A user-centred approach to digital health

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University of Melbourne

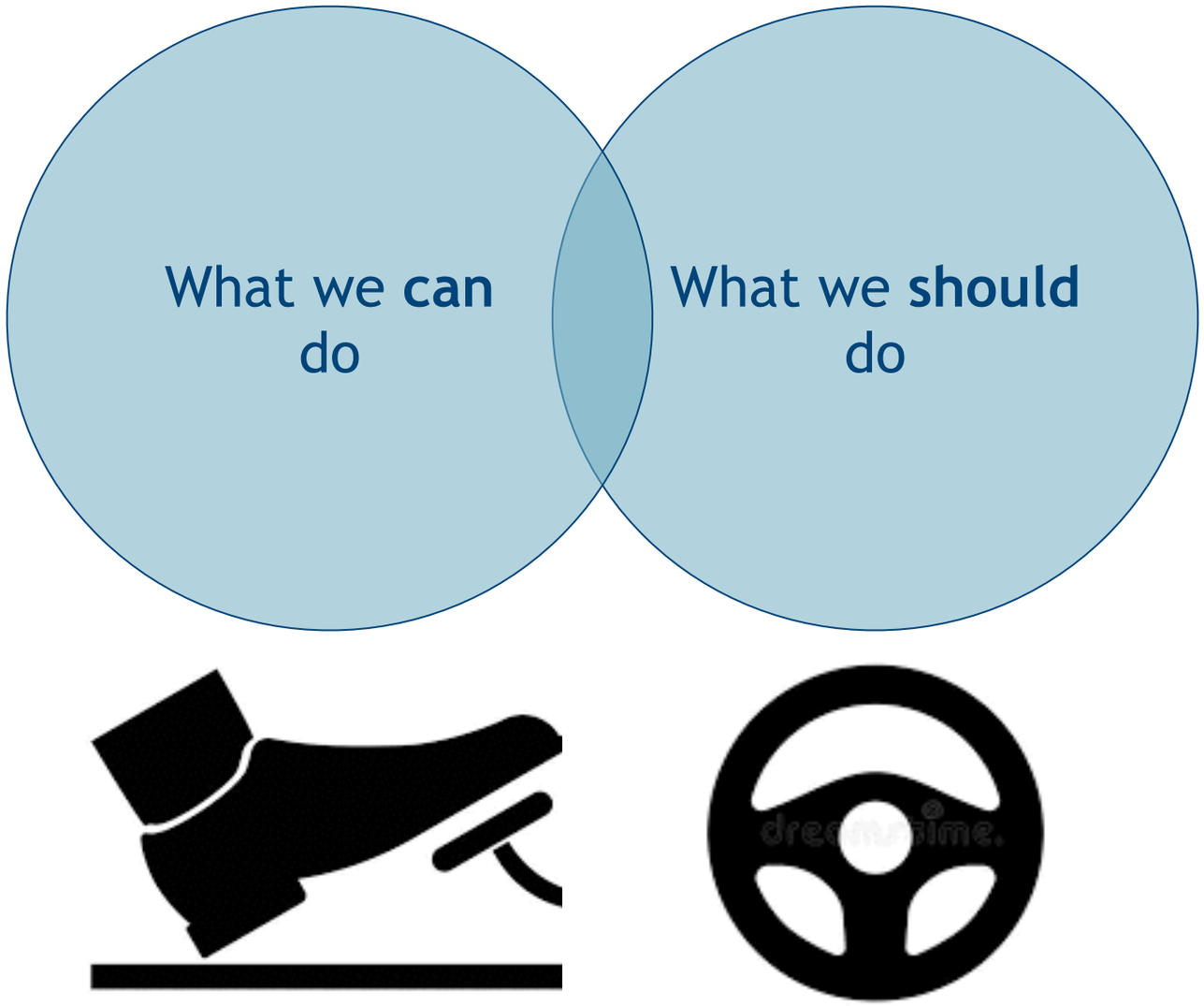
Presented 25 Oct 2024
RMIT, Melbourne, Australia

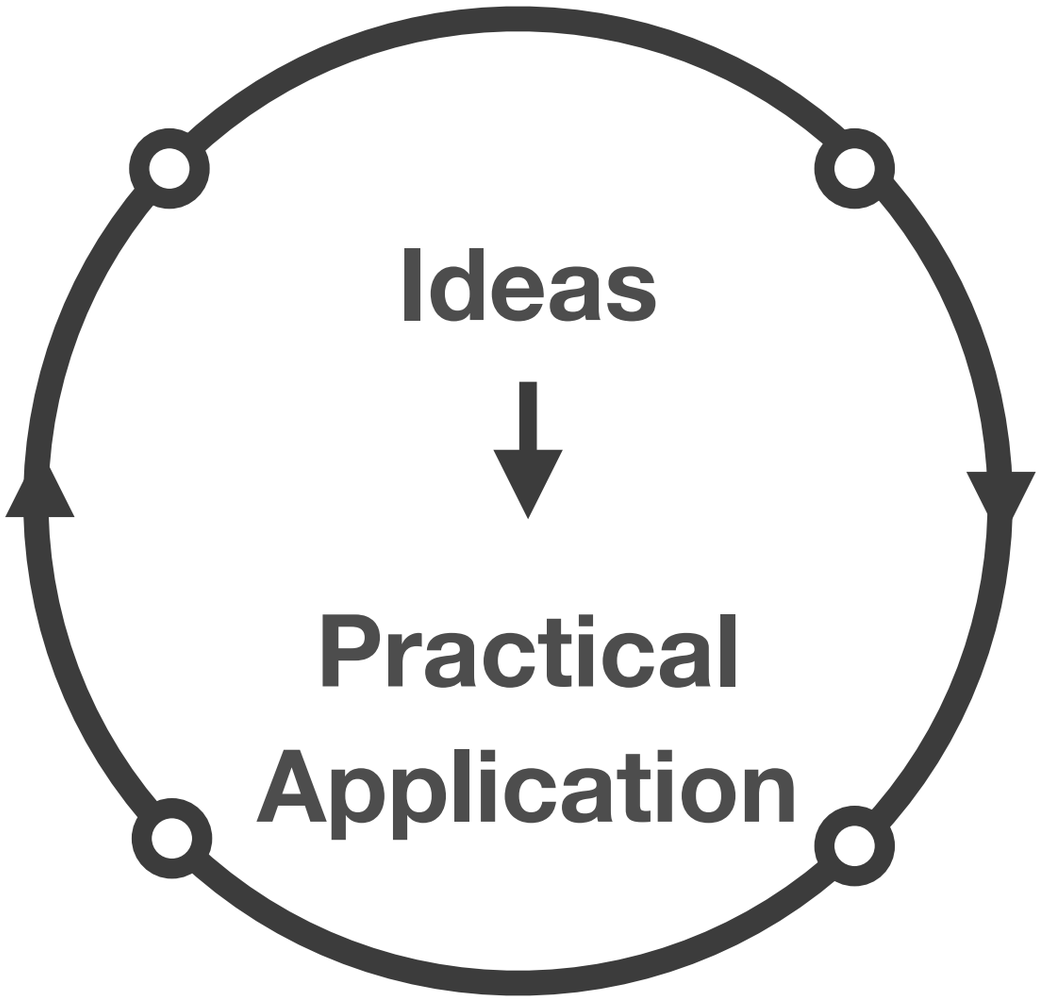
Human-Computer Interaction

Computing
Psychology & Social Sciences
Design

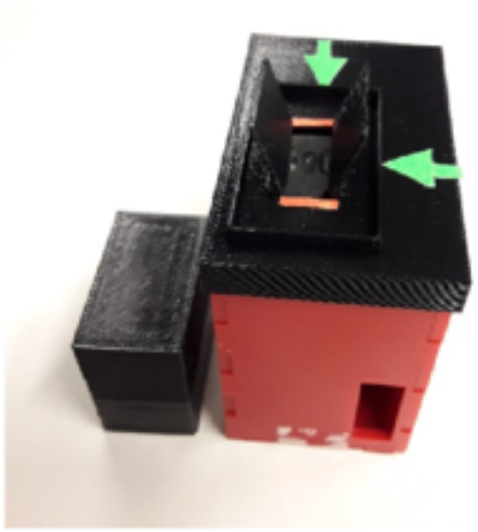
Mission:
Create the next generation of Interactive Technologies

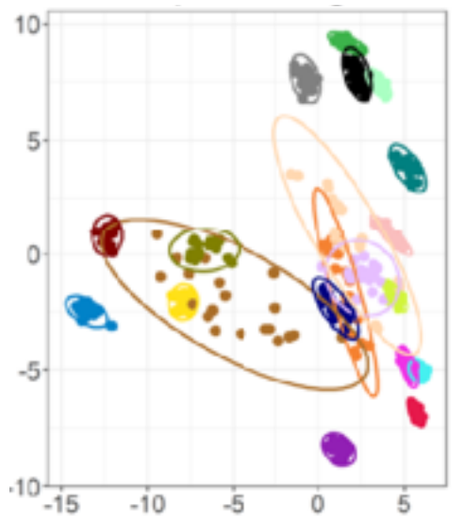
Designing technology

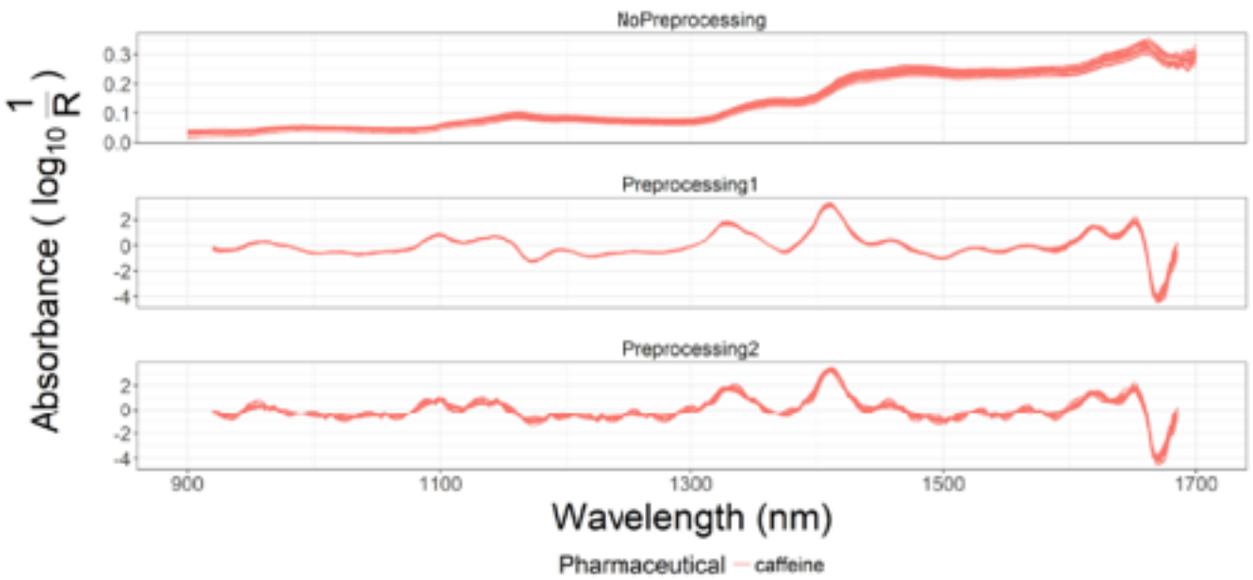


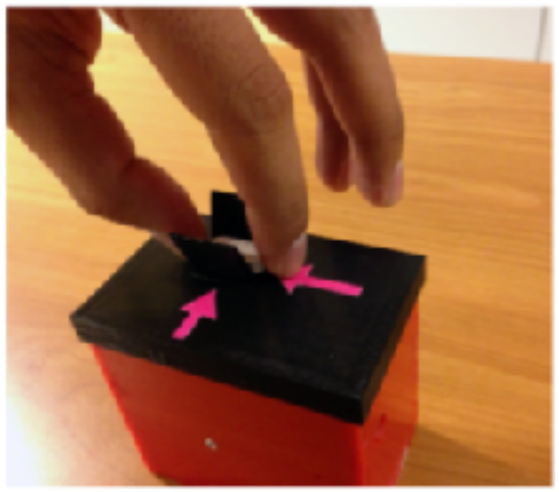

Ideas
Practical
Application

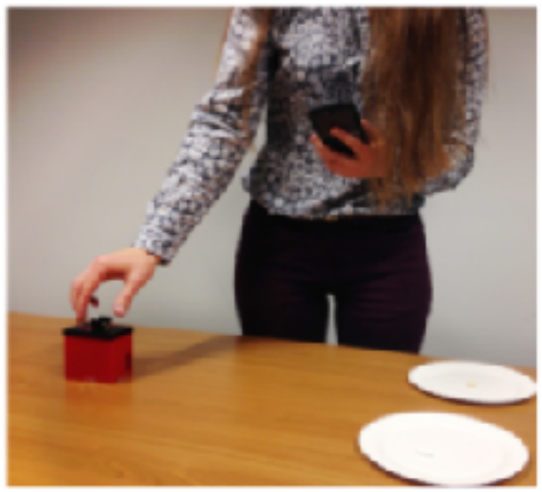
Smart pill box
Identify pills using chemical signatures





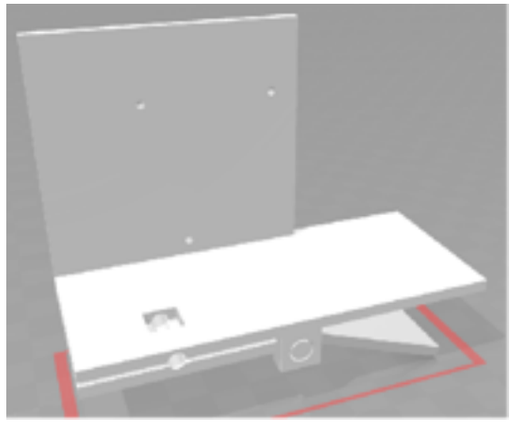


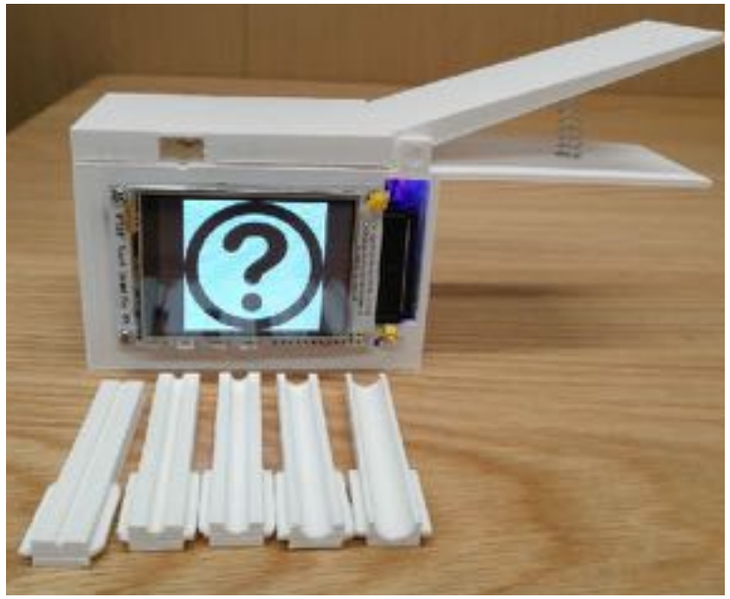


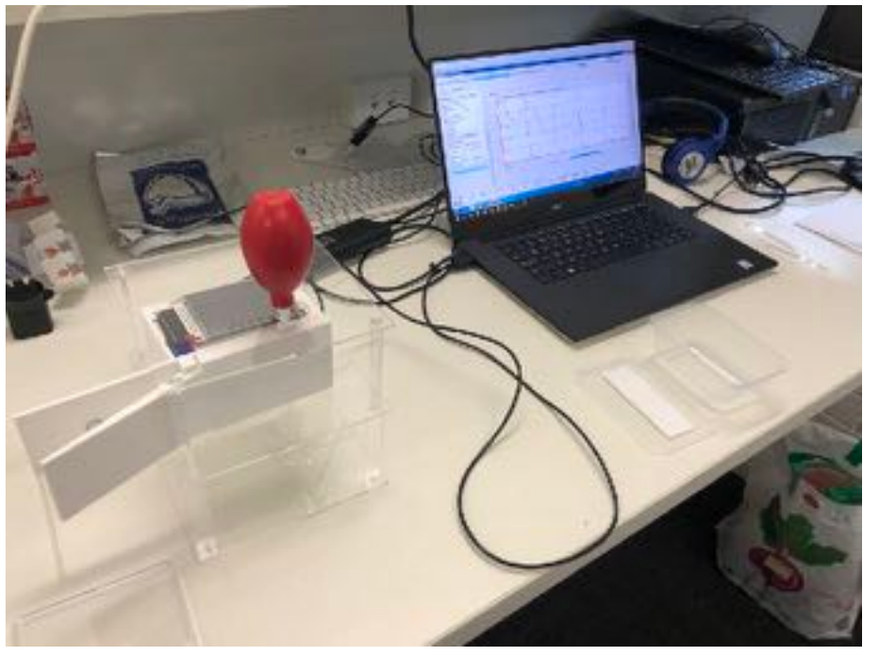


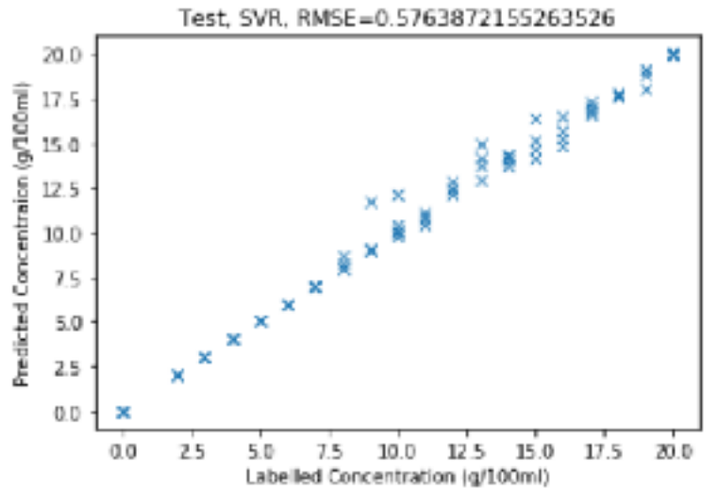
Scan
Stop

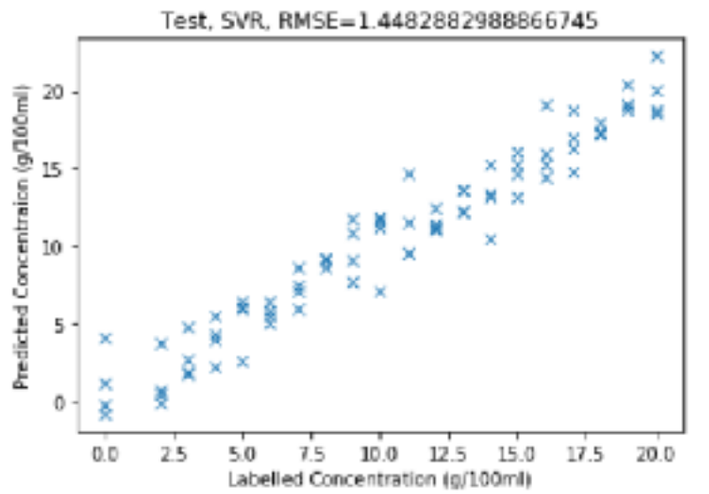
IV line monitoring
Continuous identification of liquids/concentrations in IV line





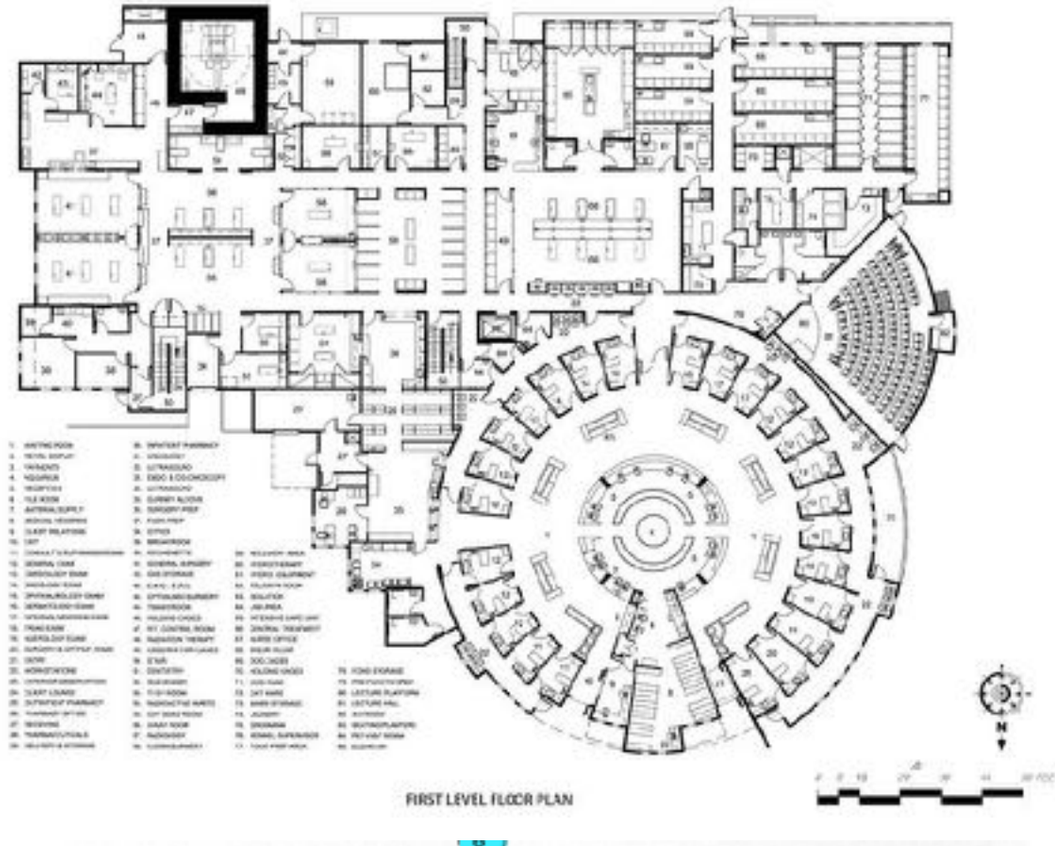


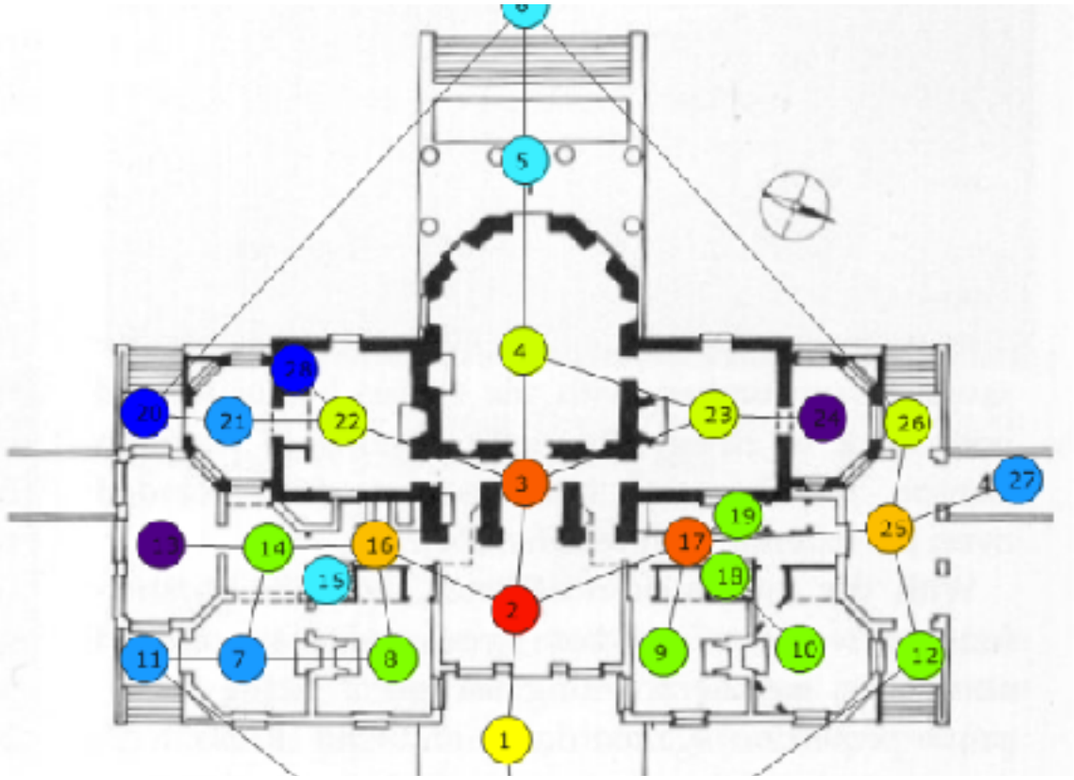




諸事皆宜
百無禁忌

Operating theatre tracking
Track patients/staff in & out of operating theatres





526
423
360
315
342
405
486
567
462
487
408
409
442
320
597
406
513
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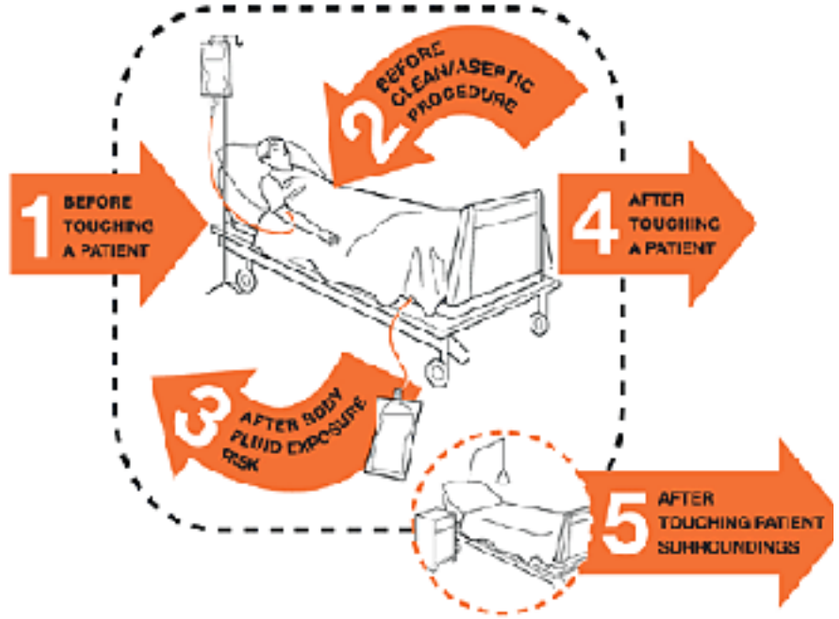
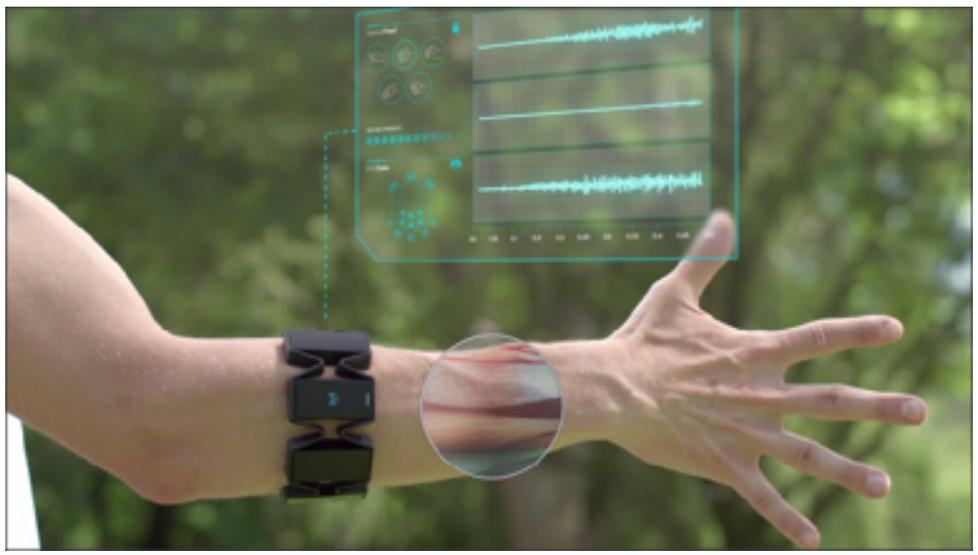
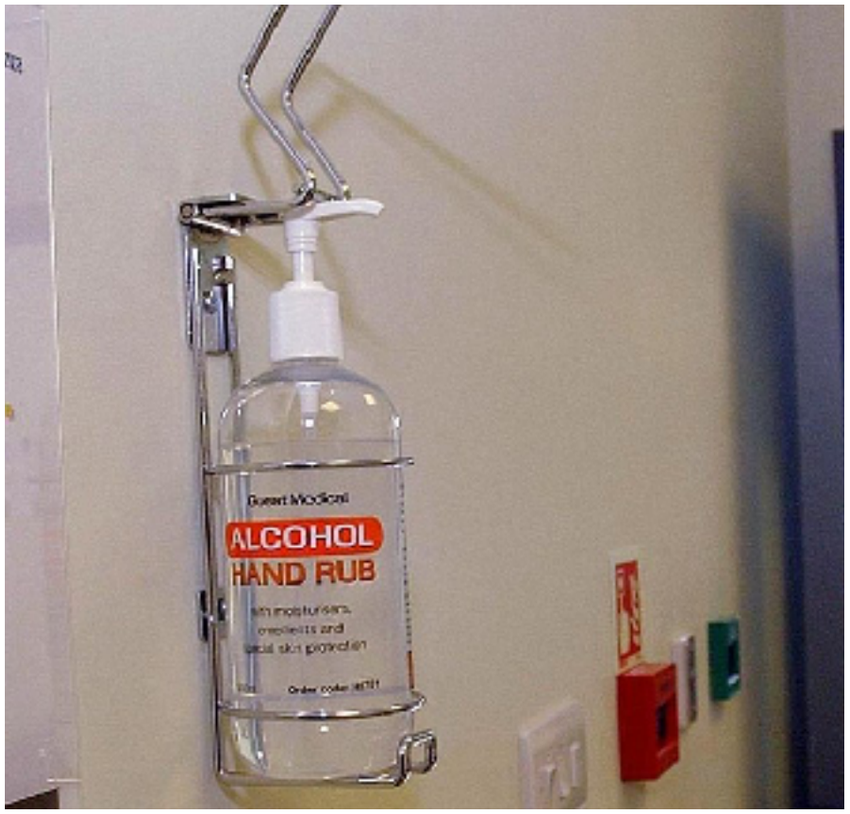
446
536
477
435
605
333
512
568
395
343

Hand washing detection

Detect (and quantify) hand washing in the hospital







How to Handrub?

9:41

Home

Hand Hygiene History

Record - 21 — Active Now
Good completeness of hand washin...

Record - 20 — 5 mins ago
You missed some steps when last h ..

Record - 19 — 5 hours ago
There are some steps you need to i...

Read More

Summary

01 02 03
04 05 06
07 08 09
10 11

9:41

Home

01 Wet your hands with water
Completeness: 50%

02 Apply Soap to cover all hand surfa
Completeness: 100%

03 Rub hands palm to palm
Completeness: 70%

04 Right palm over left dorsum with interlaced finger and vice versa
Completeness: Missed

06 Backs of fingers to opposing palm with fingers interlocked
Completeness: 100%

05 Palm to palm with fingers interlac
Completeness: Wrong Order

07 Rotational rubbing left thumb clas in the right palm and vice versa
Completeness: 50%

08 Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa

9:41

Home

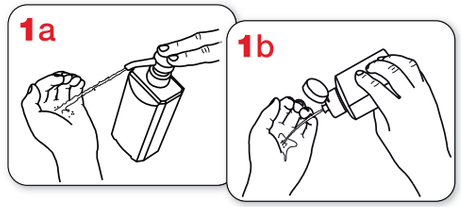
01 Wet your hands with water
Completeness: 50%

Description

This is the first step from the standard hand washing process from WHO; however, it seems like you may need to prolong the duration of hand washing.

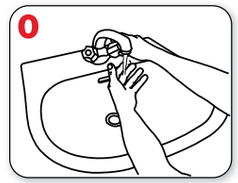
Standard Procedure

How to handrub?
WITH ALCOHOL-BASED FORMULATION

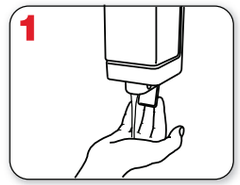


Apply a palmful of the product in a cupped hand and cover all surfaces.

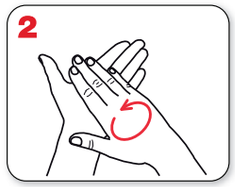
How to handwash?
WITH SOAP AND WATER



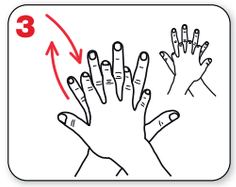
Wet hands with water



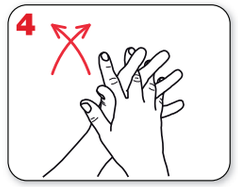
apply enough soap to cover all hand surfaces.



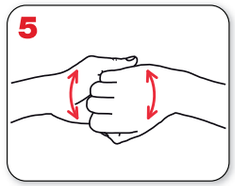
Rub hands palm to palm



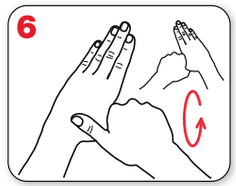
right palm over left dorsum with interlaced fingers and vice versa



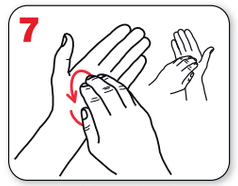
palm to palm with fingers interlaced



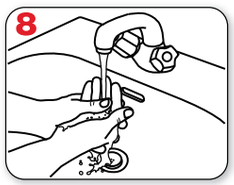
backs of fingers to opposing palms with fingers interlocked



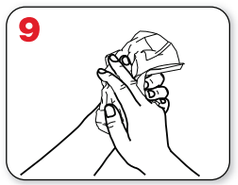
rotational rubbing of left thumb clasped in right palm and vice versa



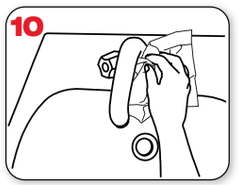
rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa



rinse hands with water

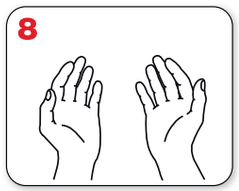


dry thoroughly with a single use towel



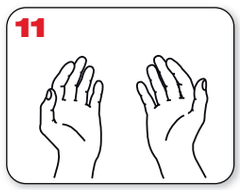
use towel to turn off faucet

20-30 sec



…once dry, your hands are safe.

40-60 sec



…and your hands are safe.

Design: mondofragilis network

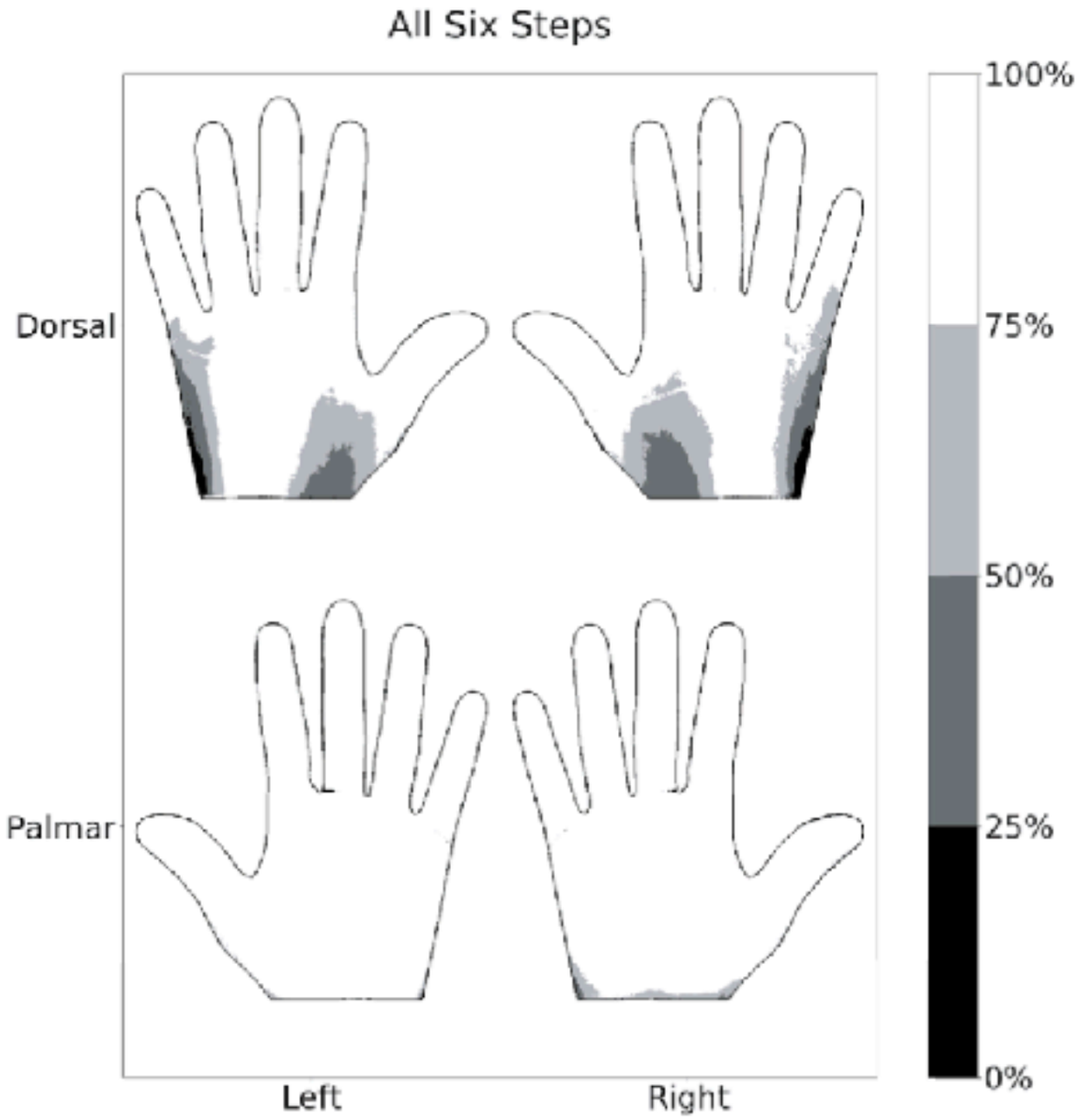
THE UNIVERSITY OF MELBOURNE

WORLD ALLIANCE for PATIENT SAFETY

WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

World Health Organization

October 2006, version 1.


All Six Steps
Dorsal
Palmar
Left
Right
100%
75%
50%
25%
0%

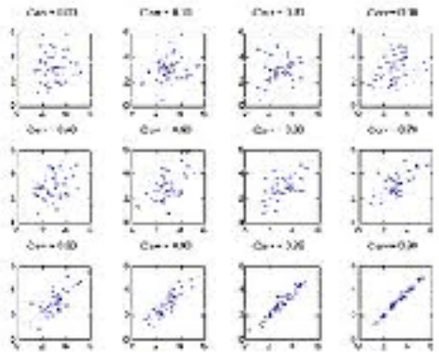
What's next?

Large Language Models: empowering the study of human behaviour

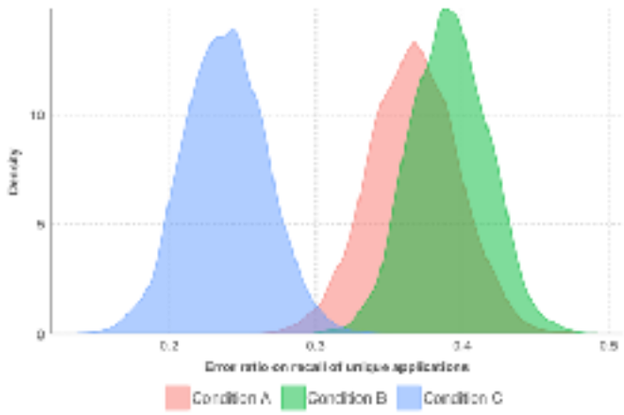
Measurement

Phenomena

Sample data



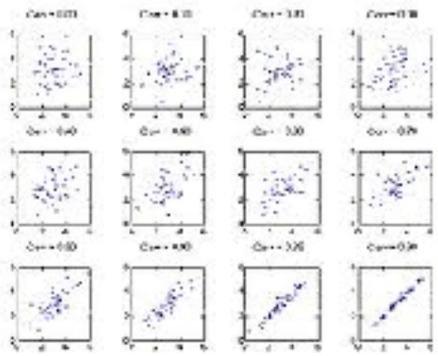
Analysis/Statistics



Modus operandi

Smartphone/Sensors

Calculate metrics



Establish correlations
Describe behaviour

Behaviour, attitudes, questionnaires, etc.

Calculate metrics

Sources

Social Media

Smartphone use

Smart city

Interaction

Insights

Happiness

Personality

Habits

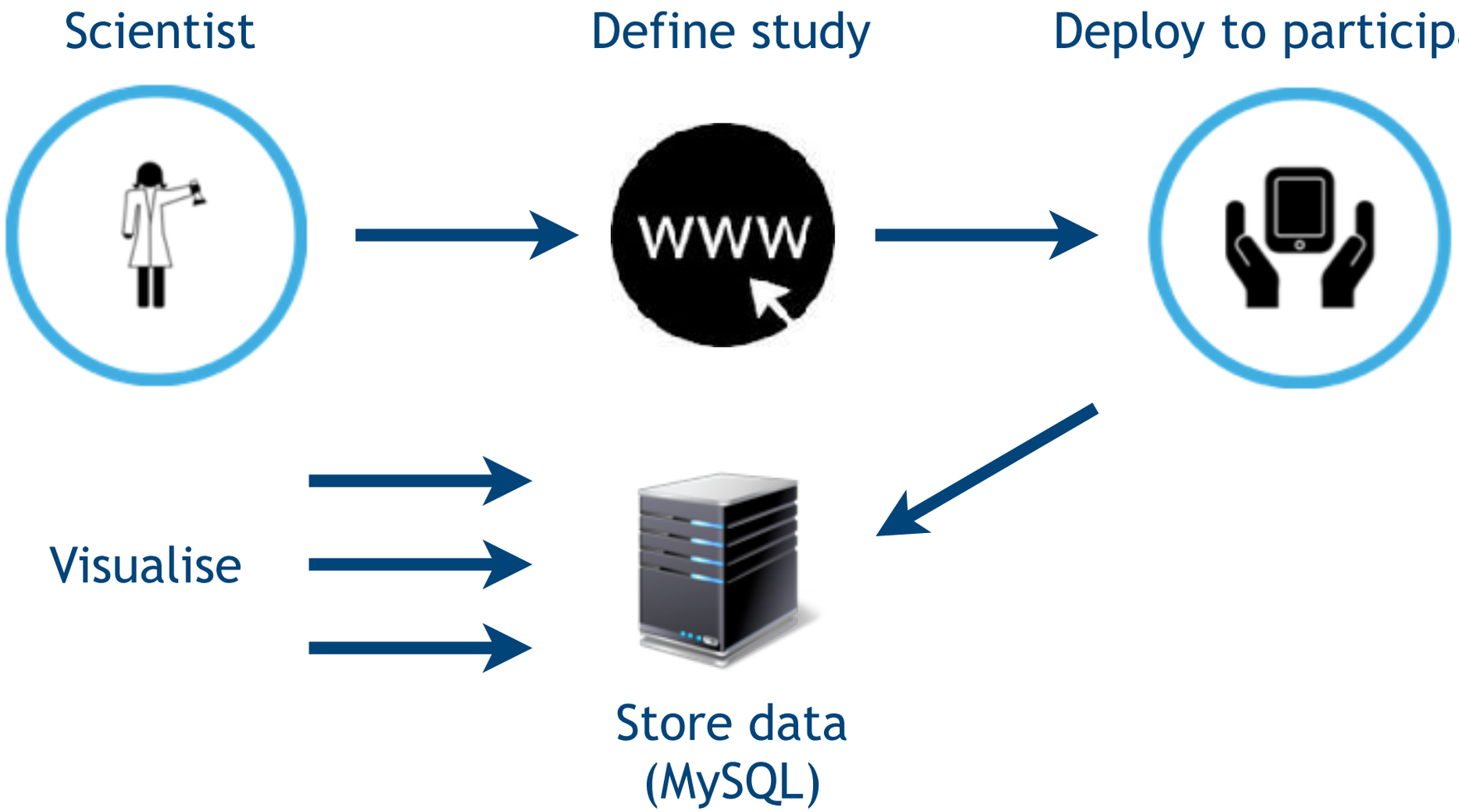
Exposure

Methods

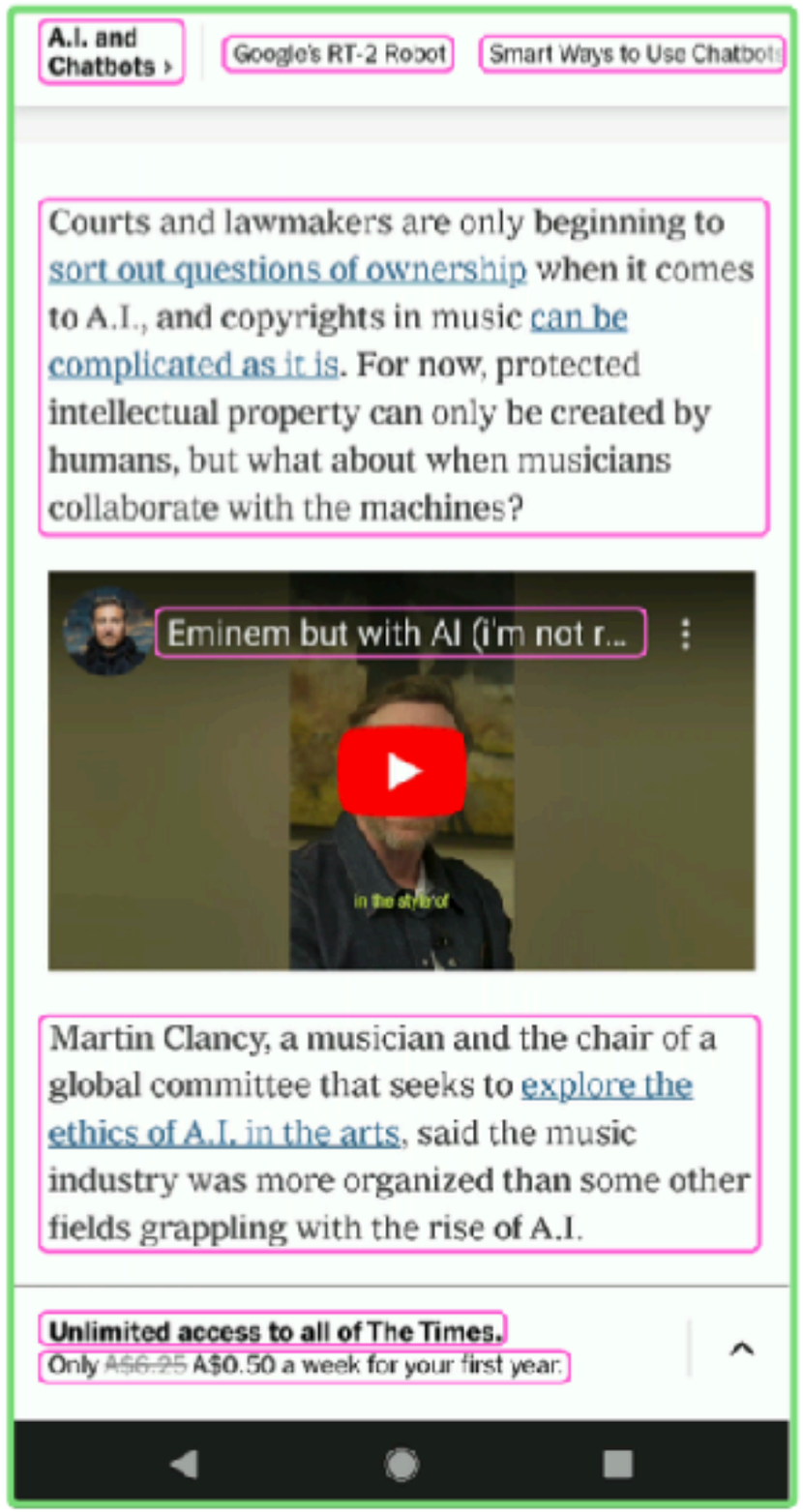
Smartphone sensing

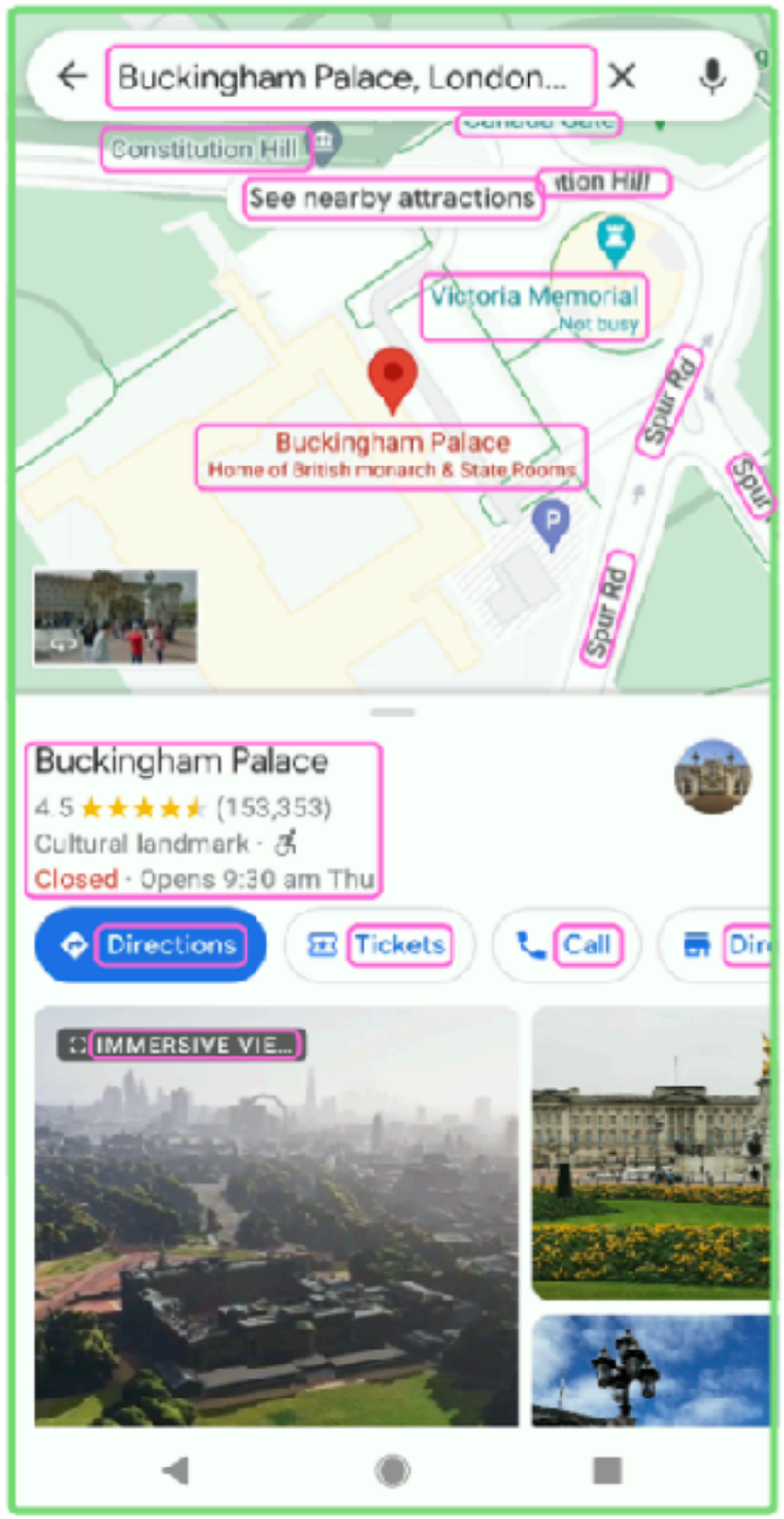
Crowdsourcing

In-the-wild methods



https://www.aware-light.org


A.I. and Chatbots ›
Google's RT-2 Robot
Smart Ways to Use Chatbots
Courts and lawmakers are only beginning to sort out questions of ownership when it comes to A.I., and copyrights in music can be complicated as it is. For now, protected intellectual property can only be created by humans, but what about when musicians collaborate with the machines?
Eminem but with AI (i'm not r...
Martin Clancy, a musician and the chair of a global committee that seeks to explore the ethics of A.I. in the arts, said the music industry was more organized than some other fields grappling with the rise of A.I.
Unlimited access to all of The Times.
Only A$6.25 A$0.50 a week for your first year.


Buckingham Palace, London...
Constitution Hill
See nearby attractions
Victoria Memorial
Not busy
Buckingham Palace
Home of British monarch & State Rooms
Spur Rd
Buckingham Palace
4.5 (153,353)
Cultural landmark
Closed · Opens 9:30 am Thu
Directions
Tickets
Call
IMMERSIVE VIE...

Word	Count
relevant	1070
unit	856
teaching	758
lecturer	689
information	642
accounting	535
professional	535
academic	535
cyber	535
security	535

App: SEEK (Job-Finding) (All Participants)

Word	Count
cal	11348
km	7875
distance	5473
set	5057
heart	4995
sleep	4949
hr	4811
fitbit	4793
rate	4162
2023	4100

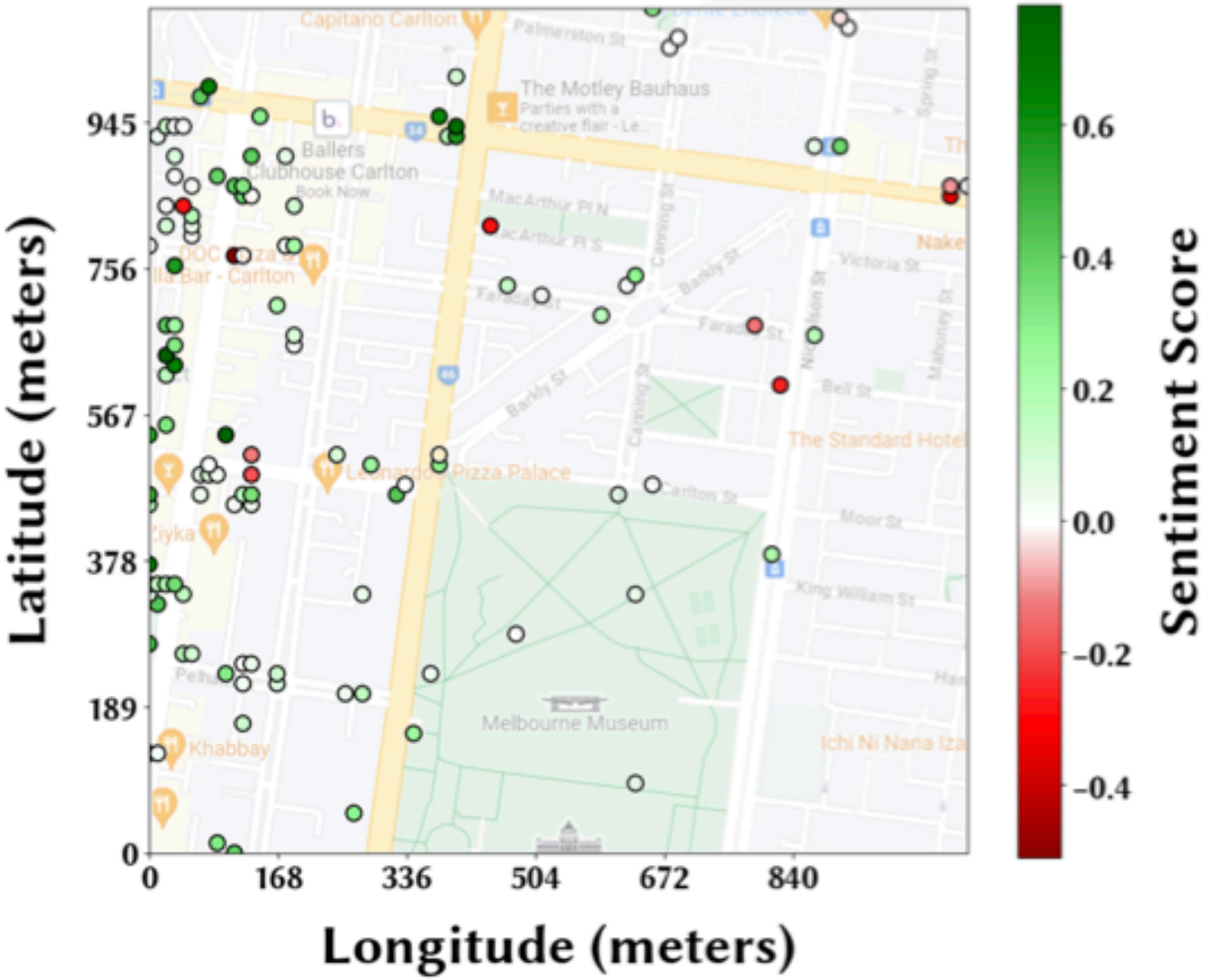
Category: Health (All Participants)

Word	Count
taylor	3964
swift	3248
version	1832
playlist	1749
red	1628
loving	1174
english	980
never	927
chou	879
g.e.m	860

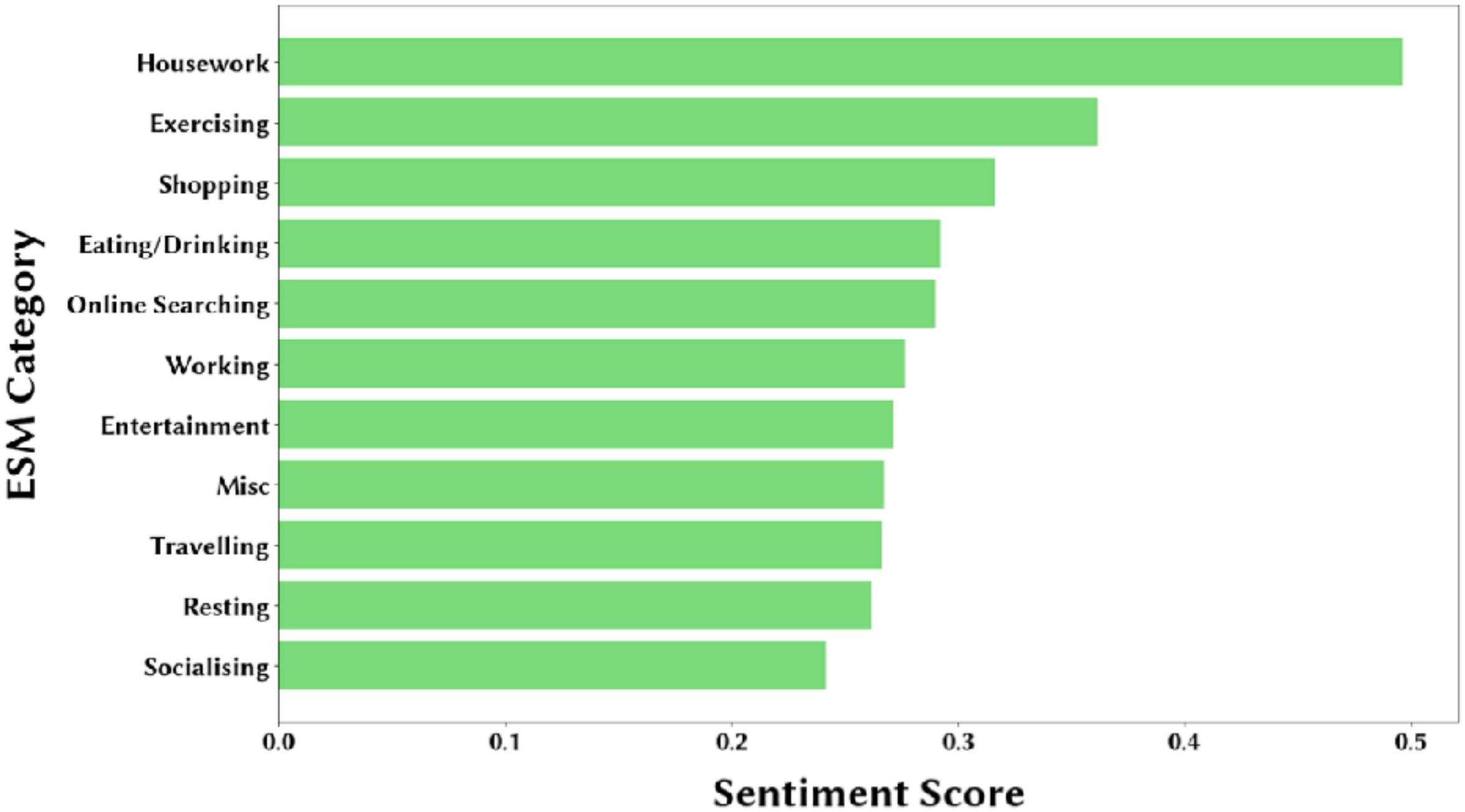
App: Spotify (Music) (P8)

Word	Count
foo	3197
fighters	3197
bon	3031
jovi	3016
led	2490
zeppelin	2490
remaster	1747
jukebox	1594
postmodern	1592
rock	1346

App: Spotify (Music) (P11)



(a) Average sentiment.


ESM Category
Housework
Exercising
Shopping
Eating/Drinking
Online Searching
Working
Entertainment
Misc
Travelling
Resting
Socialising
0.0
0.1
0.2
0.3
0.4
0.5
Sentiment Score

Here are the sentiments of text that a university student has viewed on their smartphone for each day over a week. The sentiments range from -1 to 1, with -1 being most Negative and 1 being most Positive.
Your task is to rate how the student felt for each of the following feelings based on the sentiments of the text they have viewed:

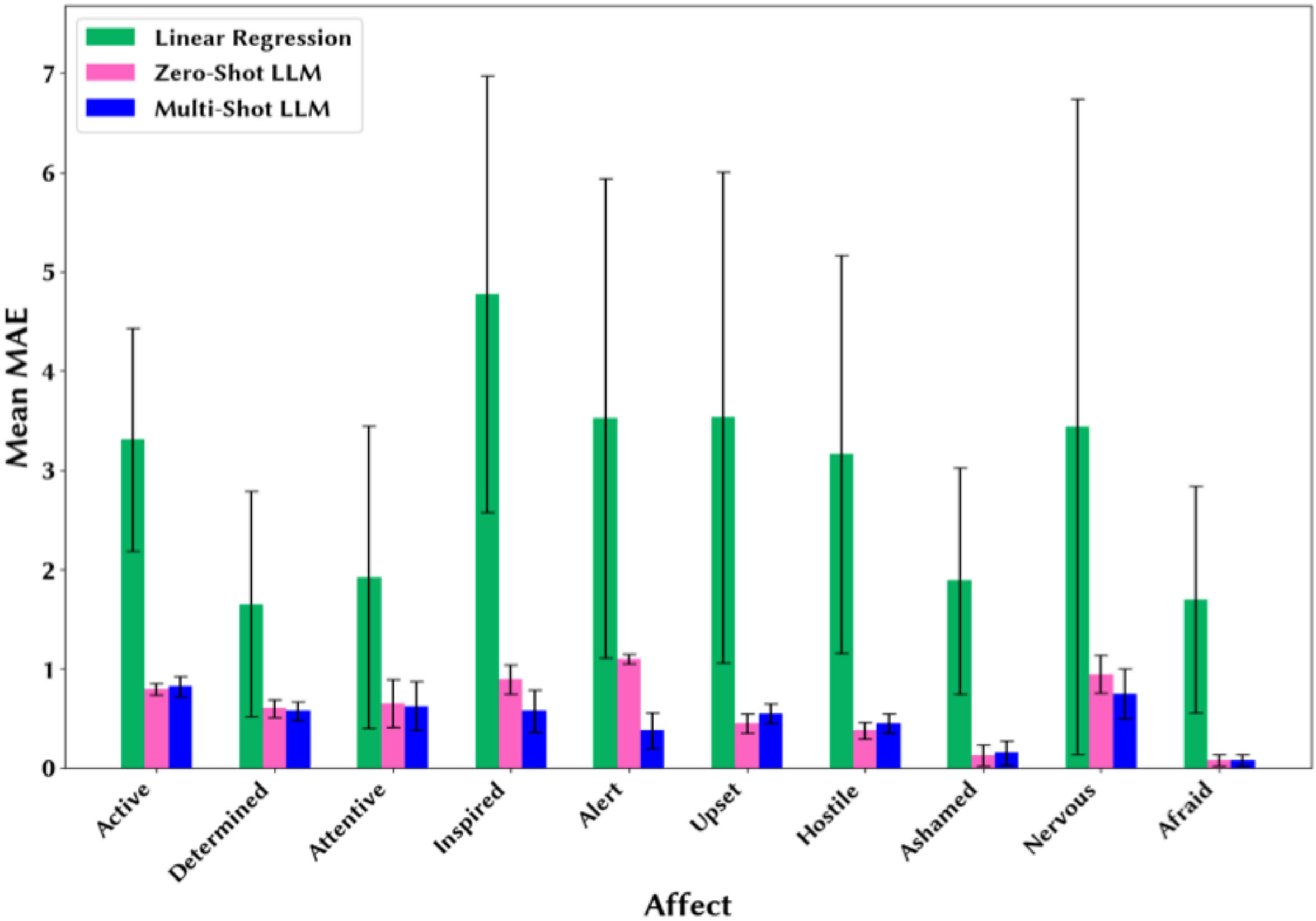
Active
Determined
Attentive
Inspired
Alert
Upset
Hostile
Ashamed
Nervous
Afraid

For each feeling, choose a Likert score ranging from 1 to 5 that best represents how the student generally felt during the week, where 1 represents Never and 5 represents Always.

Sentiments of text the student has viewed on their smartphone over a week:

Day 1: {sentiment of text viewed on the first day of the week}
Day 2: {sentiment of text viewed on the second day of the week}
Day 3: {sentiment of text viewed on the third day of the week}
Day 4: {sentiment of text viewed on the fourth day of the week}
Day 5: {sentiment of text viewed on the fifth day of the week}
Day 6: {sentiment of text viewed on the sixth day of the week}
Day 7: {sentiment of text viewed on the seventh day of the week}

When predicting information for a single week, only consider data from that


Linear Regression
Zero-Shot LLM
Multi-Shot LLM
Mean MAE
0
1
2
3
4
5
6
7
Active
Determined
Attentive
Inspired
Alert
Upset
Hostile
Ashamed
Nervous
Afraid
Affect

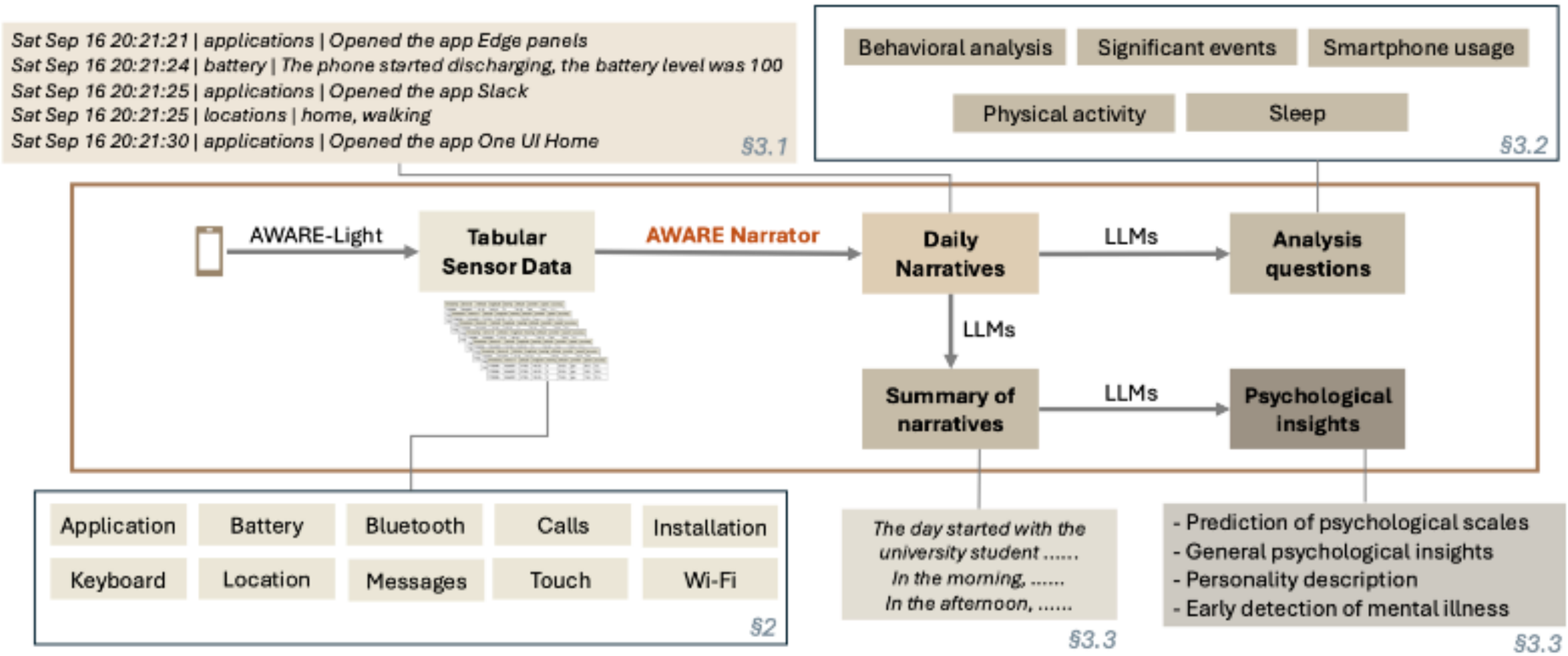


Fig. 1. AWARE Narrator workflow.

Large Language Models: empowering the study of human behaviour

- Labelling
  - Transcripts, data
- Observations
  - Can describe what's happening in a photograph
  - Can describe what's happening on a user's phone
- Personalisation
  - Personalise interventions
  - Personalise messages
  - Identifying suitable moment to deliver intervention

Concluding thoughts on what the future holds

- Everyone is obsessed with AI
  - "Give me your data and I will give you gold"
  - Most likely to work well in only some scenarios
  - Robots will not take over the world
- New tech > AI
  - AI needs data, so how do we get better data?
  - How can hospitals generate better data?
  - How to help people/experts generate better data?
- In the future, there will likely be 2 kinds of jobs:
  - Those who tell a computer what to do
  - Those who are told by a computer what to do
  - In both cases, tech needs to be designed for/with humans

The ~~end~~ beginning!

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