Smart Textiles Go Clubbing

Sensing Audience at the Amsterdam Dance Event

@SergioCabrero

Smart Textiles & Soft Robots Symposium @RCA, London, 26.09.2017

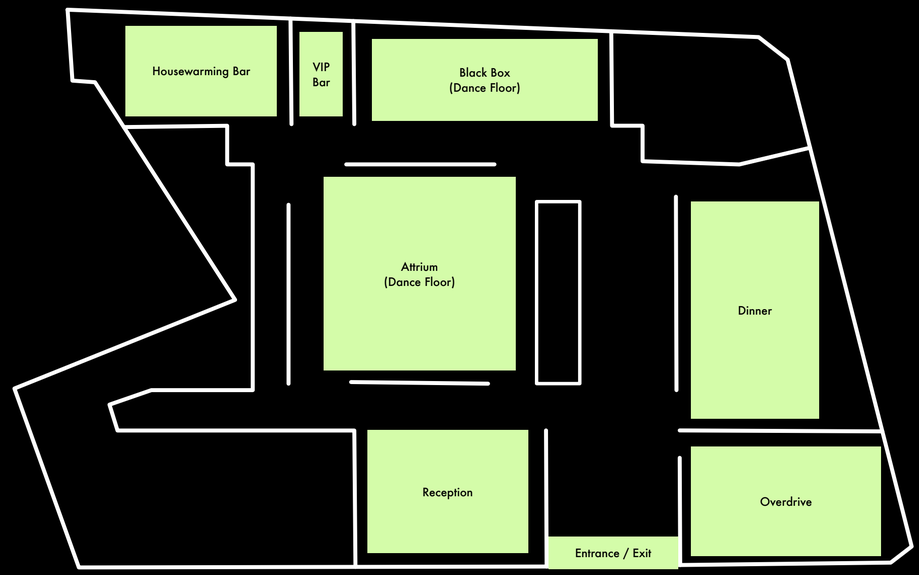
The Party

CWI x BYBORRE

RedBull Playrooms: https://vimeo.com/207023703

PARTY LIKE IT’S 2099!

- 2 nights, 7 hours & ~ 500 guests per night
- Michelin* Dinner: 75 Friends of RedBull
- 2 Dance Floors, Chill-out (overdrive) Room, Bars…
- Selected Artists/DJs
- Iconic Building: Bugenhuis

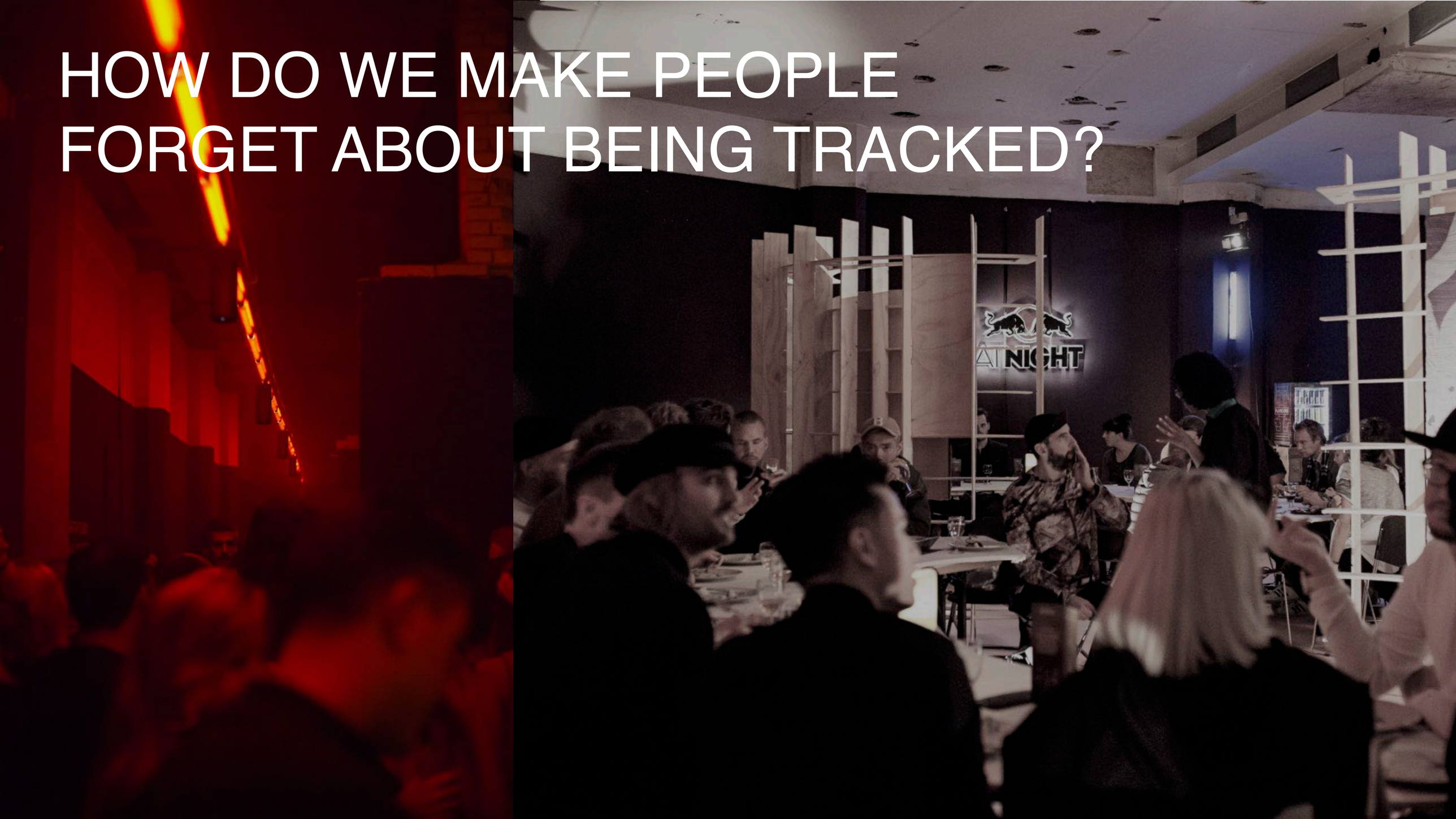


SMELL
SIGHT
TASTE
HEAR
TOUCH
Red Bull AT NIGHT
PLAYROOMS
Curated By BY BORRE
October 20/21 2016

CAPTURE THE EXPERIENCE & SHARE IT BACK

Capturing the Experience

HOW DO WE MAKE PEOPLE FORGET ABOUT BEING TRACKED?



YARNS

Natural
- Wool
- Hennep
- Cotton
- Silk

Synthetic
- Polyester
- Nylon
- Acrylic

Other
- Soy
- Bamboo
- Corn

MACHINE

Weaving (Dornier)

MACHINE

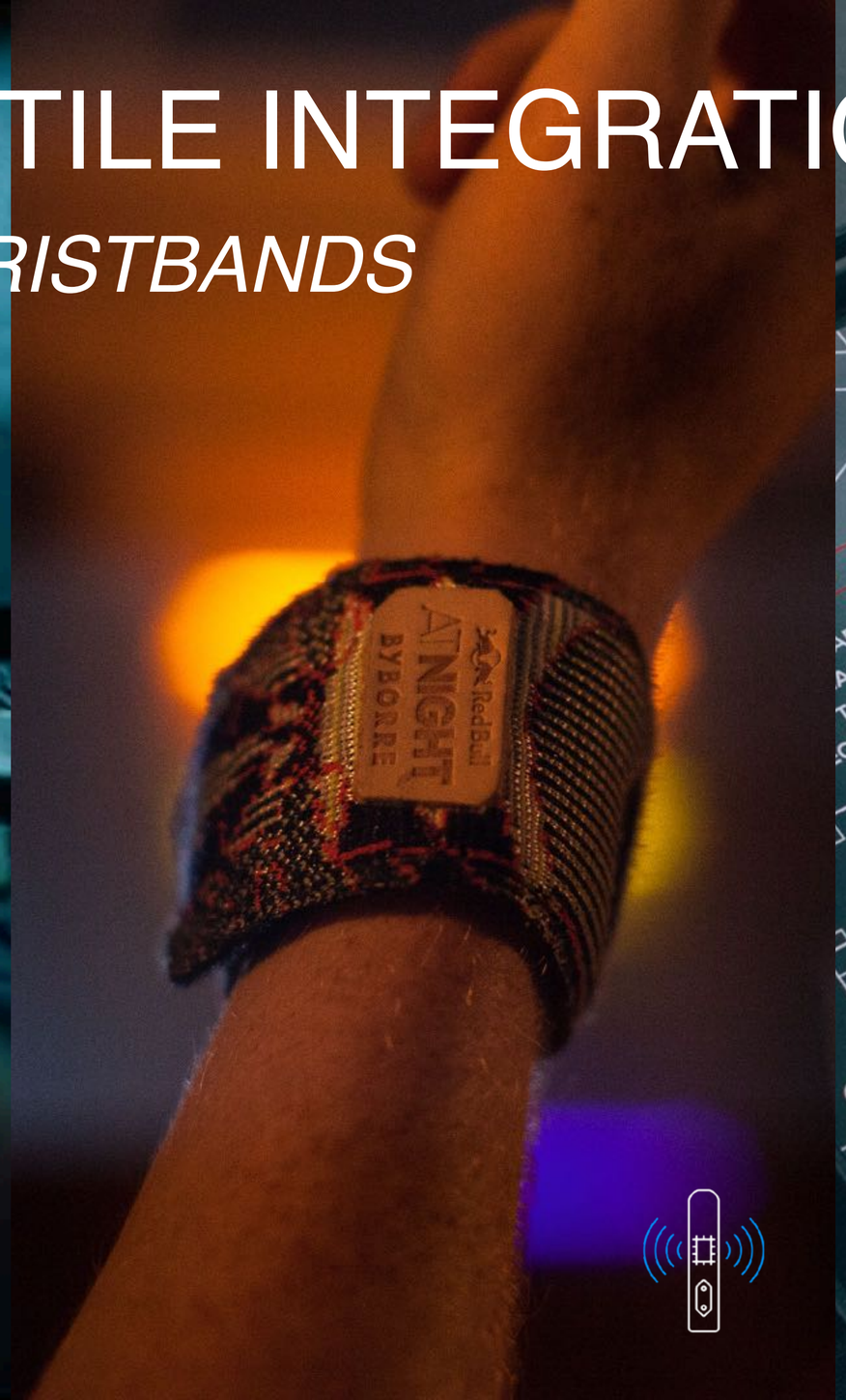
Circular knitting (Santoni)

PROGRAMMING

Pixel to Needle

SENSOR-TEXTILE INTEGRATION

BLE-ENABLED WRISTBANDS

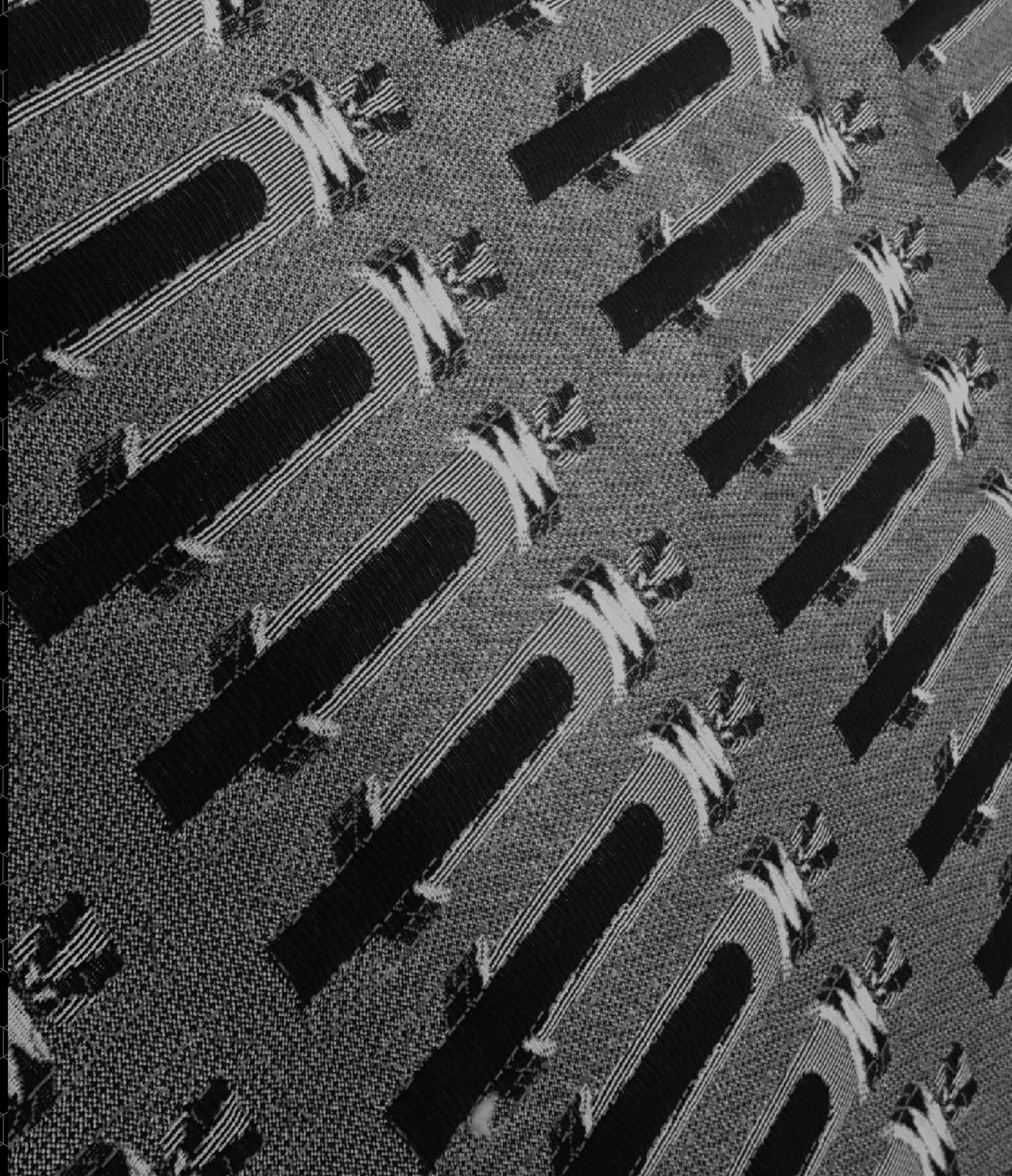


900 X VIP

Estimote Stickers
Programmed in the factory
Data: Temperature & Accelerometer
Period: 1.25 / 2.5 seconds

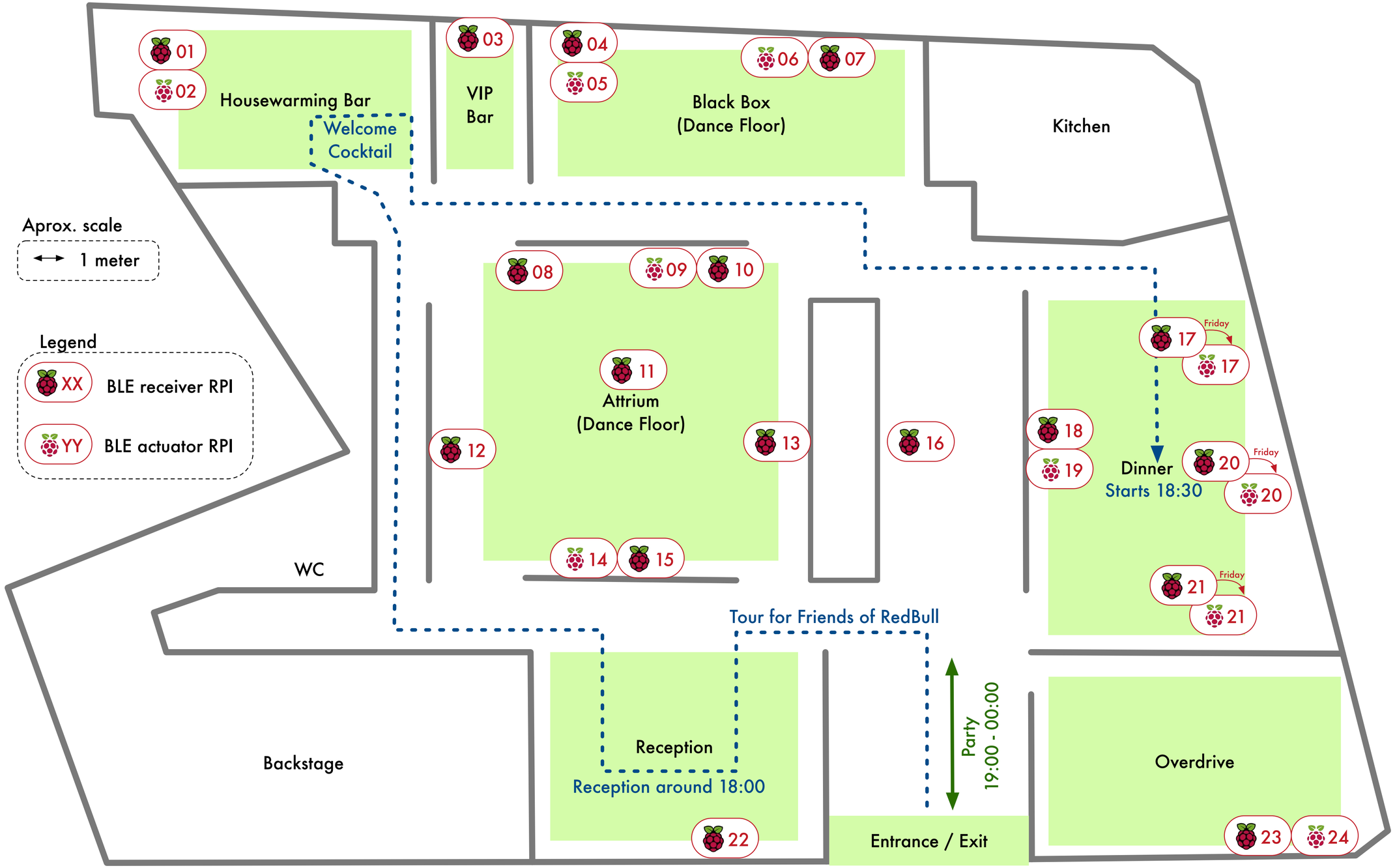
100 X FOR

TI SensorTag CC2650
Programmable
Data: Temperature & Accelerometer
Period: 1.25 seconds
LED



HOW DO WE MAKE THE CLUB LISTEN TO THE CROWD?

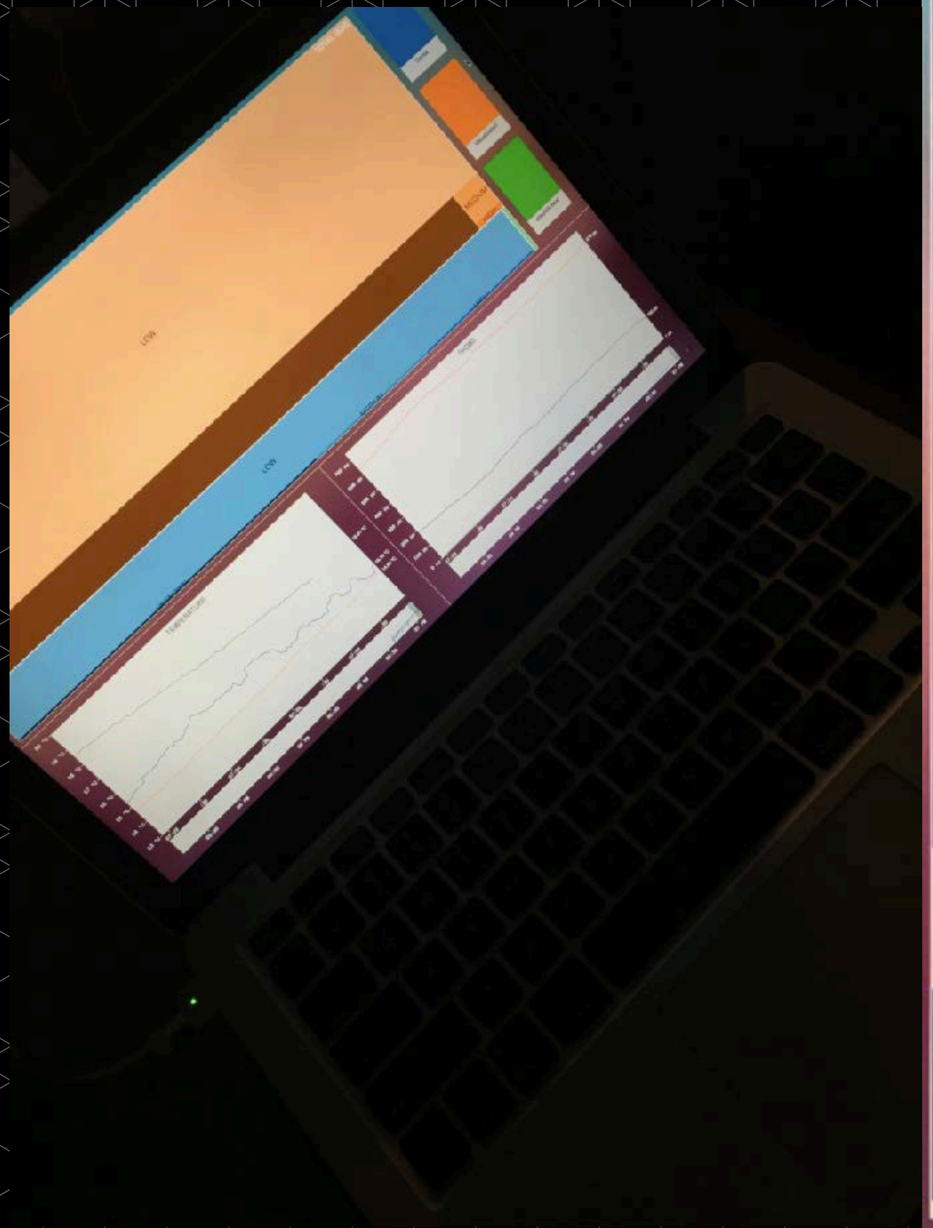
A NETWORK OF RPI

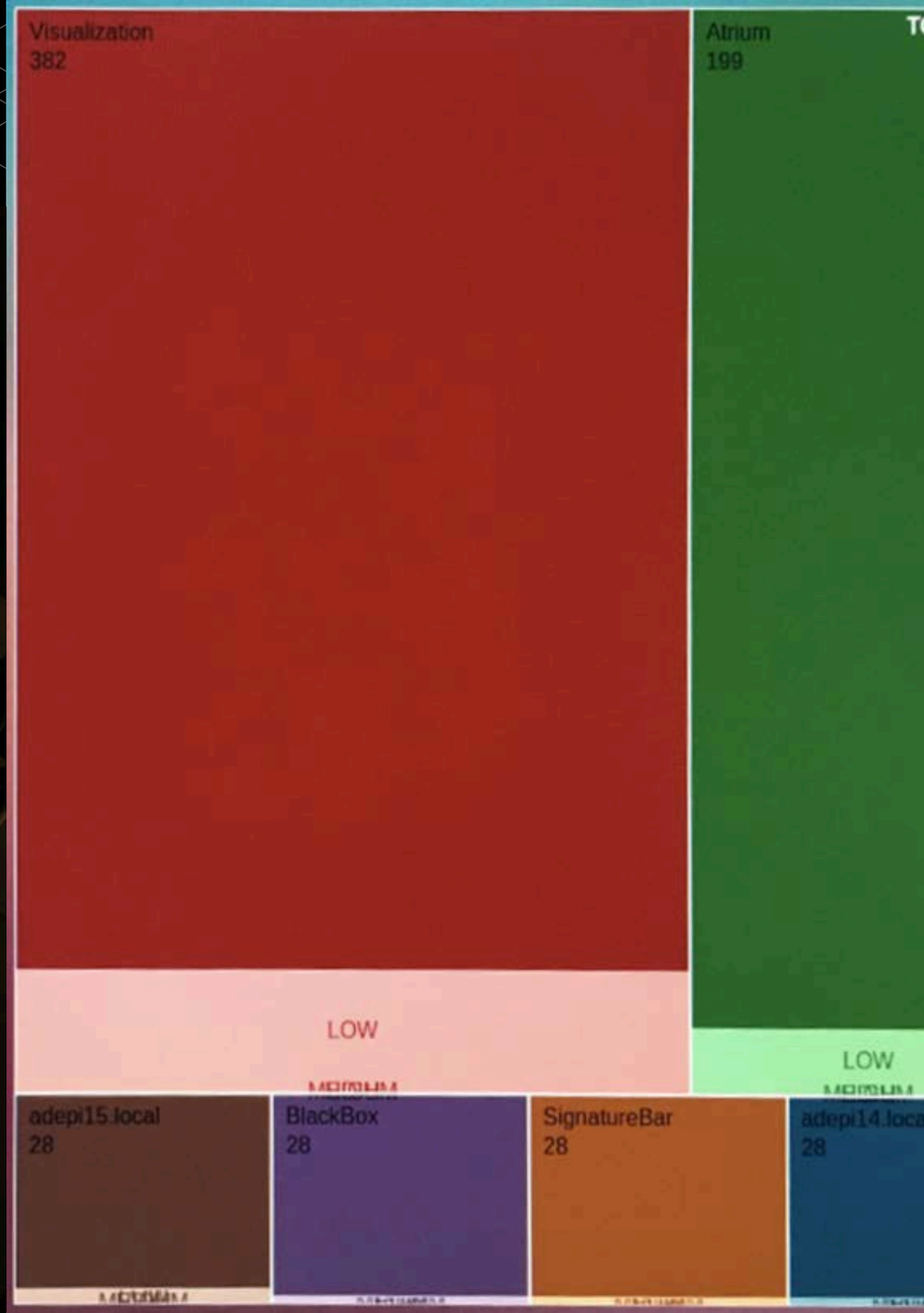


From Data to Insights

INDIVIDUAL & CROWD

- Temperature
- Location
- Energy level

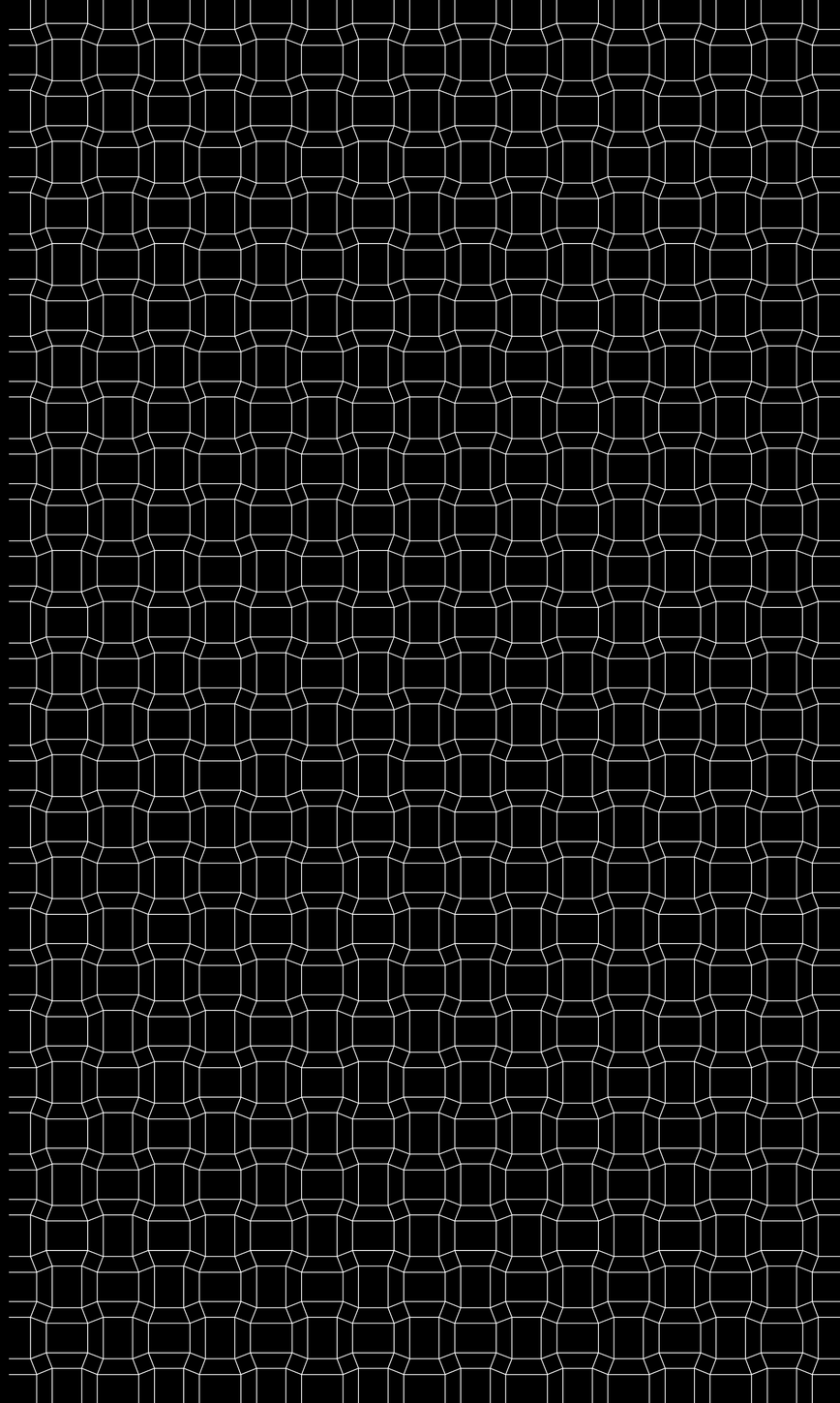




ARE YOU DANCING?

- Dancing not an ‘exercise’ activity
- Sensors can go to sleep/low broadcast mode
- Broadcast rates of BLE beacons are between 0.4Hz–0.8Hz

  Most activity recognition is done at > 30 Hz
- Packet loss by function of BLE delivery



SOLUTIONS

- Dancing not an ‘exercise’ activity
- Sensors can go to sleep/low broadcast mode
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- **First:** We collect some ‘bootstrap’ data

SOLUTIONS

- Dancing not an ‘exercise’ activity
- Sensors can go to sleep/low broadcast mode
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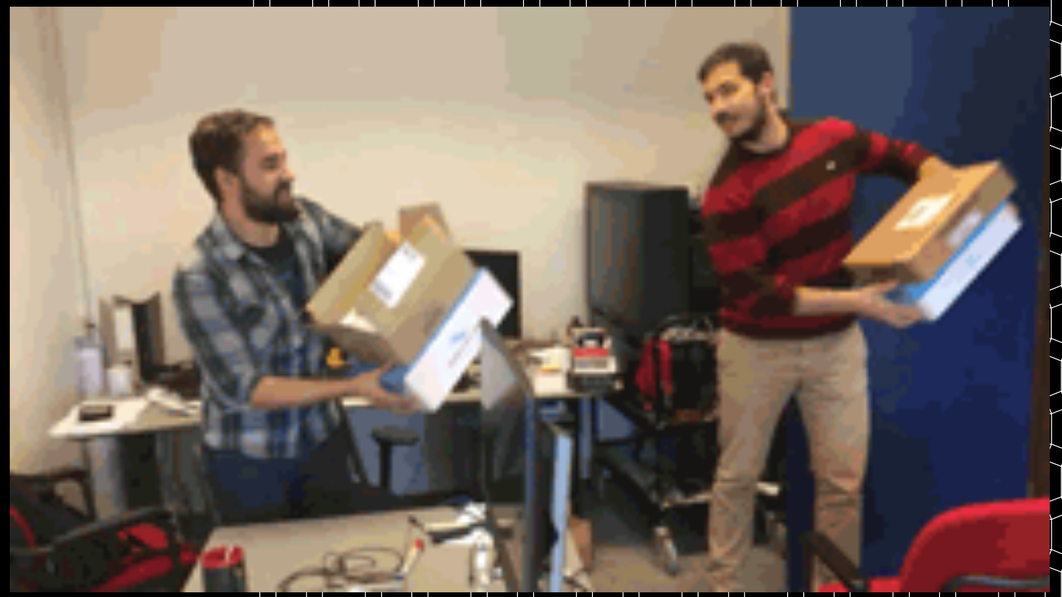
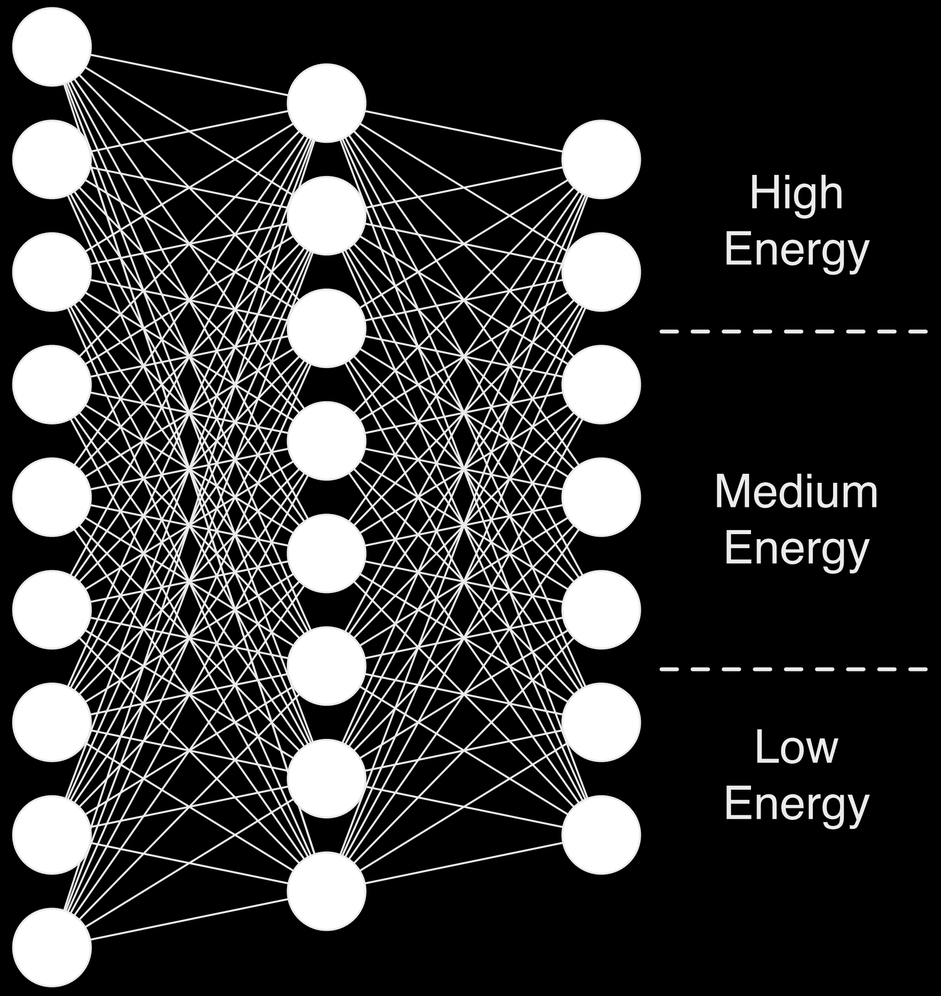
  Most activity recognition is done at > 30 Hz
- Packet loss by function of BLE delivery

- **First:** We collect some ‘bootstrap’ data
- **Second:** We measure expected packet loss

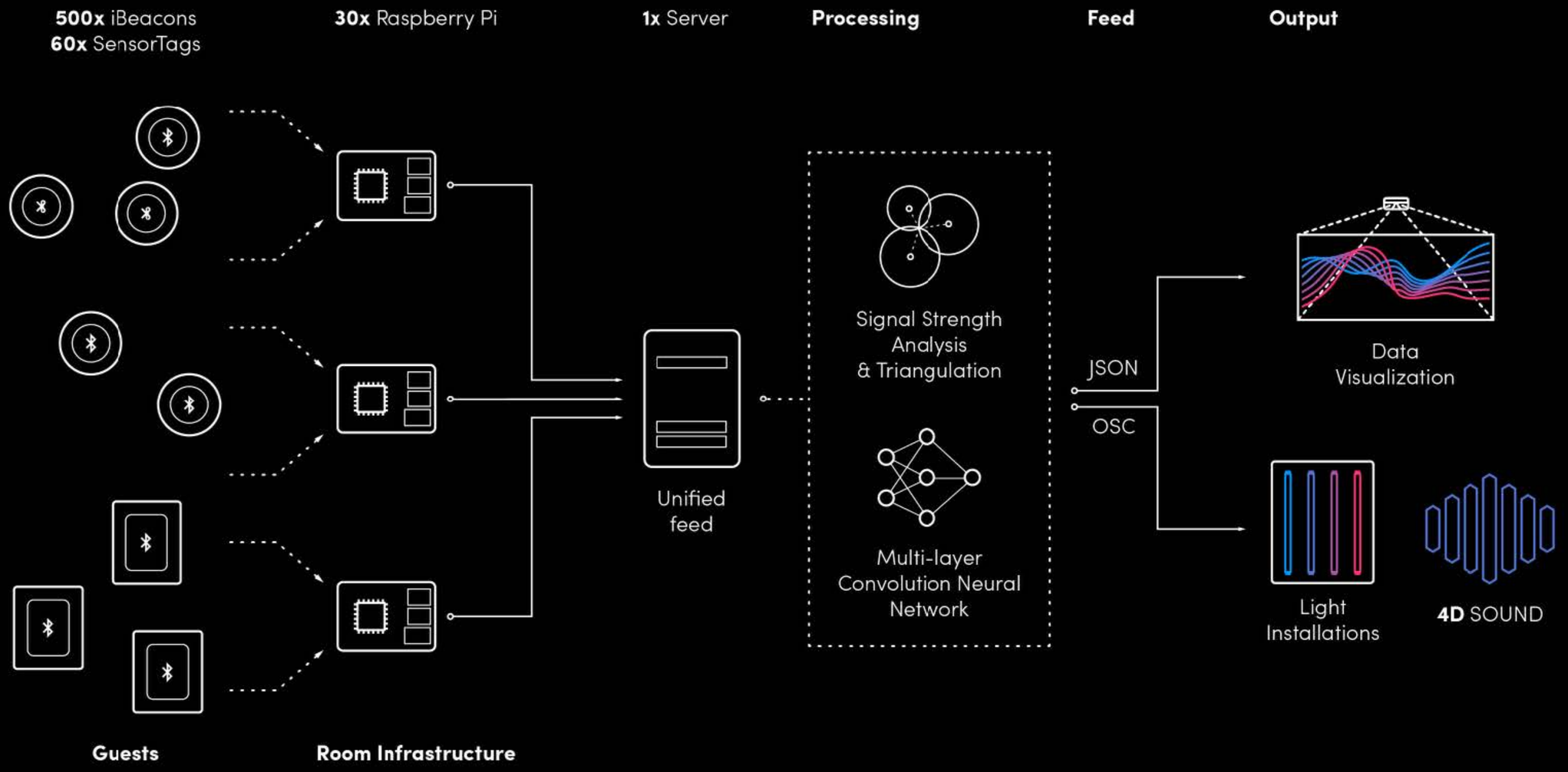


NEURAL NETWORK



DATA PIPELINE

Data collection, processing & interpretation



AN OPEN DATASET

https://github.com/cwi-dis/CWI-ADE2016-Dataset

40M BLE PACKETS

- Timestamp
- Receiver (RPI)
- Address (hashed)
- Sensor Id
- Type of Device
- Payload (hashed)
- Payload Length

14M SENSOR READINGS

- Temperature
- Accelerometer (X, Y, Z)
- Is moving? (Estimote)
- Previous Motion State (Estimote)
- Current Motion State (Estimote)

Creating Experiences from Data

FROM DATA TO SOUND

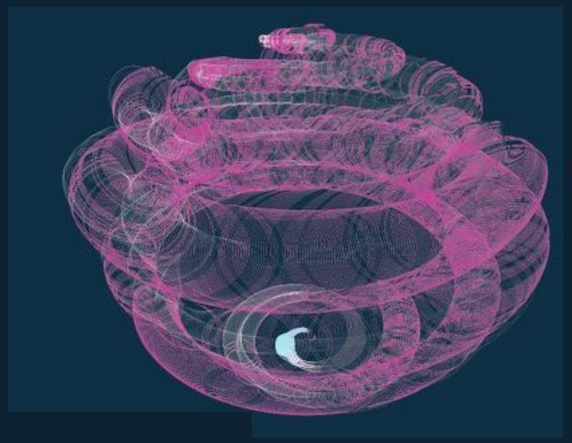
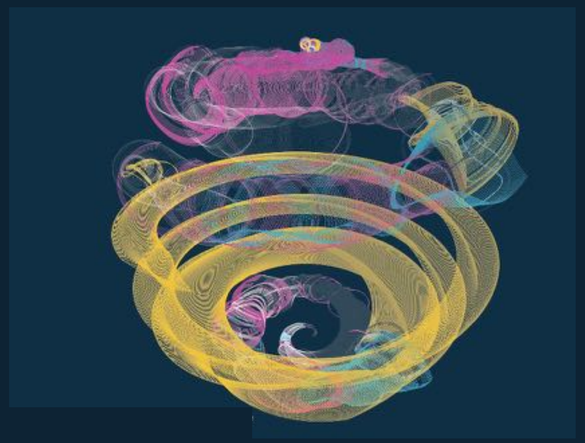
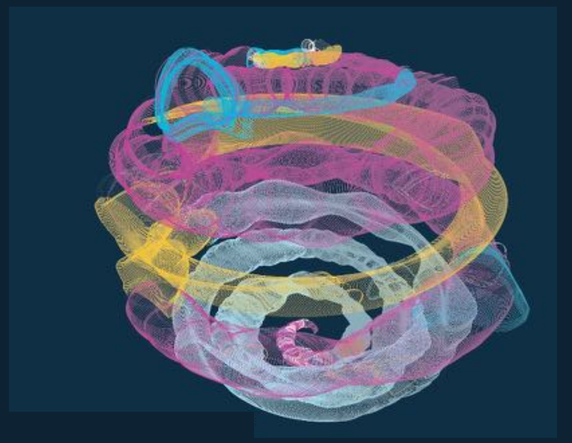
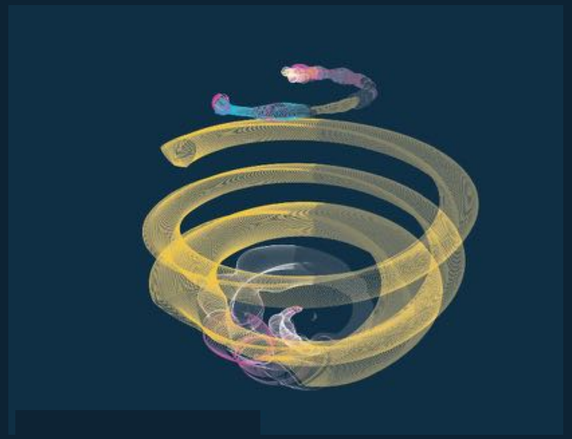
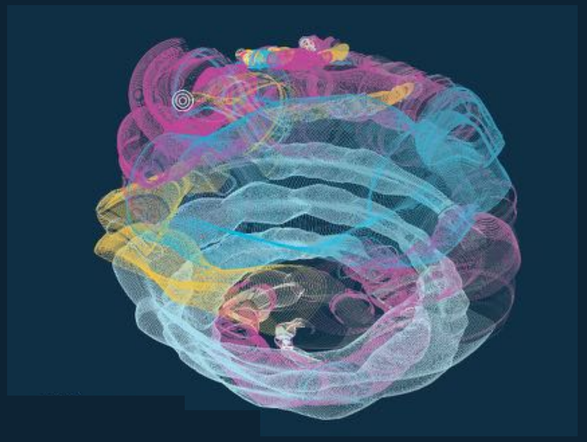
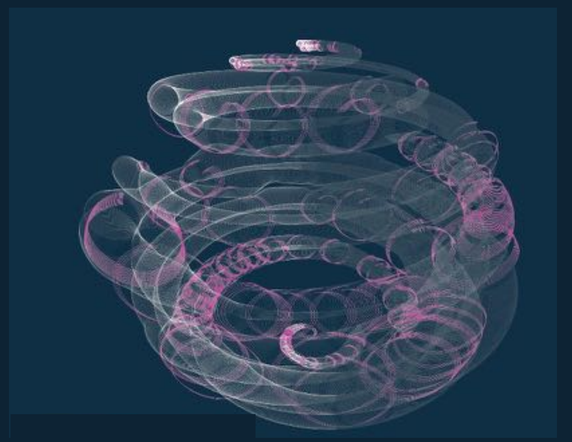
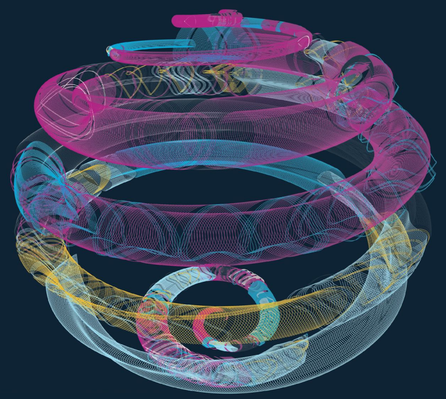
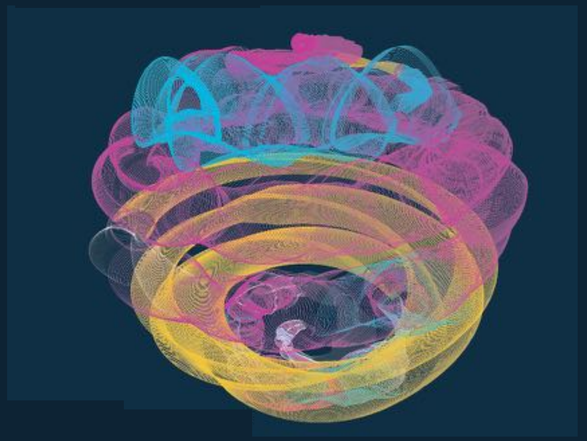
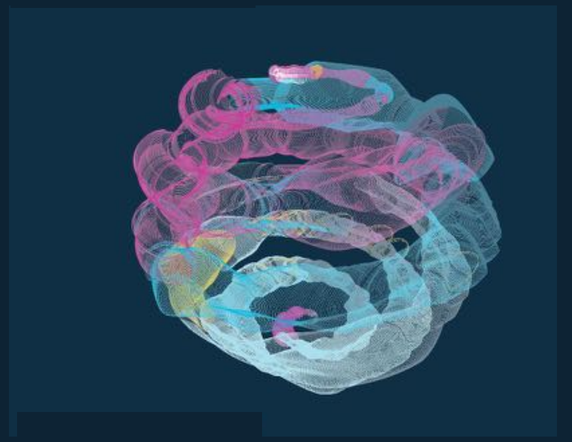
Giving the club a voice

ON-SITE LIVE VISUALIZATION

Creating Meaningful Data Summaries

VISUAL EXPERIENCE SUMMARY

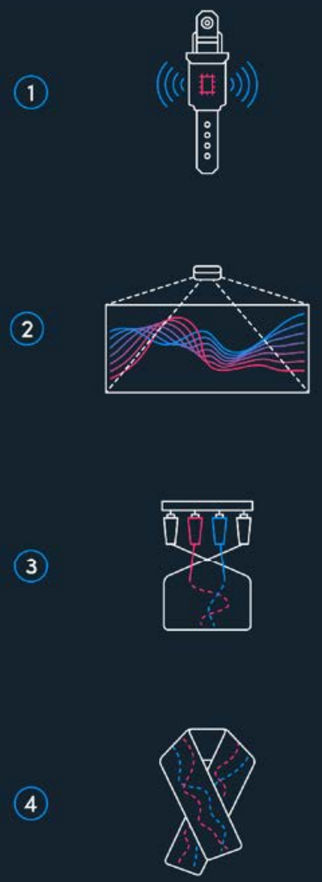
Guest > Data > Club Energy > Flight of the Night

OVERDRIVE - ATRIUM - BLACKBOX - DINNER - HOUSEWARMING - ENTRANCE

PERSONALISED SCARF

Club Energy > Data Visualisation > Pixel to Needle > Scarf



What Now?

Project Cairo
An intelligent soft-robotic jacket

BYBORRE x CWI x AMOLF

Soft-robotic matter
Bas Overvelde

Video: https://www.youtube.com/watch?v=maKILHxcGAE

DATA

- User profile
- Internal sensors
- External sensors (e.g. in the bike)
- Other data sources (e.g. weather)

REACTIVE

- Soft-robots / origami

PERSONALISED & INTELLIGENT

Image: byborre.com

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Thanks
David Ayman Shamma
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Amritpal Singh Gill
REDBULL, IBM,
Clever&Franke

CWI
Distributed and Interactive Systems

www.dis.cwi.nl
@cwi_dis

BYBORRE

Dataset: https://github.com/cwi-dis/CWI-ADE2016-Dataset
RedBull Playrooms movie: https://vimeo.com/207023703