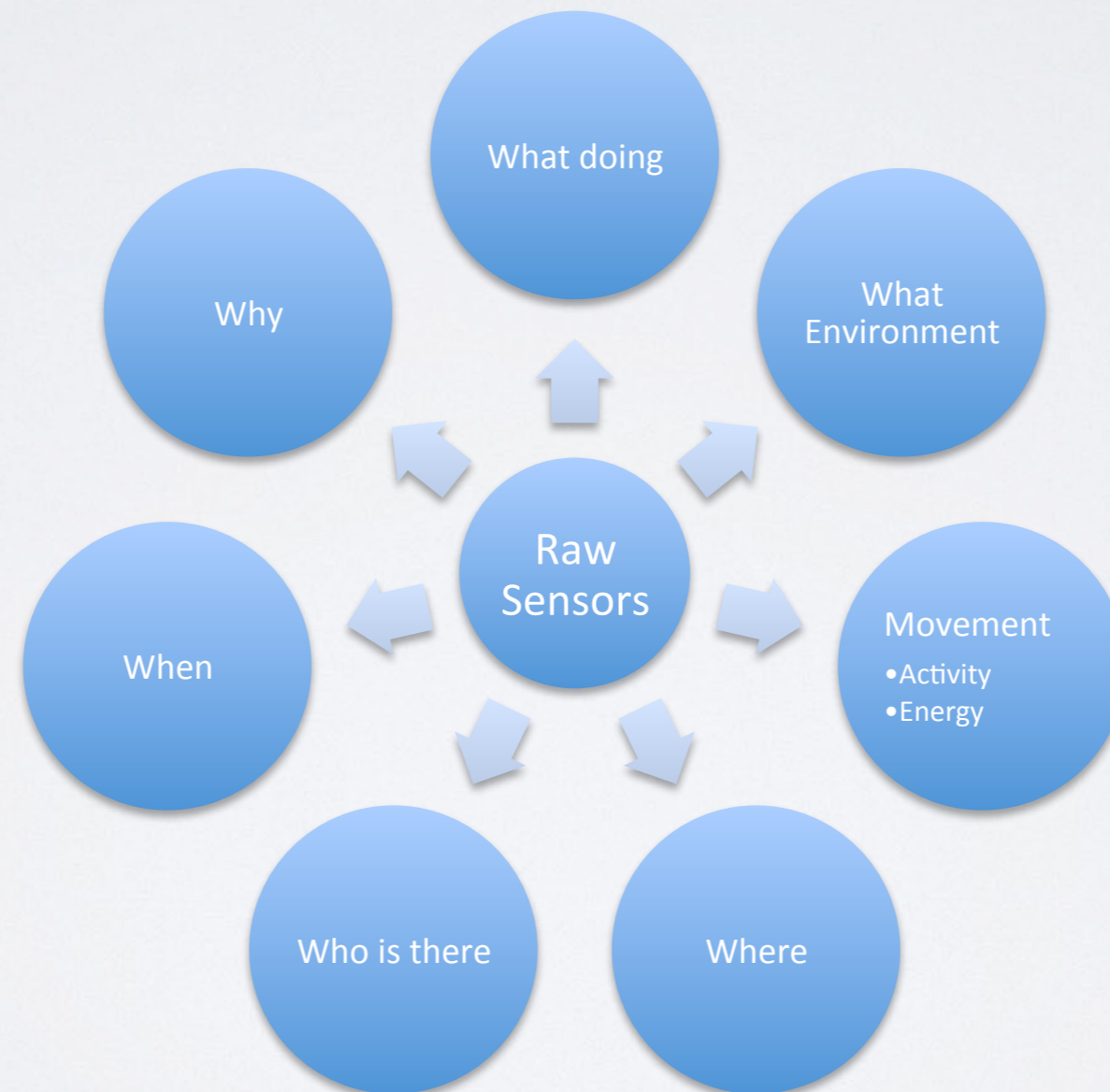


Integrating many new  
sensor and feedback  
sources



The challenge is to extract meaning from the sensor data.

## Data Analytics & BigData Analytics



# AND DEVELOP PROTOTYPES FOR REAL-WORLD EVALUATION

With partner collaborators (e.g. healthcare partners, market research partners, hardware manufacturers) and based on our own understanding.



# UNDERSTAND THE CONTEXT



**desk**

**monitor**

**desktop\_computer**

**screen, CRT\_screen**

**laptop, laptop\_computer**

**notebook, notebook\_computer**

**mouse, computer\_mouse**

**file, file\_cabinet, filing\_cabinet**

**studio\_couch, day\_bed**

**radio, wireless**

Info: 20131121\_170143\_047.jpg

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# VISUAL EVENT-MEMORY

## DAILY VISUAL DIARY

My Visual Diary WITH SENSECAM

Men: 76,430 photos (25 days)

MY ACCOUNT | SIGN OUT | ABOUT

CALENDAR

29 May 2006

19 EVENTS

Drag the slider bar to adjust the number of Important Events

Similar Events

92 Similar Events have been found. Click on the photo to replay all photos within the Event

1 | 2 | 3 | 4 | 5 | 6 |

Sort by: TIME | SIMILARITY | #PEOPLE

16:25 (Duration: 08m-43s)  
14 APR 2006 >

13:45 (Duration: 14m-05s)  
14 APR 2006 >

10:02 (Duration: 23m-56s)  
13 APR 2006 >

14:33 (Duration: 15m-30s)  
12 APR 2006 >

11:25 (Duration: 09m-21s)  
12 APR 2006 >

06:52 (Duration: 01m-03s)  
12 APR 2006 >

15:13 (Duration: 21m-10s)

Selected day is shown below in the context of whole week. Move mouse cursor over to see other similar Events in the week

WEEKLY SUMMARY

ADD TO FAVORITE | FIND SIMILAR

# QUANTIFIED SELF ANALYSIS

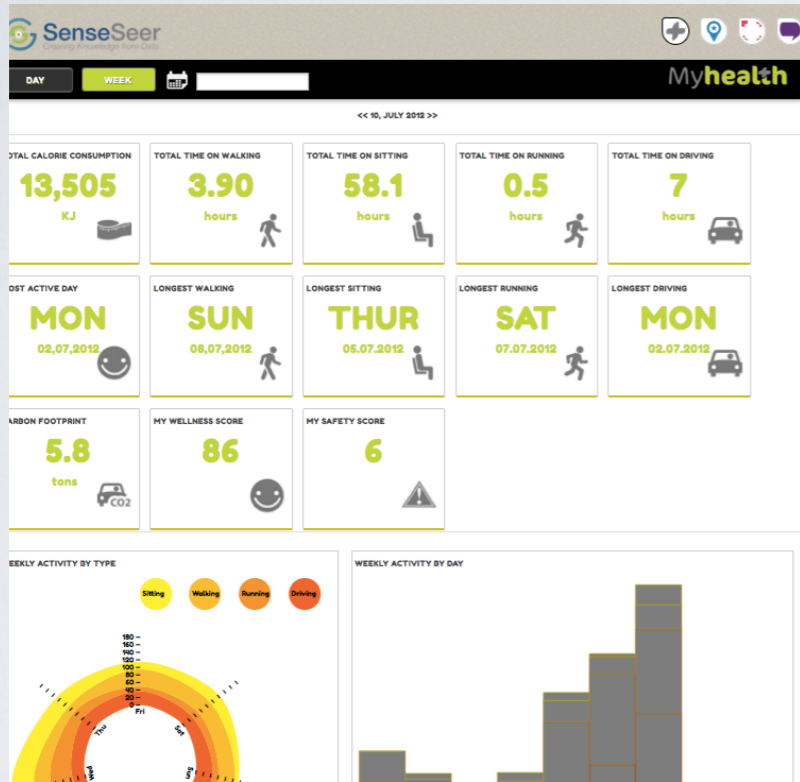
COLOUR OF LIFE



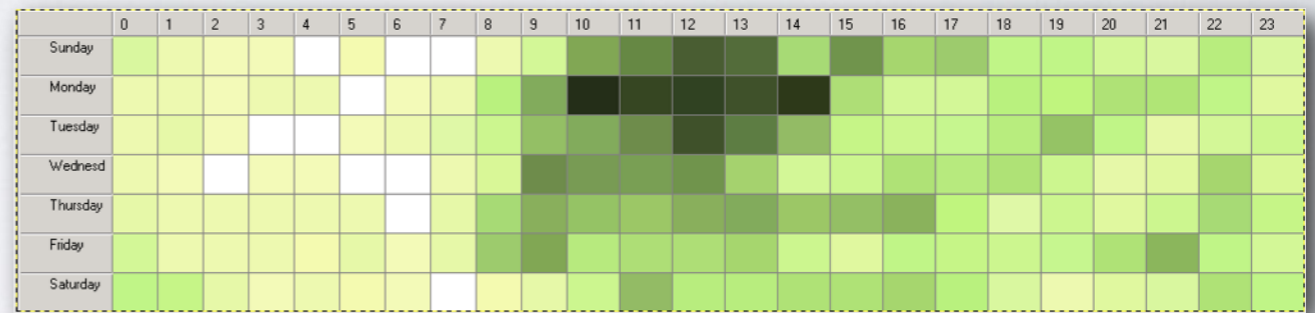
Enhanced Understanding of Self

# QUANTIFIED SELF ANALYSIS

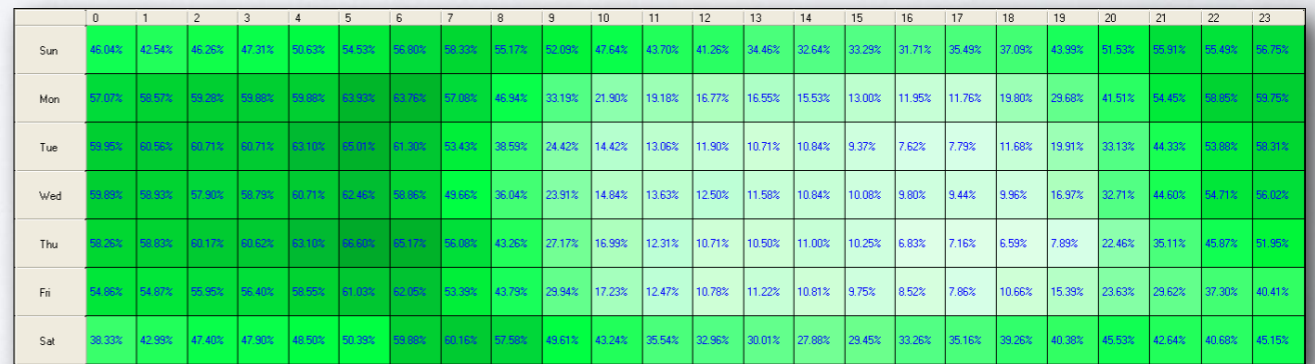
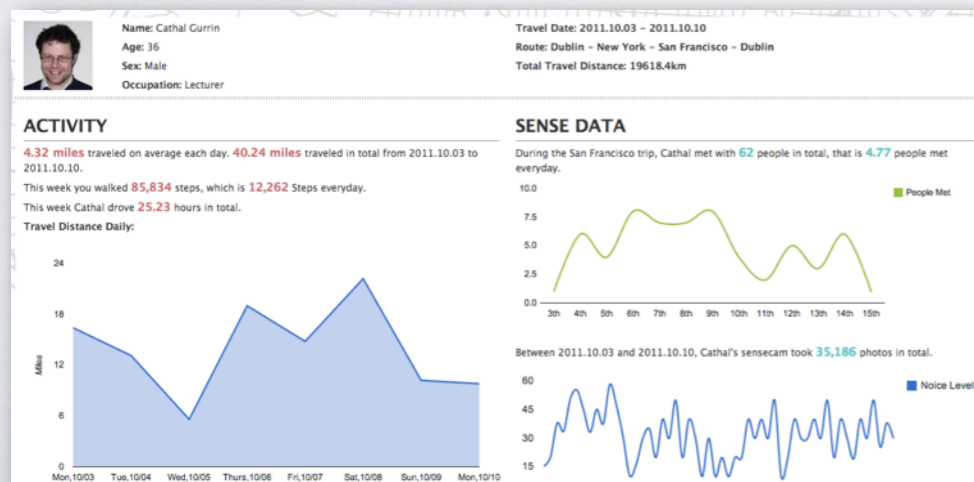
## HEALTH, SOCIAL, SECURITY



Lifestyle Infographics



Activity Understanding



# ENHANCING PRODUCTIVITY

## I HAVE READ IT BEFORE... SOMEWHERE

### Information Recall

ScreenNinja window showing recording settings: JPEG Sequence, Medium quality, and a recorded duration of 94 hours 50 minutes 51 seconds.

A screenshot of a desktop environment showing several windows. The primary window is a PDF document titled 'sig-alternate.pdf' with the following content:

### Personal Life Archives

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#### ABSTRACT

Automatically and automatically maintaining a life archive is a future activity for most people that can help to improve their lifestyle, learning and working. This is recognised by many. We have the greatest experience in this and we will outline our vision for a real-time lifelogging platform, chart our work to date and describe the multidisciplinary research that is needed to achieve the vision. TO BE DONE.

#### Categories and Subject Descriptors

H.4 (Information Systems Applications): Miscellaneous; D.2.8 (Software Engineering): Metrics—complexity measures, performance measures

#### General Terms

Theory

#### Keywords

Lifelogging

### 1. INTRODUCTION

There has been an explosion in the amount of consumer-sensed and -generated data now being created, stored and shared. Yet the ability to organize and provide useful retrieval facilities about this sensed data is currently limited. While there are many domain-specific solutions for uses such as sensing the level of exercise or sharing a user's location, there are still few attempts to fully grasp the potential of this data. The early lifeloggers such as Steve Mann [7] made inroads into capturing lifelog content, the first real attempt to use the lifelog is the seminal MyLifeBits project at Microsoft, which was concerned with gathering and making searchable, a long-term personal life sensed archive for one individual [7]. Such Personal Life Archives require the use of sensors to continually sample life experience, whether through photos of what we see, videos of what we experience, audio recording of what we hear, or the sensor capture

### 2. KEY RESEARCH AREAS

Personal Life Sensing requires a multidisciplinary approach to develop useful solutions. From capture of life experience to presentation and summarisation for multimodal access, this is not simply a computer science problem. For capture of life experience the sensors that are utilized need to sample life activities in as much detail as possible, yet be unobtrusive enough to wear every day. Such sensors can be wearable, environmental, or informational (sensing our knowledge activities) and developing useful solutions would require the input of personal and environmental sensing and diagnostic experts. Making sense of such streams of raw data requires continual segmentation into digital representation of life experience and semantic understanding of life experiences, which require extensive use of machine learning and multimedia content analysis. To achieve this in a useful manner involves the input of the likes of cognitive psychologists and healthcare professionals, with whom we have worked for a number of years in the development of our own prototype systems. Once archives of life experience are gathered, it becomes necessary to support personal archiving, real-time search and recommendation which once again brings together expertise from search, recommendation, scalable

...ing personal life archives, and of and have been testing it with over ten users for physical and virtual sensors, offering effectively capturing photos every minute, software is. There are a number of key elements that we state and semantic experience annotation

...tion from on-board physical sensors: directly on the phone) allows for the power-some video/photos and sensor data. Used

...ing 30 minutes on average is to generate a segmentation of life-experience ing occurs on both the smartphone and the

...t real-time analysis, both server-side and nifull annotations. For example, using raw ts from images and event ontologies we can semantic visual concepts automatically

...ever this is expensive. MORE HERE.

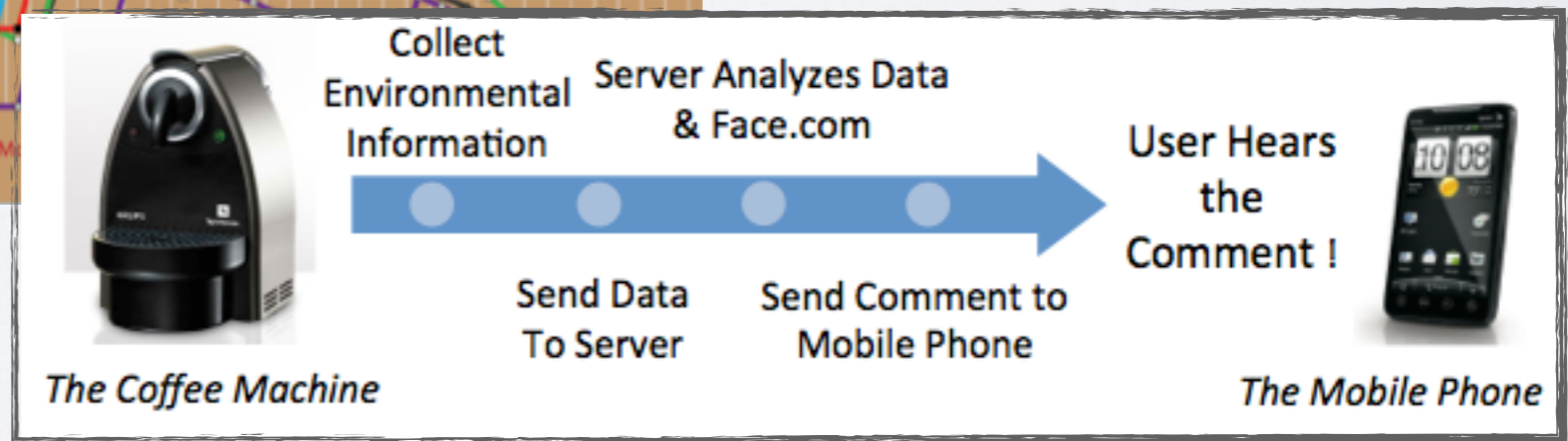
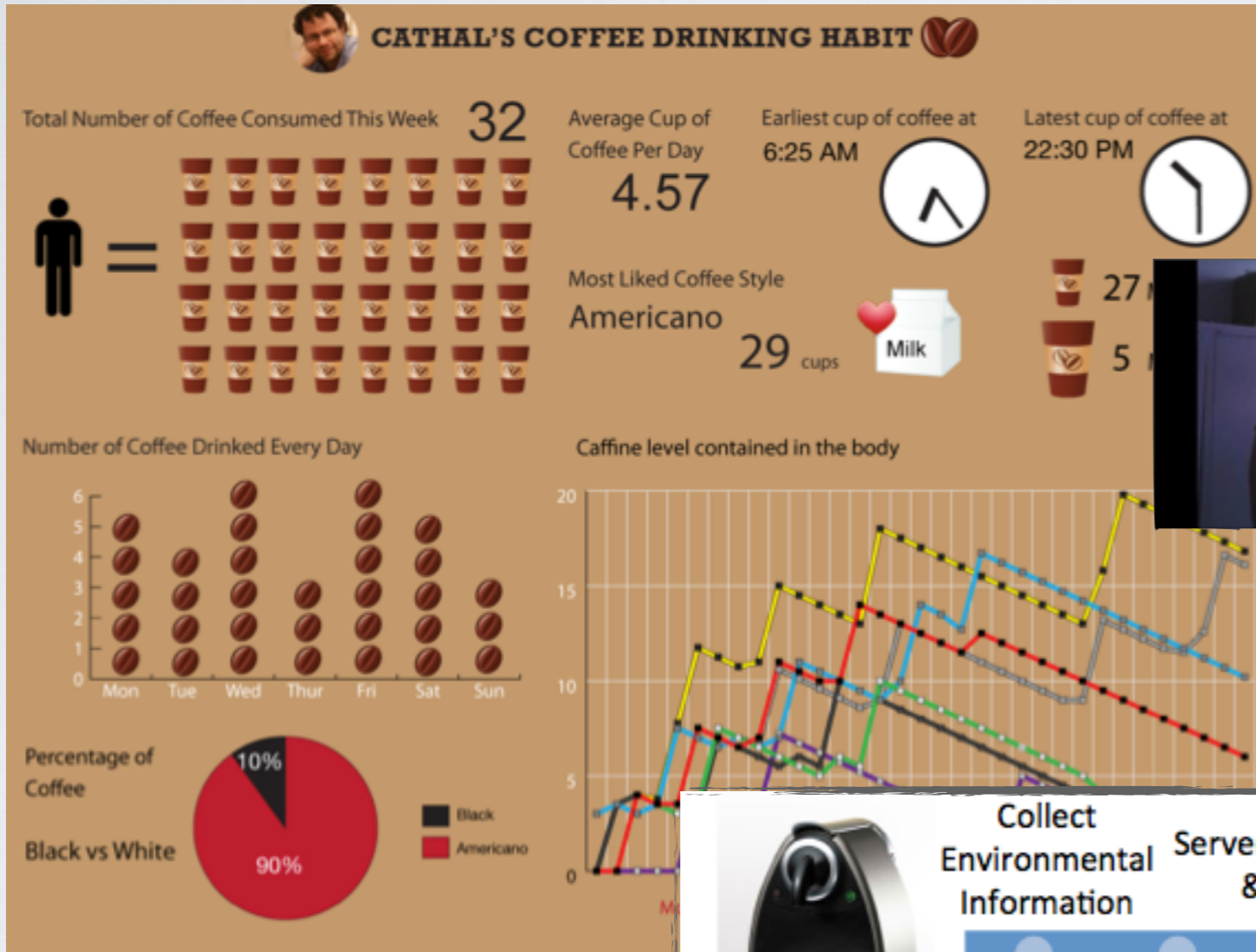
[1] LRF-8 [Line 131 of 188 col 12]

100% [page 2 of 2]

The desktop also shows a 'Save File' dialog box, a 'timr' browser window, and a file manager window displaying a list of files with columns for Name, Date Modified, and Size.

# OBJECT ENHANCEMENT

## DEVICE PERSONALITIES & ROBOTICS



# MEMORY SEARCH

Finding Items from the past...

01/01/2010 - 31/12/2011  
All locations  
Total No Photos: 243M  
Total No Events: 14.3M

LOCATION: All locations  
TIME/DATE: From 01/01/2010 To 31/12/2012  
DEMOGRAPHY: Male, Female, AGE, PROFESSION

ADD CONCEPT

01/01/2010 - 31/12/2011  
All locations  
Total No Photos: 243M  
Total No Events: 14.3M

ALL | DAILY | WEEKLY | MONTHLY | YEARLY  
3am 6am 9am 12pm 3pm 6pm 9pm 12am 3am

1,426 Spongers  
DIGITAL DISPLAY: 12,532 Events  
OUTDOOR DISPLAY MEDIA: 23,567 Events (423h 24m), 423,241 Photos, 5,323 Spongers

CONCEPT COMPONENTS: M (7,532 Events), F (5,750 Events), Age (12,532 Events), All Occupation (12,532 Events)

OUTDOOR DISPLAY MEDIA: 10,641 Events  
HAND-HELD PRINT MEDIA: 9,837 Events  
MULTI-PERSON ENTERTAINMENT: 11,083 Events  
RESIDENTIAL/WORK LOCATION: 10,861 Events  
RETAIL: 1,532 Events  
NIGHTLIFE/SOCIALISING: 2,236 Events  
TRANSPORTATION: 7,250 Events

01/01/2010 - 31/12/2011  
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DOTS | GRIDS | BALOONS | MILESTONES

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Object Matching & Result Visualisation from wearable video (with GPS)



# WHILE BEING PRIVACY-AWARE

The screenshot shows a web browser window with the address bar displaying `136.206.19.179:8080/GlassServer/gallery.jsp`. The page title is "GLASS" and features a trash can icon with the number "0". Navigation links include "Gallery", "Upload Files", and "Log Out".

The main content area is divided into two sections:

- User Profile (Cathal):** Includes a profile picture, name "Cathal" with an "Edit Profile" link, and statistics: "Photos: 26 / 8701" and "Friends: 10". Below this is a "Calendar" widget showing "November 2013" with the date "25/11/2013" selected. The calendar grid shows the 25th as the current date. A "Friends" list below the calendar includes names like Tengqi, Brian, Rami, Kevin, and Stefan, each with a "REMOVE" button.
- Gallery View (25-Nov-2013):** Shows a large photo of a person standing in a hallway. The photo has a timestamp of "12:04:24" and a blurred face. The photo is framed by a black border with navigation icons (back, forward, zoom, delete).



# THANK YOU FOR YOUR ATTENTION

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<http://www.computing.dcu.ie/~cgurrin/>

## Any Questions?

