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SWARM & SYNC

The collective self-organised dynamics of the whole population manifests in ways that cannot be ascribed to the characteristics of individuals. This behaviour is **emergent**.

“The whole is more than the sum of its parts.”

What about **humans?**

Cognitive processing of a common stimulus **synchronizes** brains, hearts, and eyes.

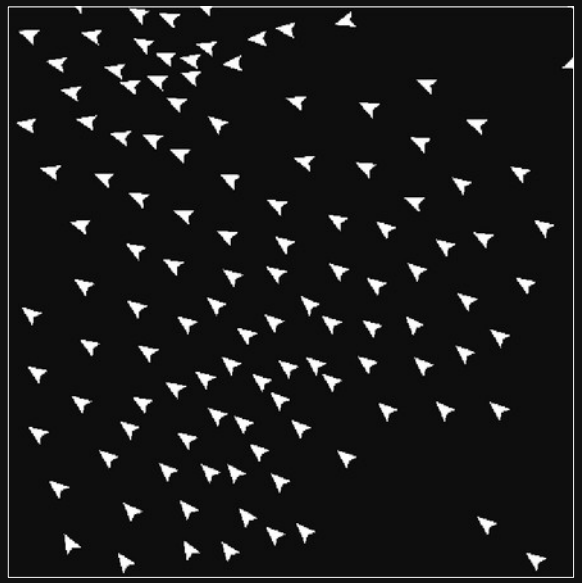
Physical synchrony between humans facilitates rapport and learning.

Group flow state encourages teamwork and cooperation.

Madsen et al (2022), Nozawa et al. (2019), Csíkszentmihályi (1990)

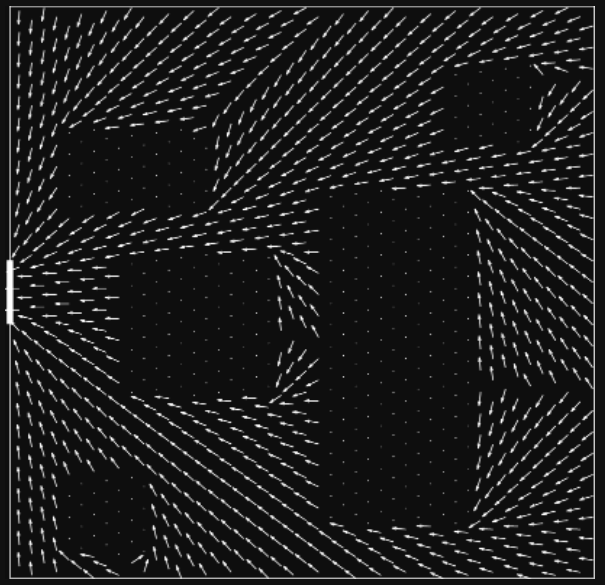
WHAT WOULD A HUMAN FLOCK LOOK LIKE?

swarming and flocking models



Reynolds (1987)

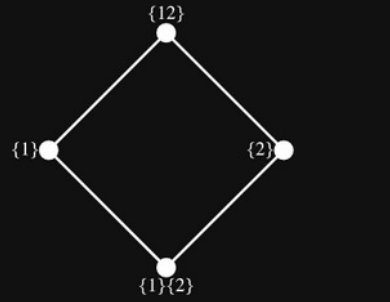
Vicsek et al (1994)

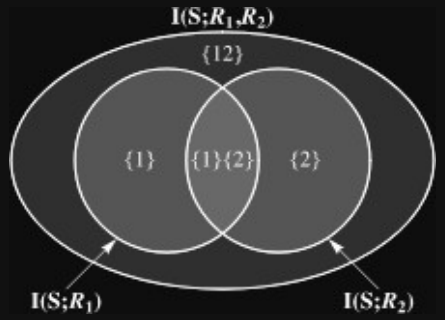


Maury & Venel (2009)

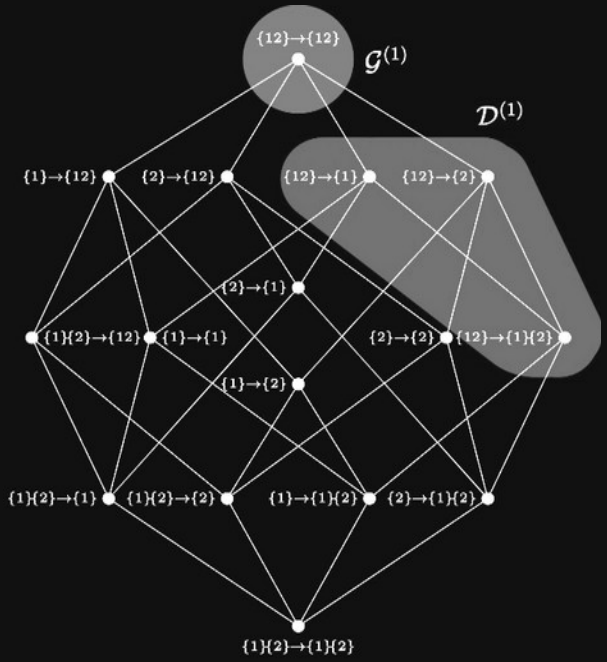
HOW DO WE FORMALISE EMERGENCE?

decompose mutual information into synergy and redundancy





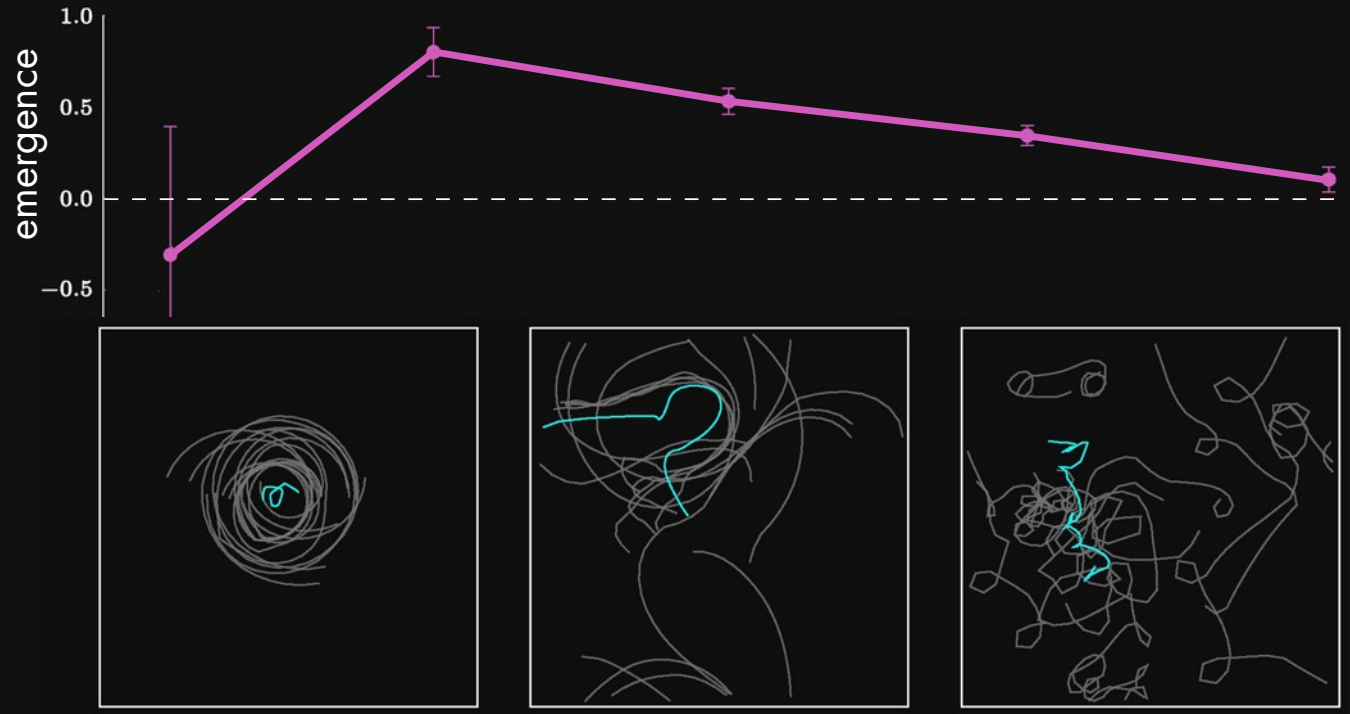
Williams & Beer (2010)



Rosas, Mediano et al (2019)

HOW DO WE FORMALISE EMERGENCE?

quantify relationships evolving in time between 'parts' and 'whole'



Rosas, Mediano et al (2019)

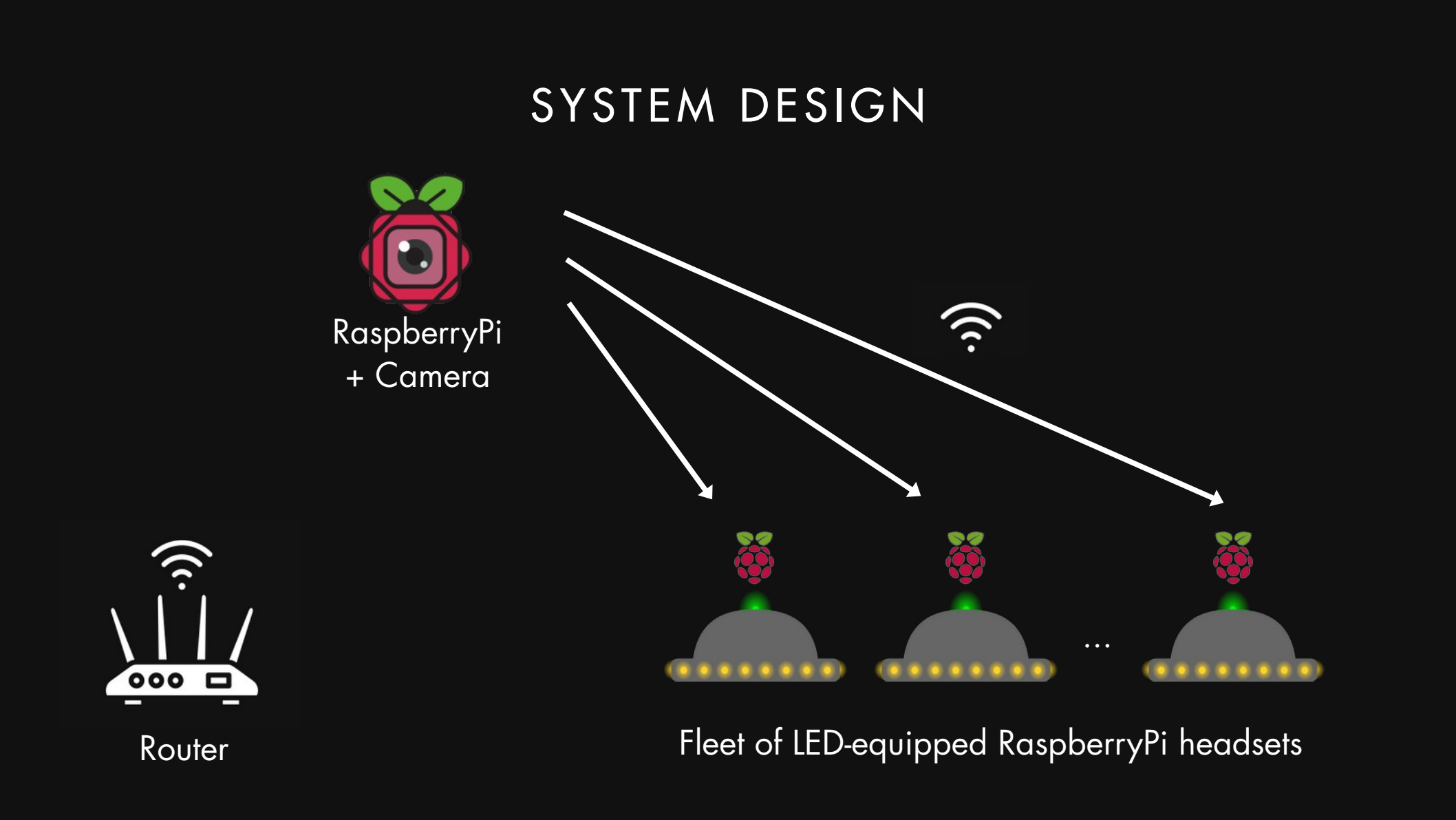
SYNCH.LIVE

a participatory first-person experience of collective emergence

CONCEPT

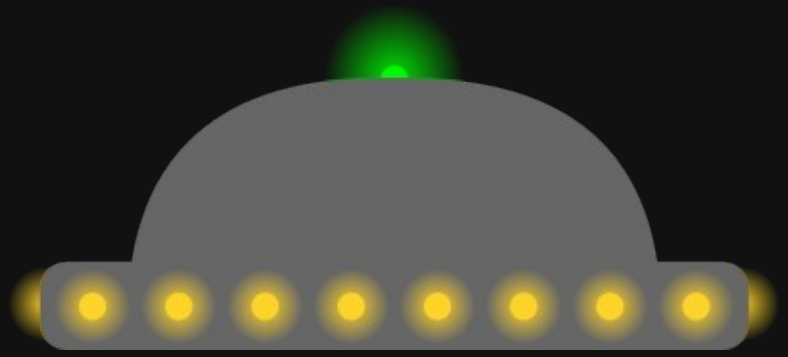
- Participants move freely, without talking, trying to synchronise their headset lights
- Hat lights blink in sync when group flocks

SYSTEM DESIGN

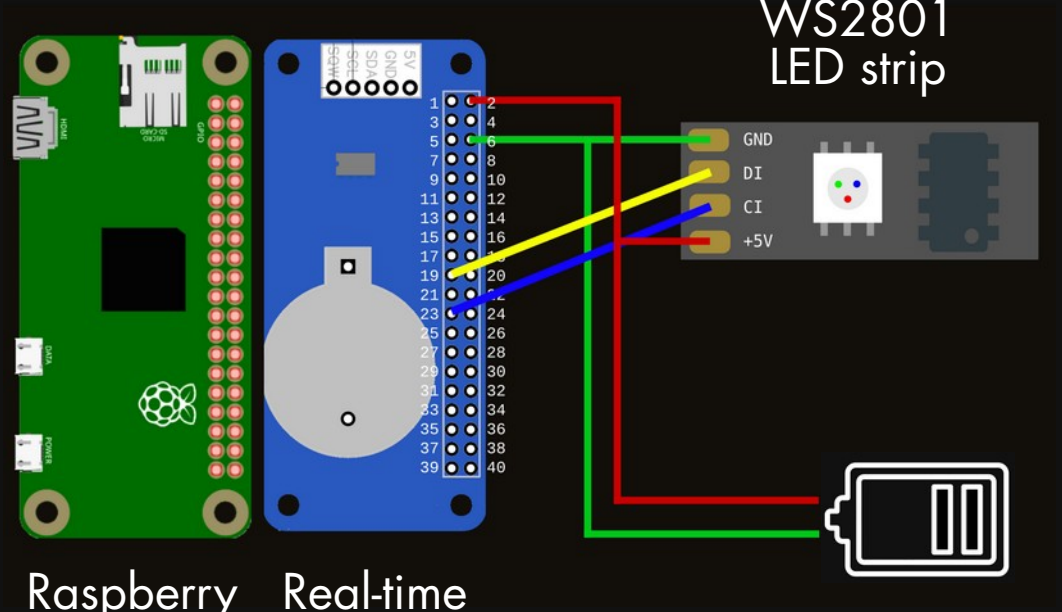


HEADSET DESIGN

using RaspberryPi Zero W and individually addressable LEDs

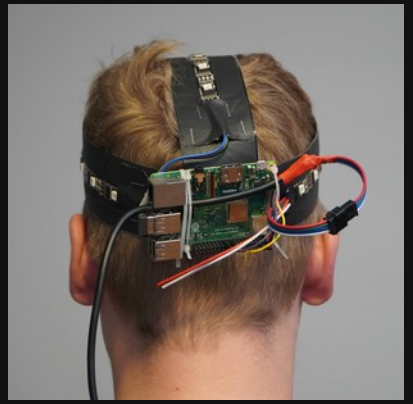


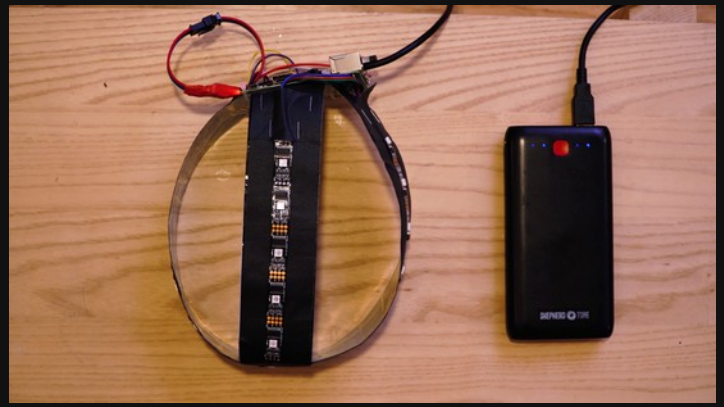
hat with LED strip and
tracking light on top

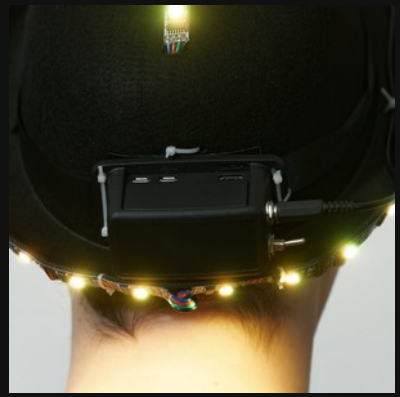


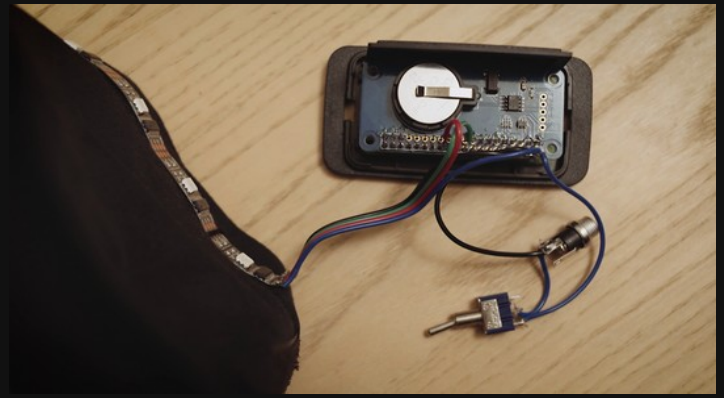
HEADSET PROTOTYPES

wireless, portable, battery-powered



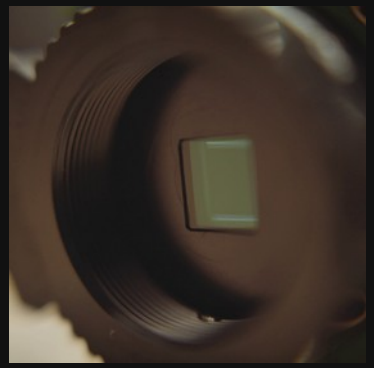


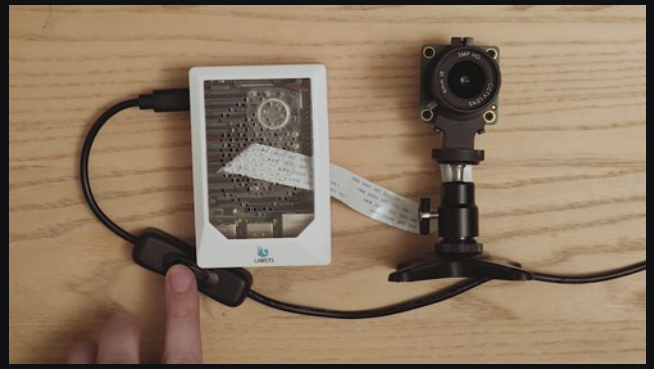


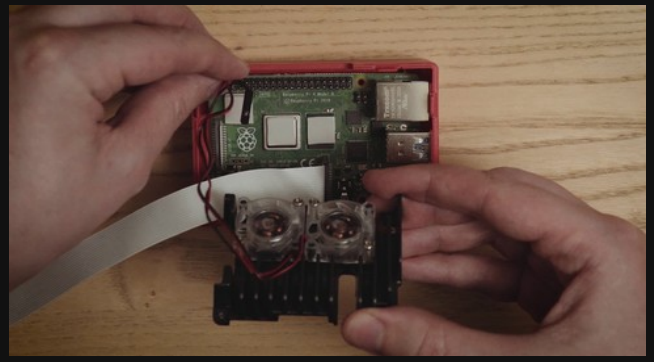


OBSERVER SYSTEM

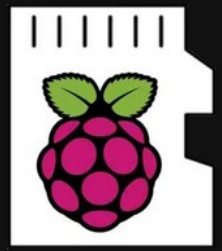
RaspberryPi 4 and PiCamera, computer vision, emergence calculation







SOFTWARE STACK



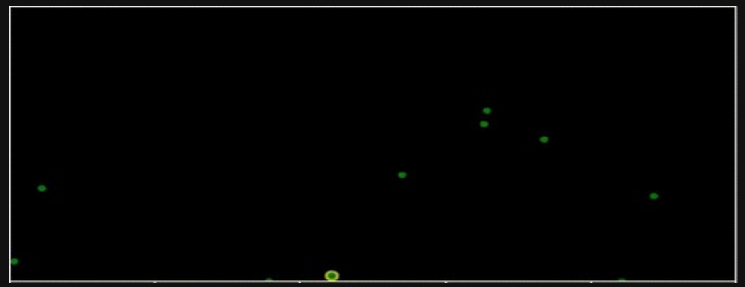
Open technology

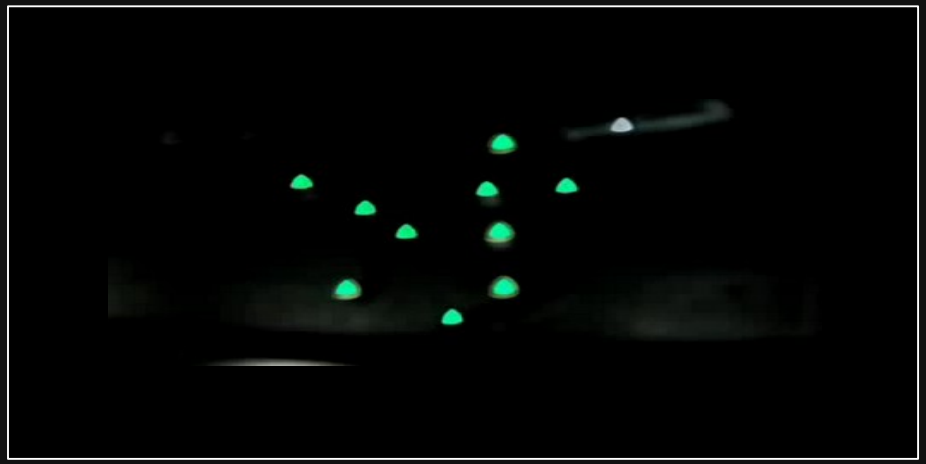
Automation

Minimalism

FLOCKING

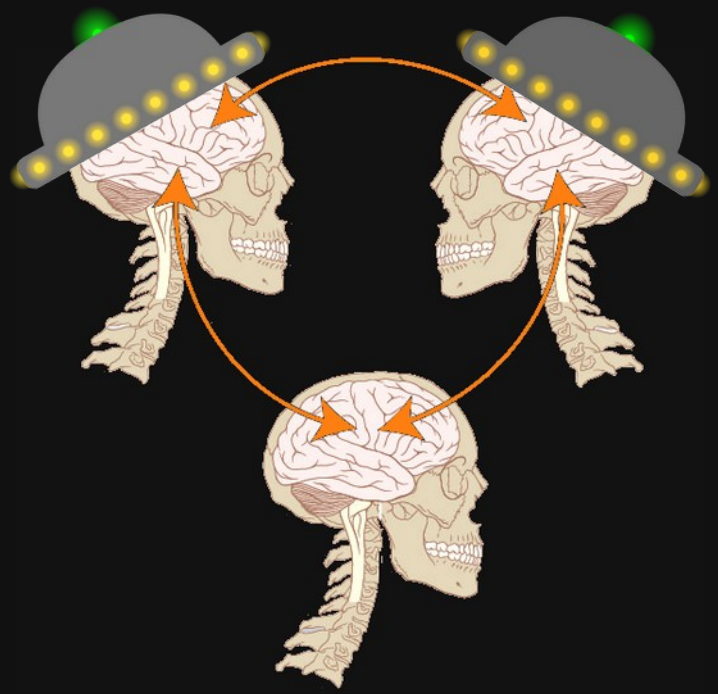
theory vs experiment





APPLICATIONS

scientific



- emergence
- states of mind and consciousness science
- group psychology
- co-creation and improvisation
- social behaviour
- nonverbal communication

- *Future work*: enhance headsets with motion sensors, EEG, other stimuli than lights, collaborations with consciousness and psychedelics science

APPLICATIONS

social

- *communitas*
- wellbeing
- conflict resolution
- teambuilding
- evacuation
- public engagement and science communication
- giving talks with a cool hat on

- Future work: global Synch.Live day!

ACKNOWLEDGEMENTS

synch.*live*



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THANK YOU!

questions?