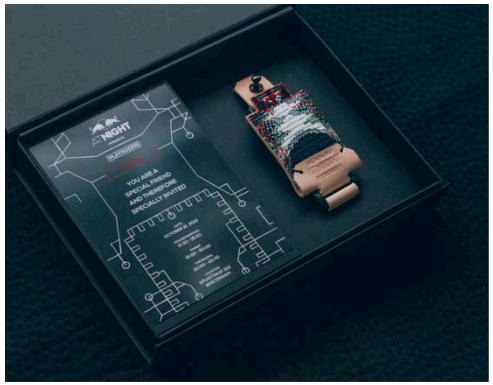
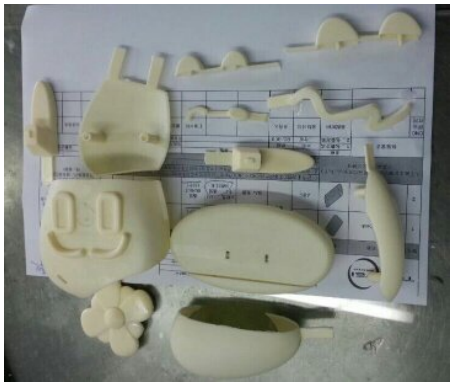
Sensing Engagement

Physiological Sensors and the Creative Industries

p.s.cesar@cwi.nl





CWI: Centrum Wiskunde & Informatica

- National Research Institute for Mathematics and Computer Science (founded in 1946)
- Staff: 55 permanent, 40 postdocs, 70 PhDs
- CWI registered the '.nl' domain (1986)
- 1st connection between Europe and the Internet (17 November 1988)
- Topics examples:
  - Holland's first computer
  - Height/Strength dykes
  - Algol-68, Python and SMIL

DIS@CWI

DIS@CWI: research areas

- **Social IoT and Smart Textiles**
- **QoE**
- **VR and Immersive Media**
- **Experience-Aware Networking**
- **Connected Shared Experiences**
- **Multi-Screen Media Consumption**

ACM multimedia

MMSYS

CWI Centrum Wiskunde & Informatica

DIS@CWI

Creative Industries

BBC

BYBORRE®

서울예술대학교 SEOUL INSTITUTE OF THE ARTS

waag society

www.news.cn 新华网 NEWS www.xinhuanet.com

Disney Research

Network Operators

BT

Telefónica

TELECOM ITALIA

& france telecom

telenor

Others

sapo.pt

Alcatel·Lucent

Microsoft

PHILIPS

nlnet FOUNDATION

SIDN

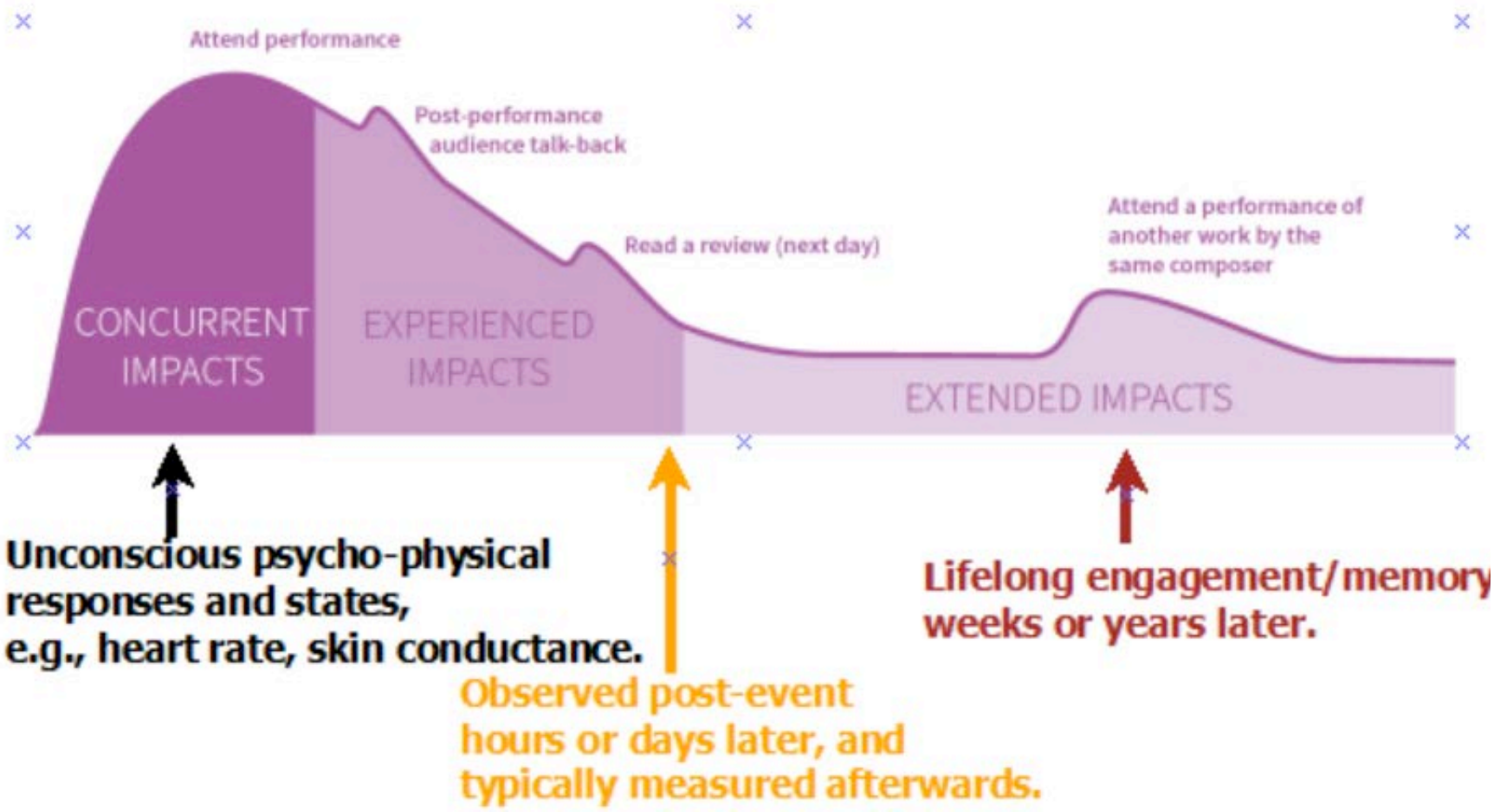
CWI Centrum Wiskunde & Informatica

OUR APPROACH

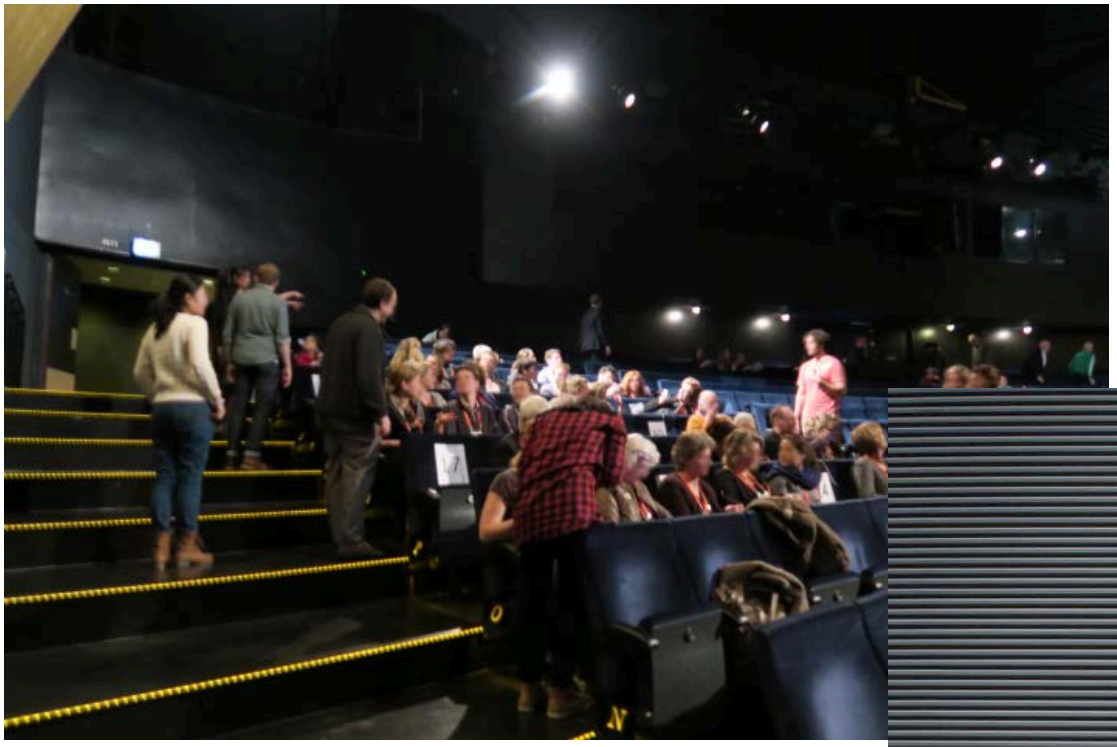
Working with Experts

Distributed Performances: Productions

Objective: quantifying engagement



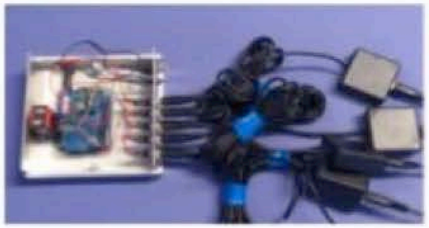
Methodology: research in the wild



Sensing: Devices

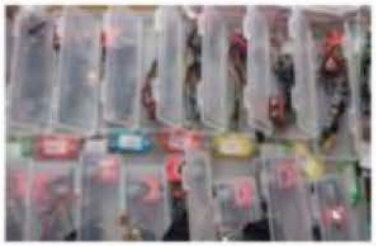
Method: Measure GSR data from 15 audience members while they watched a 28-minute pseudo play.

First generation of sensors: Consisting of one Arduino UNO board, one Xbee wireless module (for every five users), and noise filter.

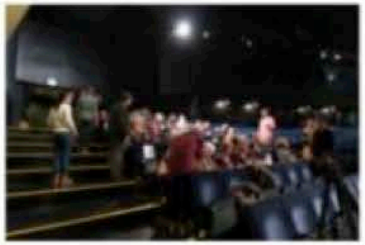


Method: Measure GSR data simultaneously from 12 live and 12 remote audience members. The show was streamed live to another location.

Second generation of sensors: Consisting of one Jeenode board and one RFM12B radio module each.

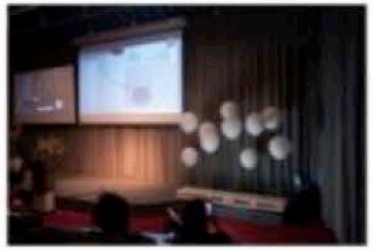


Method: Measure GSR data from 20 audience members while they watch a one hour commercial dance performance in an actual theater.

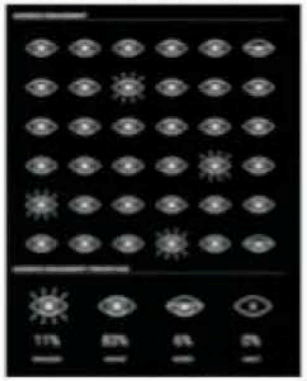


Third generation of sensors: Repackaged the hardware with a new version of software.

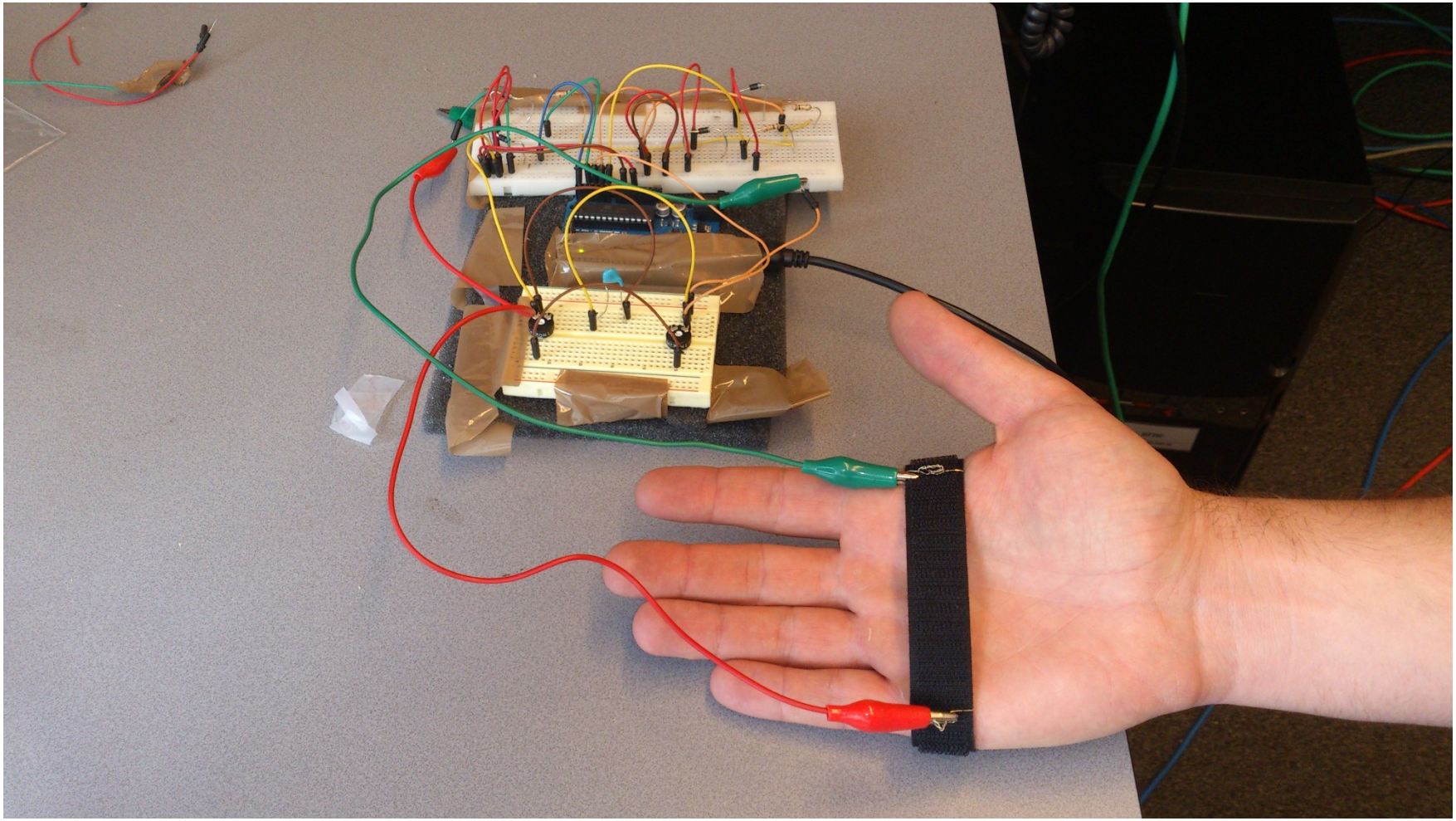
Method: Visualize measured GSR data on a digital display and use data to control heights of balloons.



Visualization to indicate audience engagement



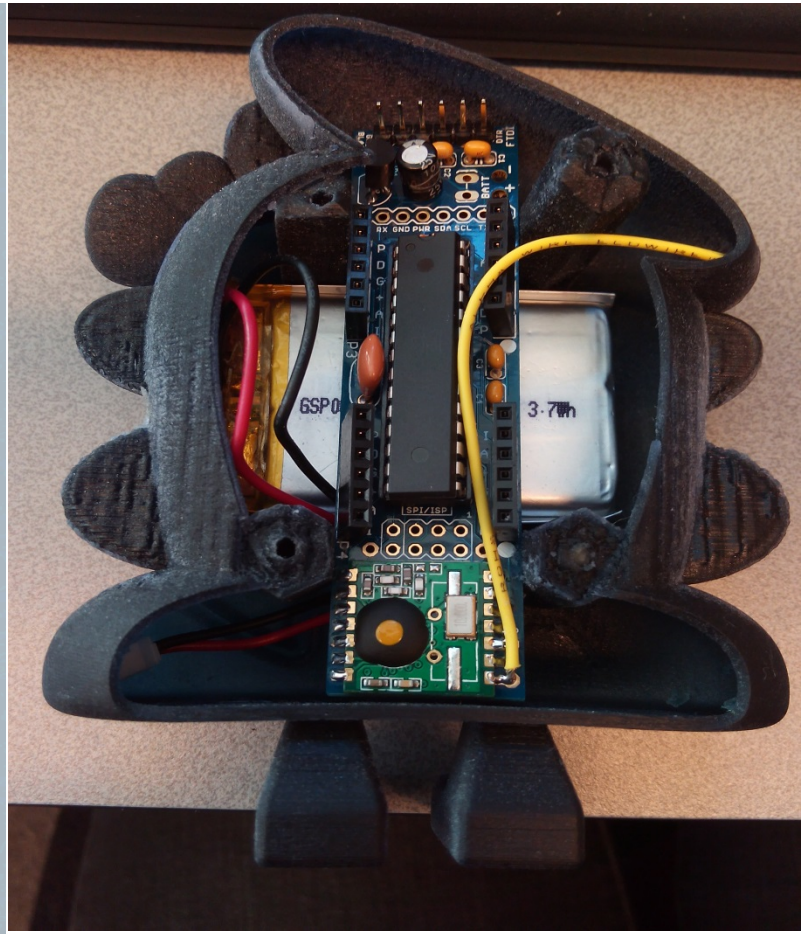
Sensing: Devices



凤凰山

TUOWEI

Sensing: Devices



Sensing: Devices

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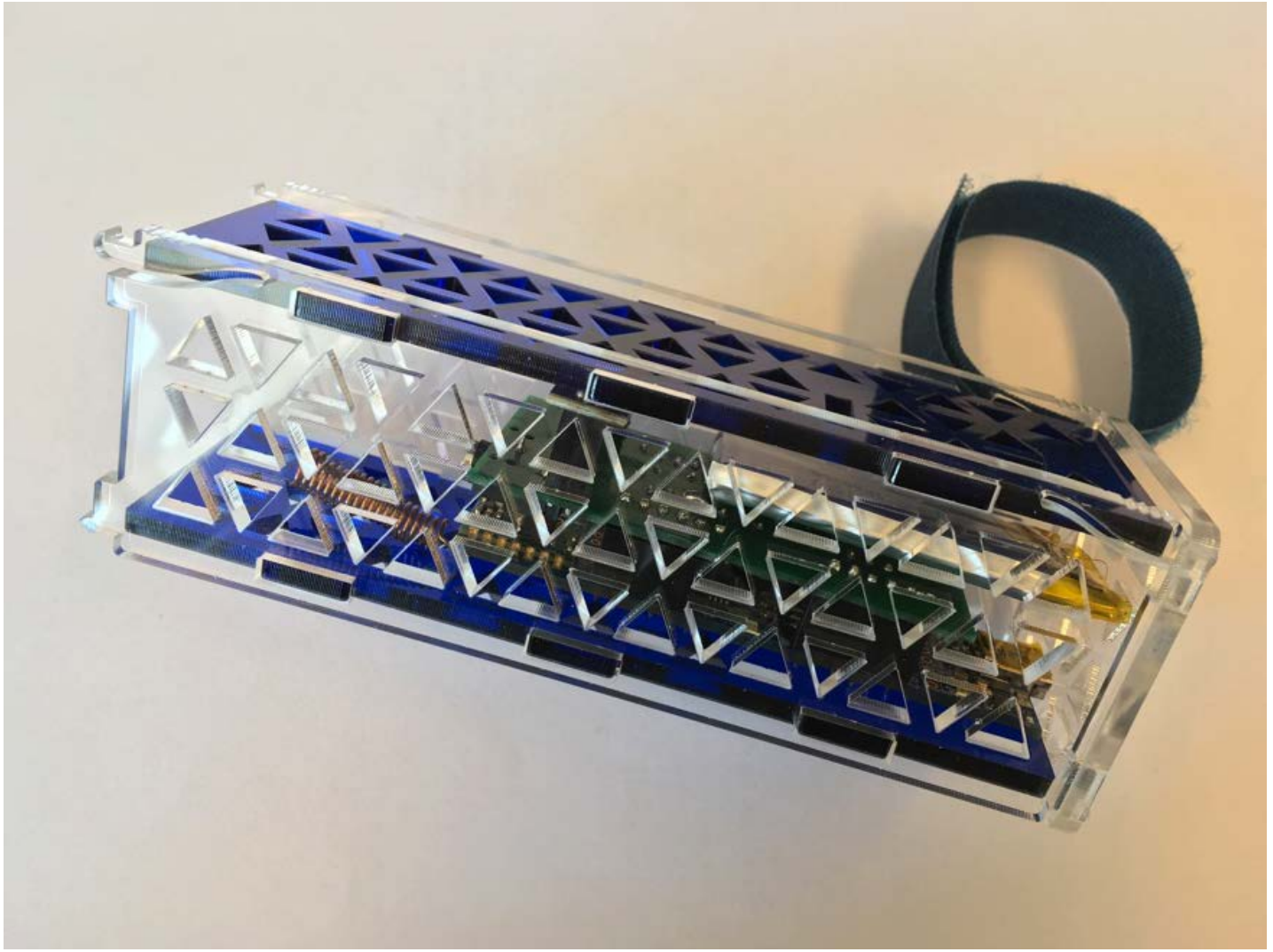
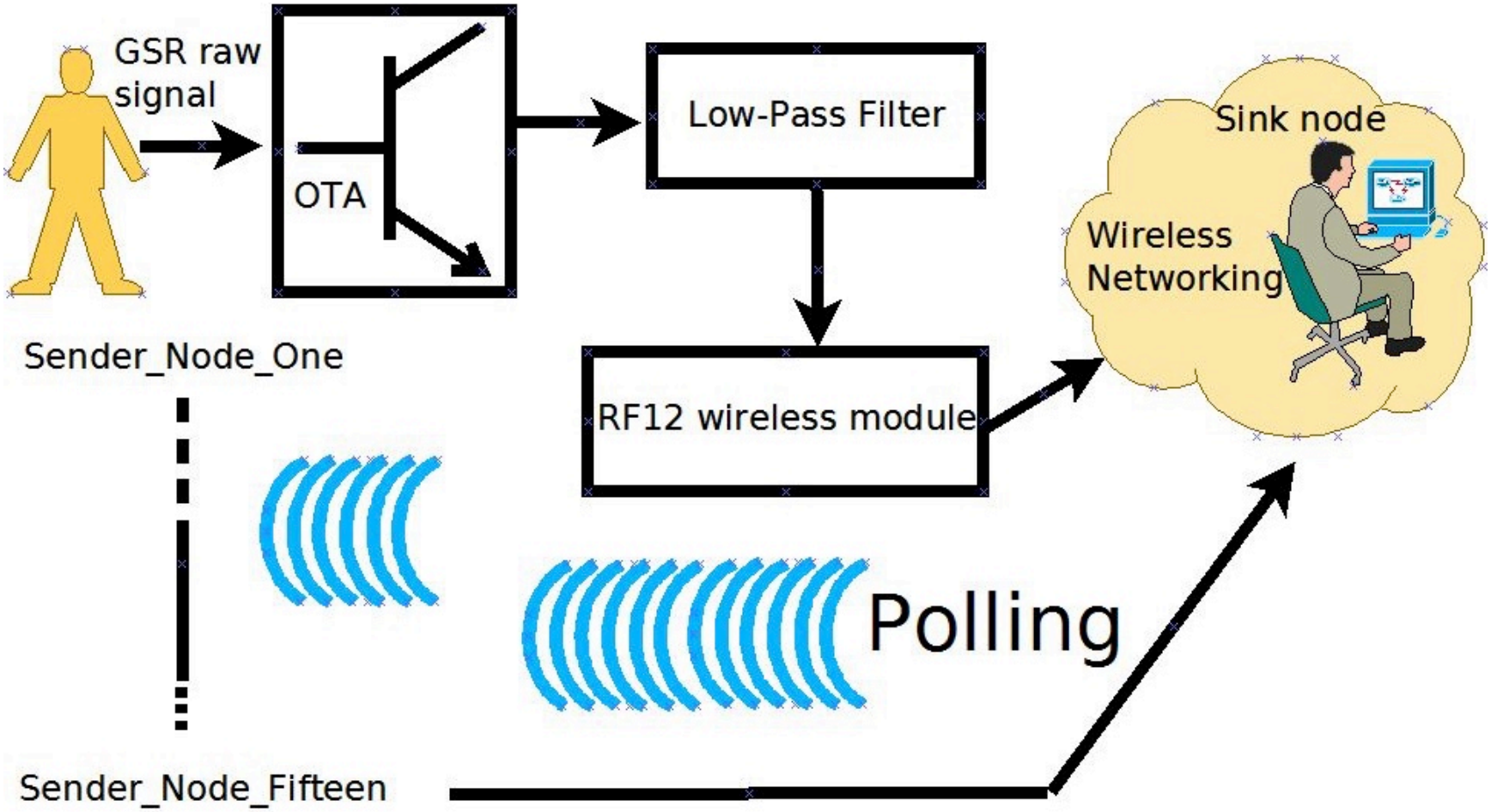
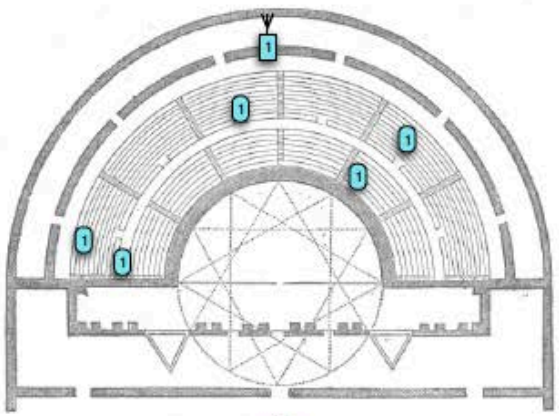
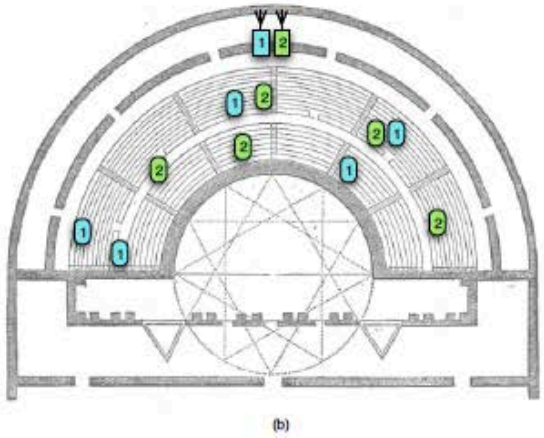


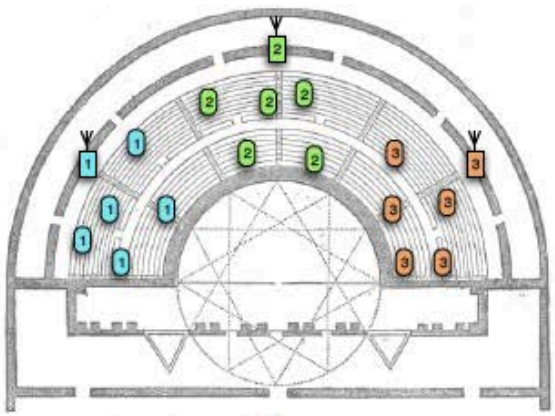
Sensing: Infrastructure

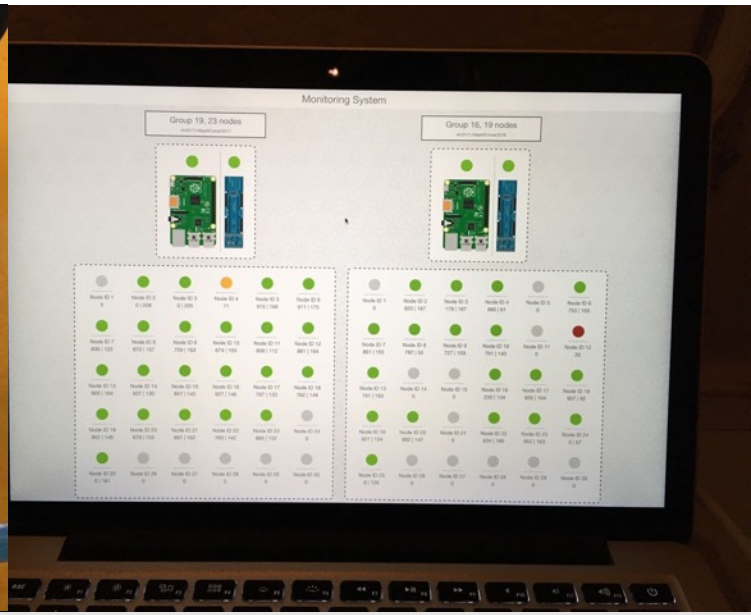


Sensing: Infrastructure



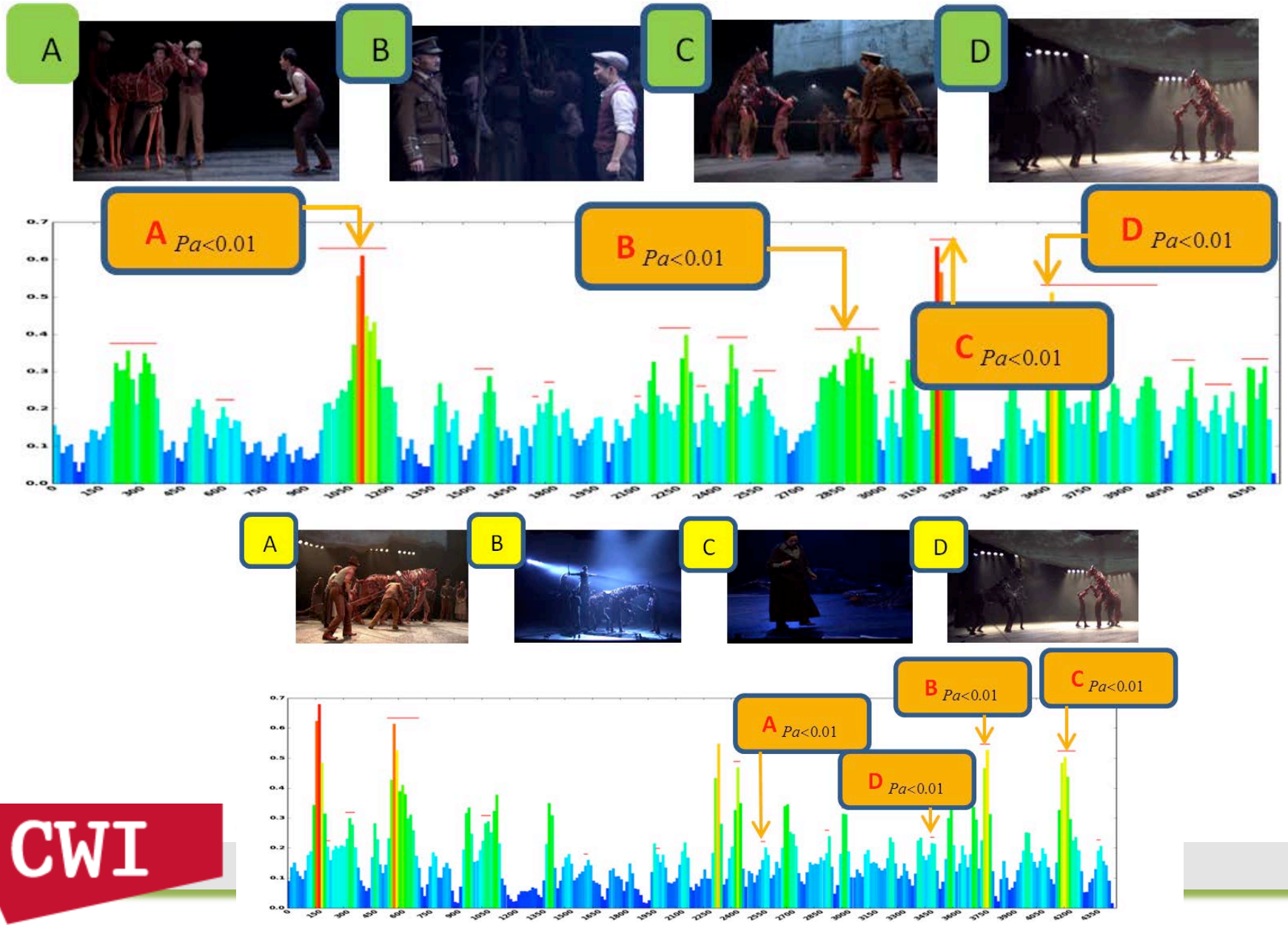






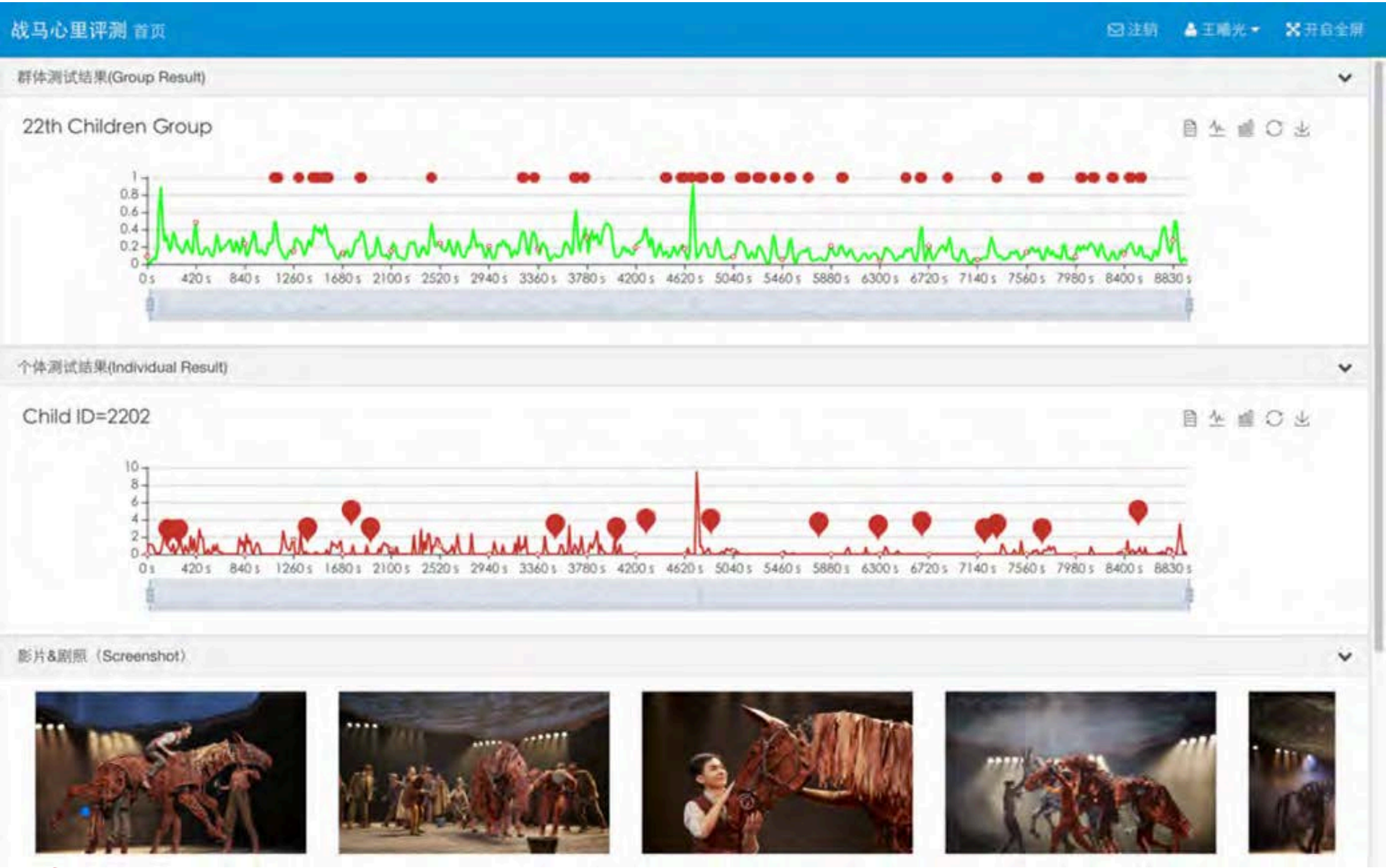
CWI

Sensing: Understanding

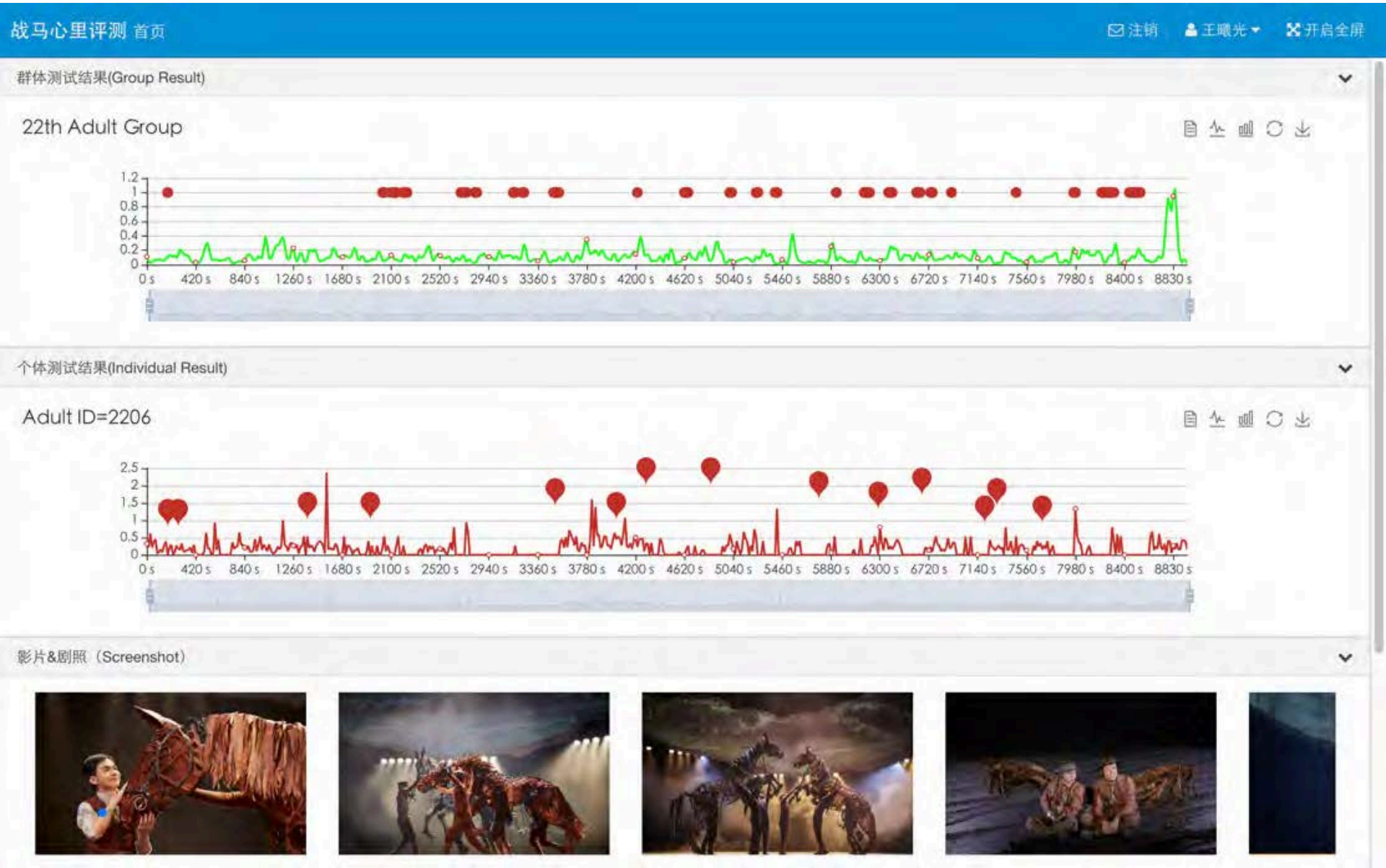


CWI

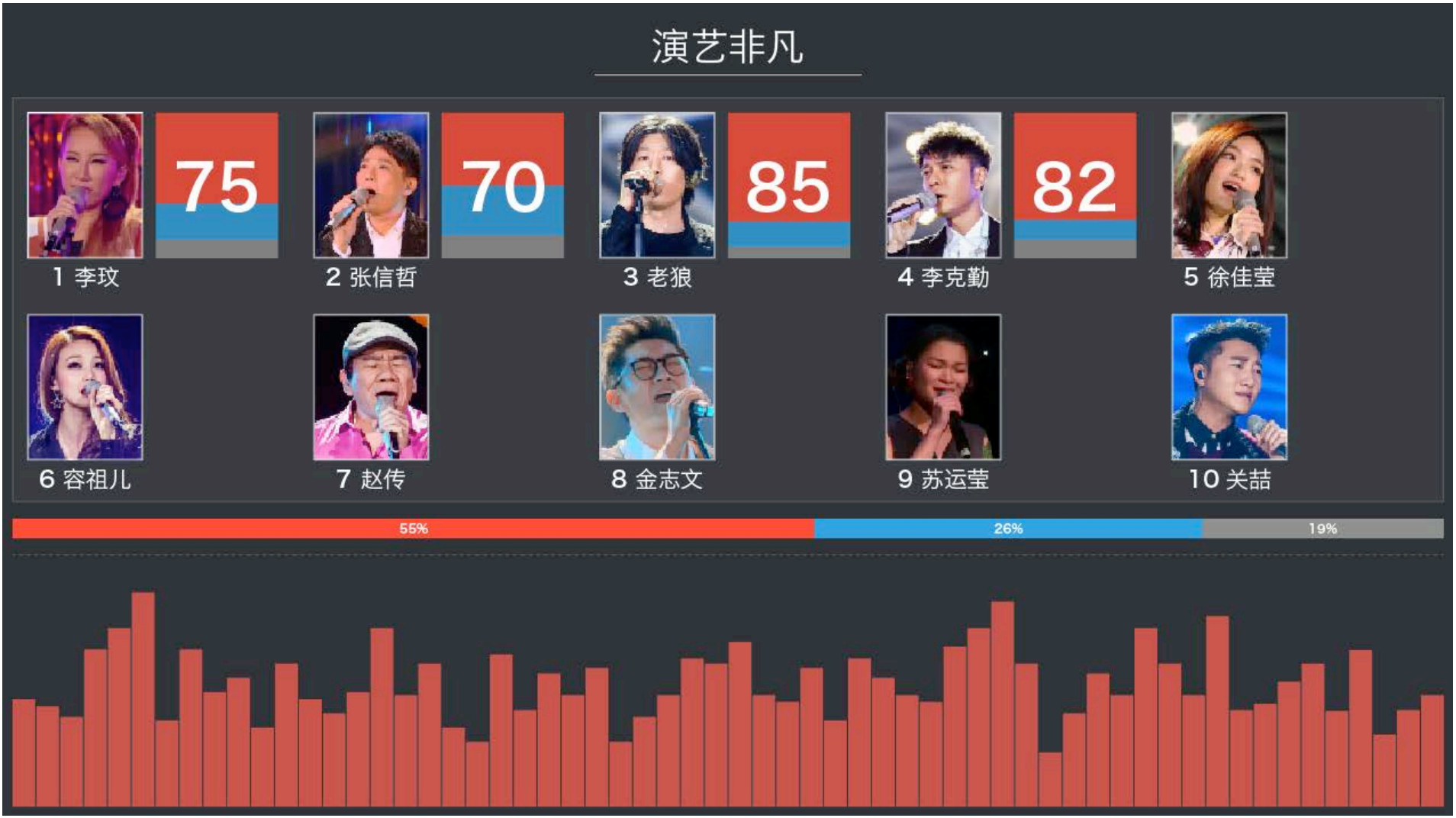
Sensing: Understanding



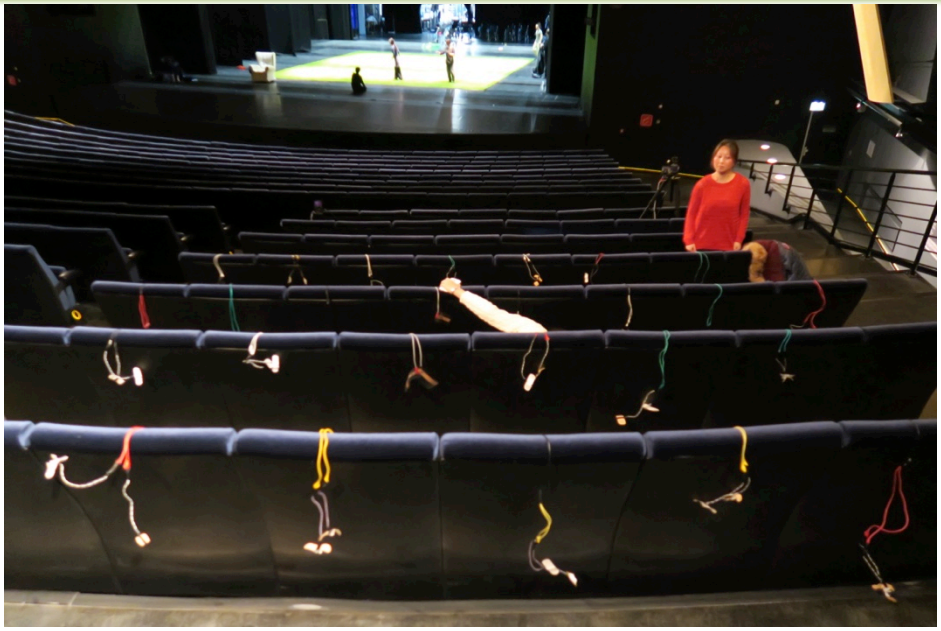
Sensing: Understanding



Sensing: Understanding



Sensing Examples: Holland Dance



Sensing Examples: War Horse

正开展的研究还包括：1）生物传感+移动医疗的传媒应用——循证医学与数据挖掘；2）电子商务领域的传媒情报分析；3）"编蝠侠"——新闻无

STAR

首个项目

战马 WarHorse 袭心

——国内首次剧场传感

新华网携手国家话剧院开展国内首次观众传感实验

被誉为英国"国宝级"的舞台剧《战马》已由中国国家话剧院与英国国家话剧院联手制作出中文版。这部讲述一战中少年艾尔伯特寻找爱马"乔伊"的舞台剧，相继在英国、美国、澳大利亚、德国、荷兰等地上演，连英国女王伊丽莎白二世和首相卡梅伦都多次接见过"乔伊"。而11月中旬上海站的演出，又成为它极为特别的一段征程。[阅读全文]

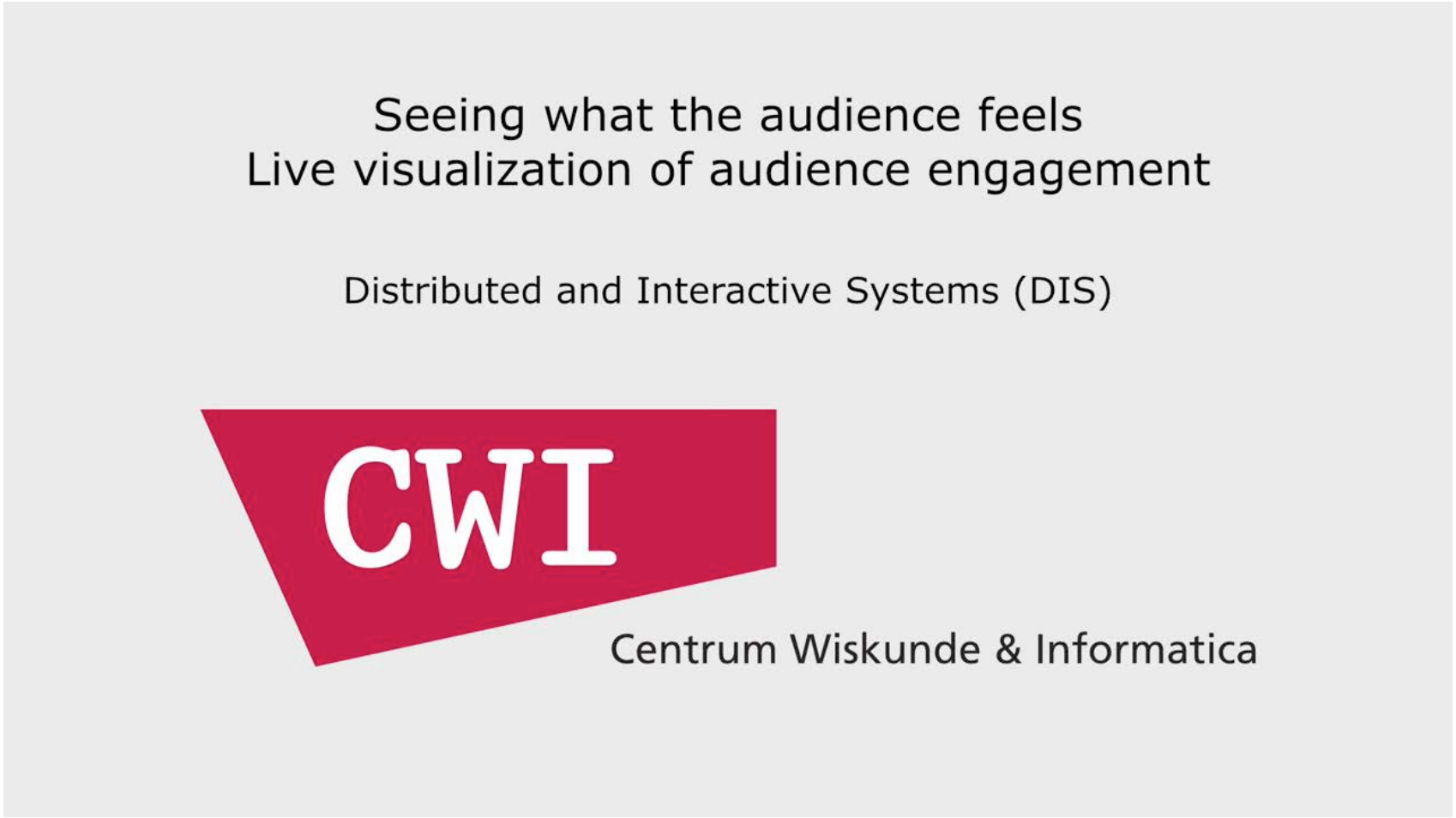
剧场传感实验引发各领域需求探索

这场科技与艺术"跨界"、研究团队"跨国"组合的实验吸引了来自各地各行业的观众志愿者，没有参与测试的观众和敏锐的媒体人也纷纷提问，对生物传感技术以及人工智能领域的最新发展与未来应用，表现出浓厚兴趣——

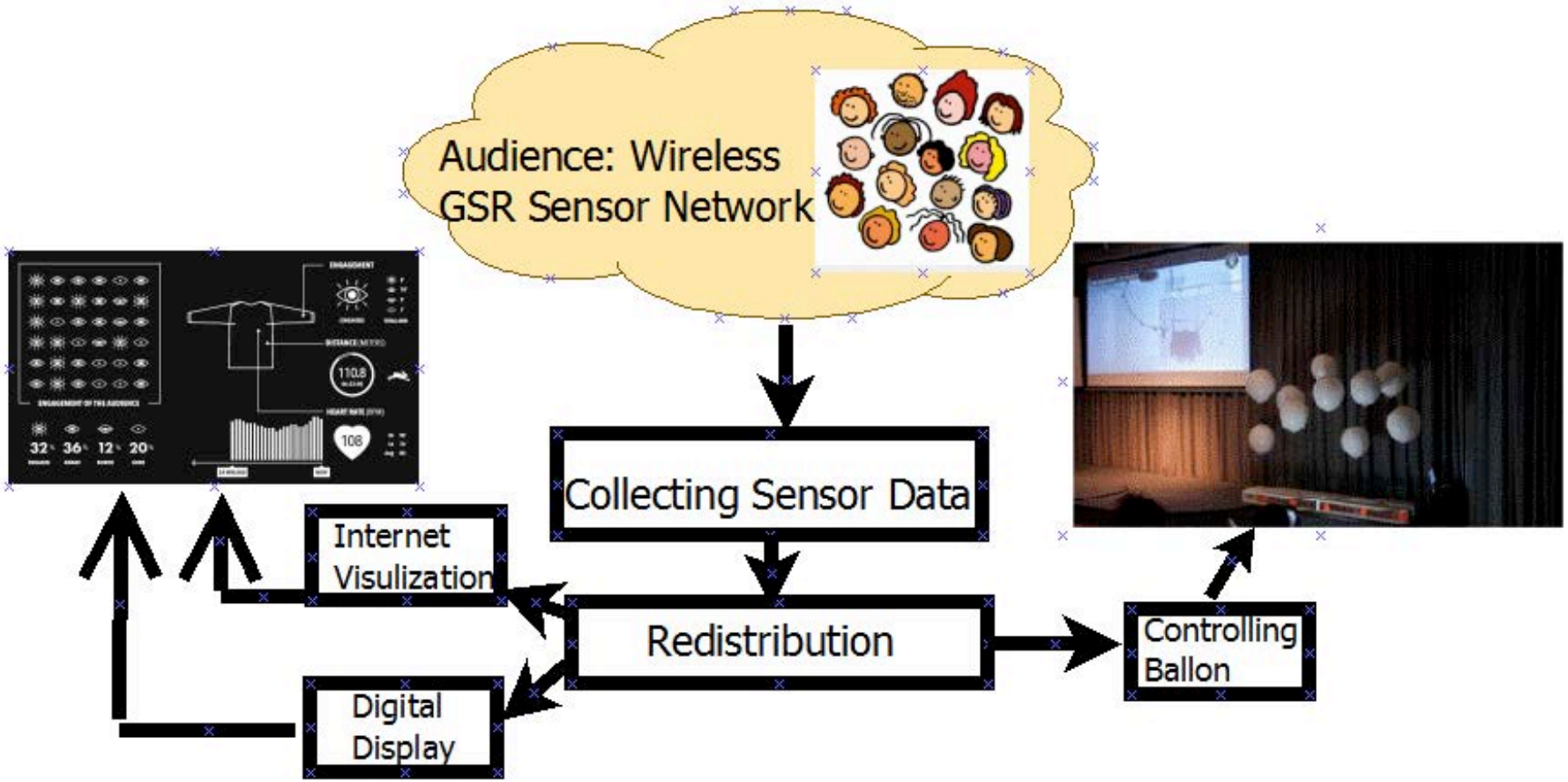
Sensing Examples: Jazz at Goethe

Sensing Examples: Jazz at Goethe

https://www.youtube.com/watch?v=RJ-HoNpytK4



Sensing Examples: Lectures



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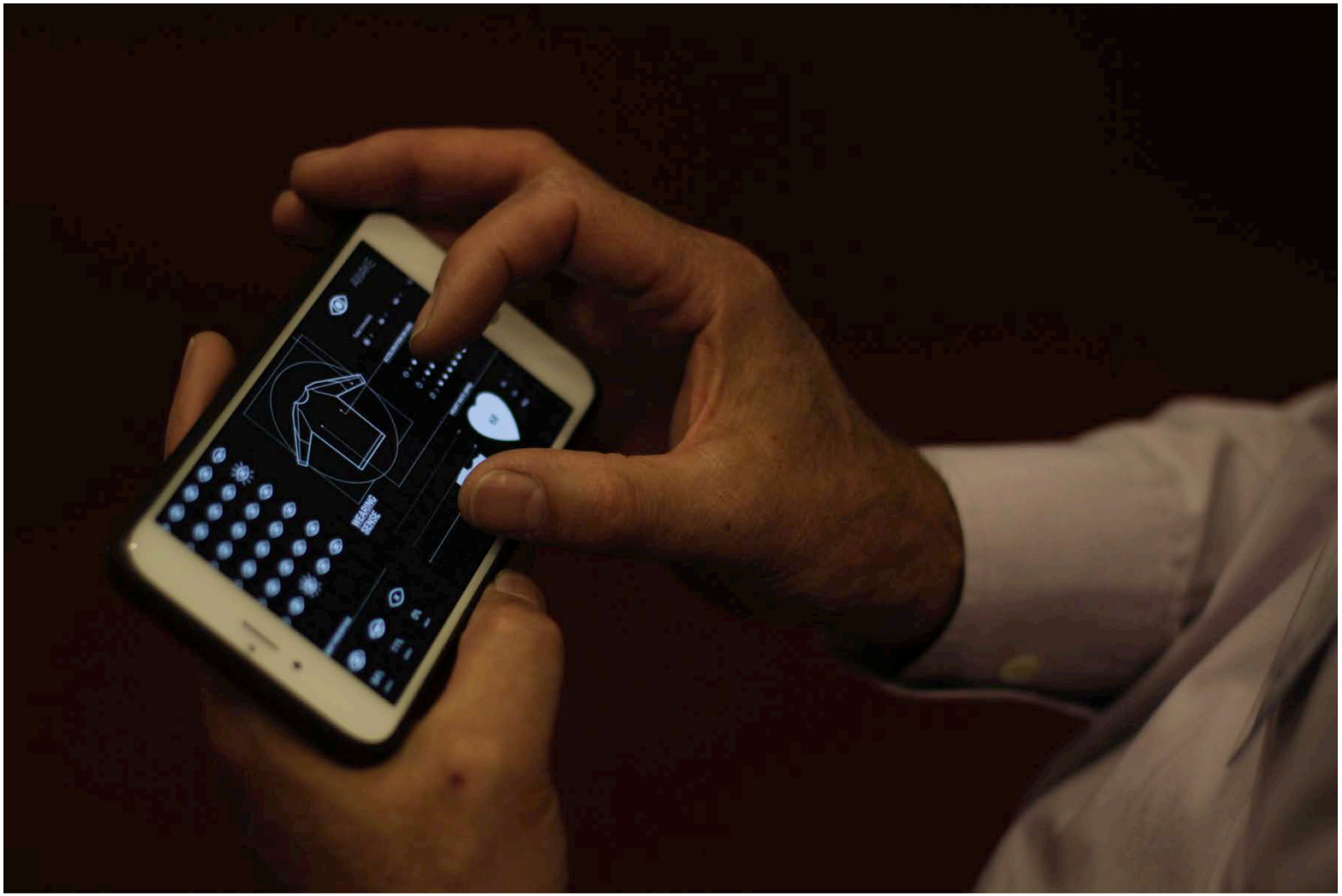
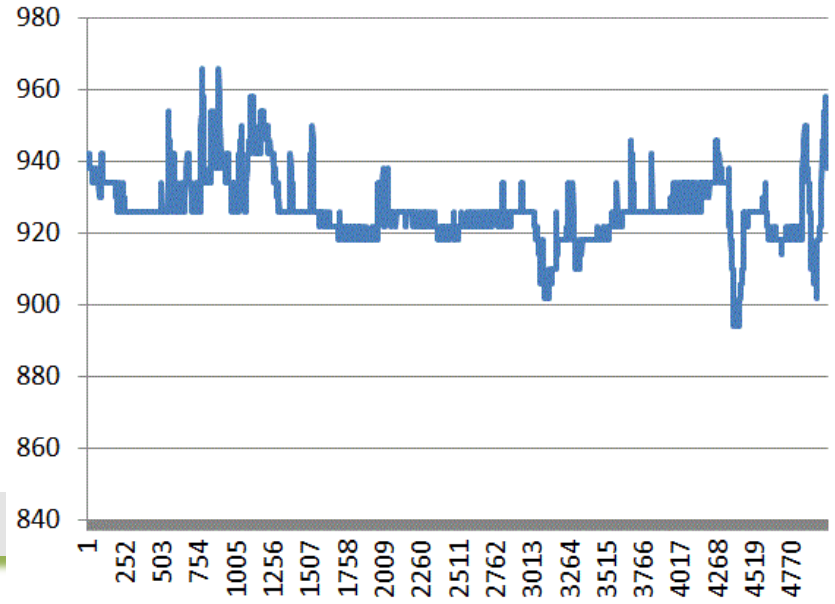


Sensing Examples: Lectures



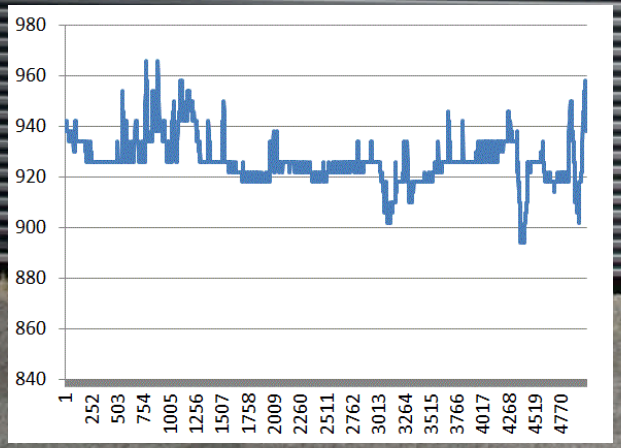
Sensing Examples: Lectures

https://www.youtube.com/watch?v=QGQobnXHFw4

From Sensors to Experience

From Sensors to Experience

https://vimeo.com/140198523



BORRE ENGAGEMENT

ENGAGED

ACCELERATION ON AXIS

x

y

z

HEART RATE (BPM)

75

50

NOW

63

Hi: 108

Lo: 52

Avg: 70