Purpose built sensing for healthcare in residential environments

James Pope[1] and Vafeas Antonis[1,2]

[1] **University of Bristol**

[2] **Wind River UK**

1. Introduction

**Low-power low-maintenance wearable sensor technology for healthcare**

The University of Bristol designed a smart home kit to collect data from which patient activity levels could be assessed. Together with that, environmental and mobility information of the participants greatly enhanced the quality and capabilities of the data for healthcare analytics.

2. Results

Have you been pinged in the ping-demic? Have you wonder how you can replace a calendar for patients with low maintenance?

Our receivers called "bunny-ears" were able to detect the inaccuracies on proximity estimations for Bluetooth signals for mobile phones during the pandemic. Particularly floor separations were identified as adjacent rooms showing the lack of dimensionality in indoor localisation solutions. SPHERE used purpose build wearable sensors that were dual purpose devices collecting activity data from participants wrists and providing context to those activities by relating them to the household room in which they took place. EurValve explore the usage of those sensors with inexpensive single board computers.
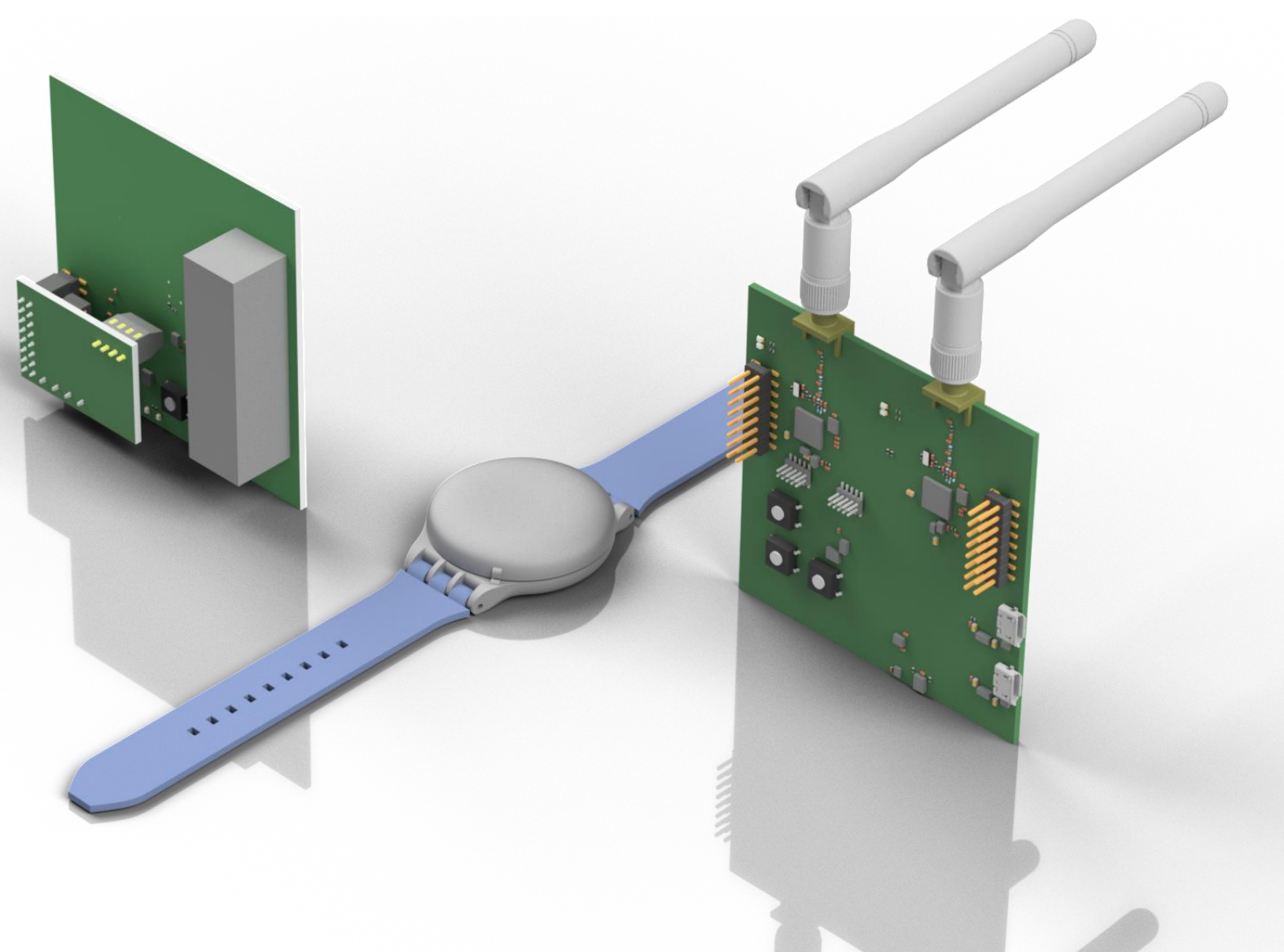
3. Conclusions

Real-time activity and mobility recognition tailed for the next generation machine learning algorithms

Detecting mobility for Parkinson, wandering for Dementia and recovery progression for hip-and-knee replacements are milestones that make a case for long term non-invasive residential healthcare monitoring.

References

[1] Holmes, M., Nieto, M.P., Song, H. et al. 'Modelling Patient Behaviour Using IoT Sensor Data: a Case Study to Evaluate Techniques for Modelling Domestic Behaviour in Recovery from Total Hip Replacement Surgery'

[2] F. Jovan, R. McConville, C. Morgan, E. Tonkin, A. Whone, and I. Craddock, 'Multimodal Indoor Localisation for Measuring Mobility in Parkinson's Disease using Transformers'

[3] R. McConville, D. Byrne, I. Craddock, R. Piechocki, J. Pope, and R. Santos-Rodriguez, 'A dataset for room level indoor localization using a smart home in a box'

[4] Y, Weisong, et al. 'Detecting and Monitoring Behavioural Patterns in Individuals with Cognitive Disorders in the Home Environment with Partial Annotations'