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# Analysis of natural locomotor behaviors at home using a sensitive floor.

Mérodie Sannier<sup>1,3</sup>, Stefan Janaqi<sup>2,3</sup>, Gérard Dray<sup>2,3</sup> & Benoît G. Bardy<sup>1,3</sup>



melodie.sannier@gmail.com

1 EuroMov Digital Health in Motion, Univ. Montpellier, IMT Mines Ales, Montpellier, France  
 2 EuroMov Digital Health in Motion, Univ. Montpellier, IMT Mines Ales, Ales, France  
 3 Human at home project (HUT), Montpellier, France

## WALKING AT HOME FACTS AND FIGURES\*

\*Averaged daily values per person  
(extracted from 40 months of occupancy)

≈ 822 m  
≈ 0.82 km  
DISTANCE

TIME  
≈ 1520 s  
≈ 25min 20s

≈ 0.58 m/s  
≈ 2.08 km/h  
VELOCITY

STEPS  
≈ 2050

≈ 170 traj.  
TRAJECTORIES

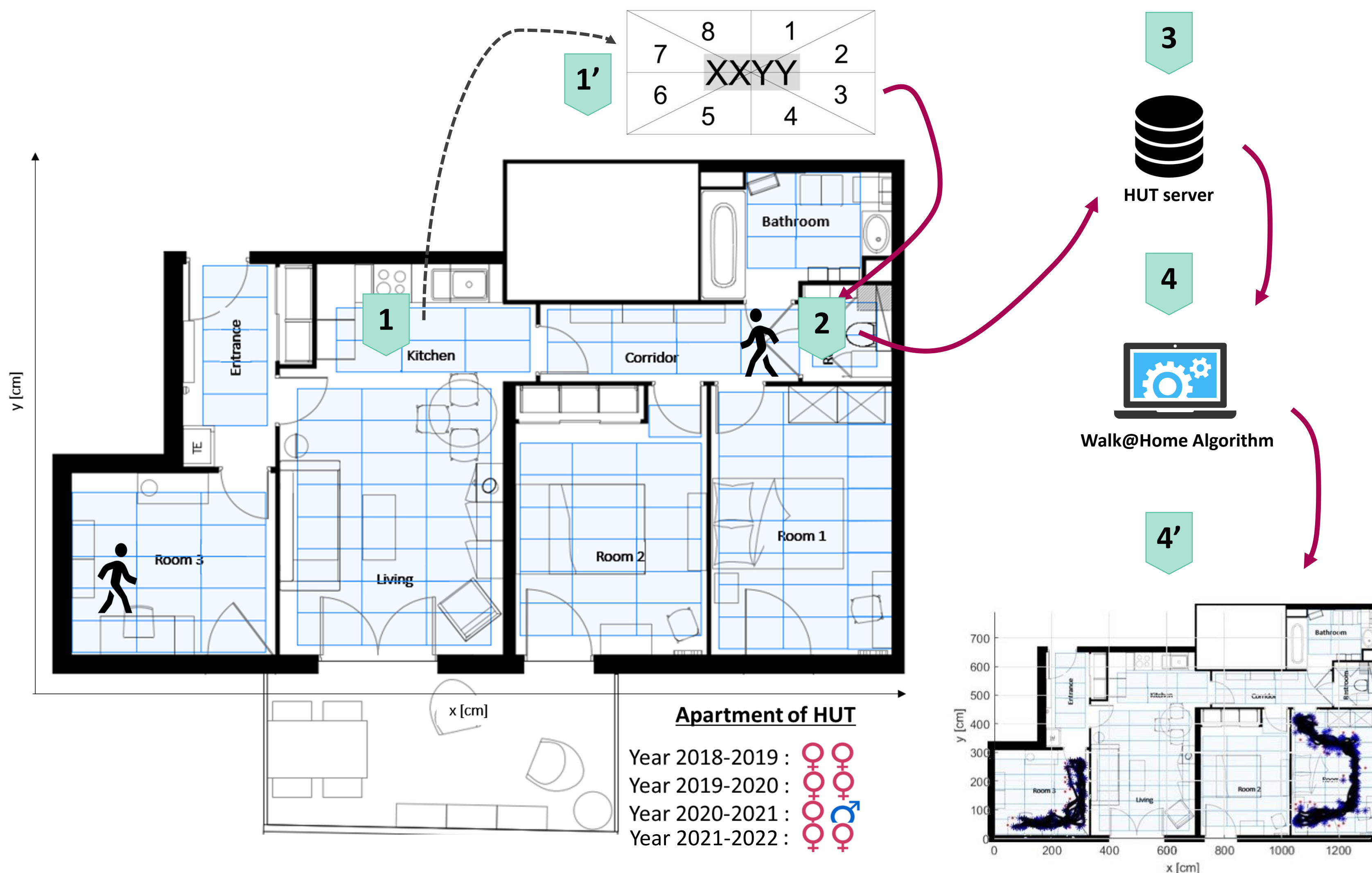
## INTRODUCTION

Documenting how people walk at home allows to identify :

- **Indoor locomotor efficiency** → Speed ( $v$ ) in m/s, distance ( $d$ ) in m, time ( $t$ ) in s, number of steps, trajectories [1].
- **Indoor space occupancy** → Occupation of a restricted space **encumbered** with obstacles (attractors-repulsors) [2].
- **Markers of wellness** → Physical and psychological well-being (influences of **mood** and **personality** on walking pattern) [3,4].

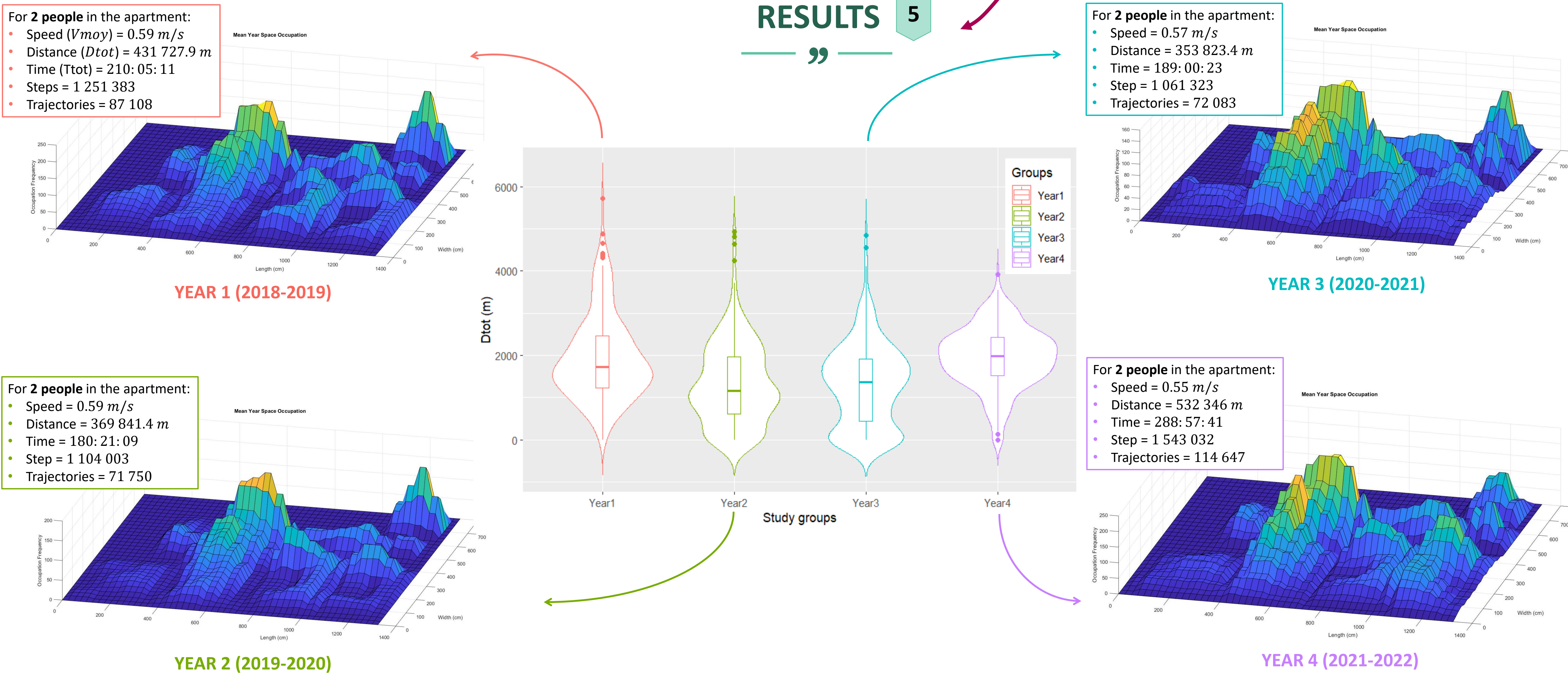
Our objective was to investigate the evolution of locomotor trajectories performed at home, captured by a capacitive proximity sensor, the SensFloor, installed in an apartment in Montpellier.

## MATERIALS & METHODS



- 1 : Installation of the SensFloor in the Human at home project apartment (72m<sup>2</sup>)
- 1' : SensFloor composed of 109 x 8 capacitive proximity sensors
- 2 : Continuous recording of locomotion from four successive dyads living naturally in their home for 1 year
- 3 : Storage of the data from the continuously captured ground
- 4 : Data cleaning with the Walk@Home algorithm
- 4' : Reconstruction of locomotor trajectories performed at home by the algorithm
- 5 : Data analysis and results visualization

## RESULTS



## CONCLUSION

This study shows that we walk every day at home approximately 25 minutes, taking 2050 steps over a distance of 822 meters with an average speed of  $0.58 \text{ m} \cdot \text{s}^{-1}$ . It also suggests a **variable locomotor behavior** (increase in distance and travel time) according to temporal moments (weekends, vacations, seasons) associated with a **constant walking velocity**. The extraction of this locomotor information over 4 years (1 year for each of the four dyads) allows us to document natural walking at home. This research also allows us to consider a **motor signature of well-being** at home that could serve as a health indicator for the recognition and prevention of psychomotor disorders.

## ACKNOWLEDGMENTS

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