

BioSpace25 - Biodiversity insight from Space
10 - 14 February 2025 | ESA-ESRIN | Frascati - Italy



From Ground to Canopy: Integrating Ground-based Sensors with Remote Sensing to Improve Urban Tree Management

Zúñiga-González, Andrés^{*1}, Millar Josh², Sethi S.², Haddadi H.², Dales M.¹, Madhavapeddy A.¹, Bardhan R.¹

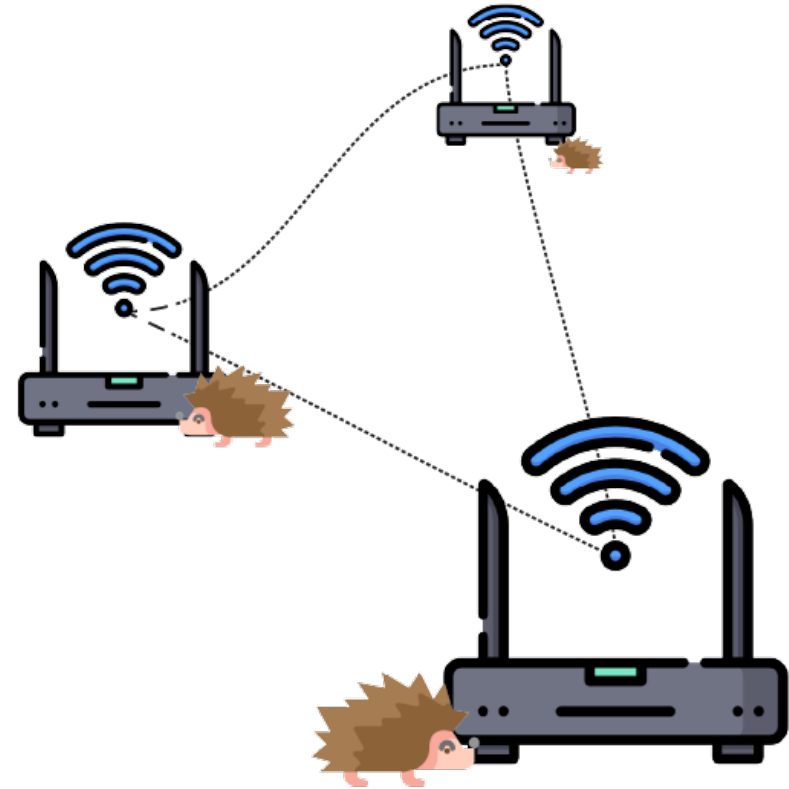


¹ University of Cambridge - ² Imperial College London

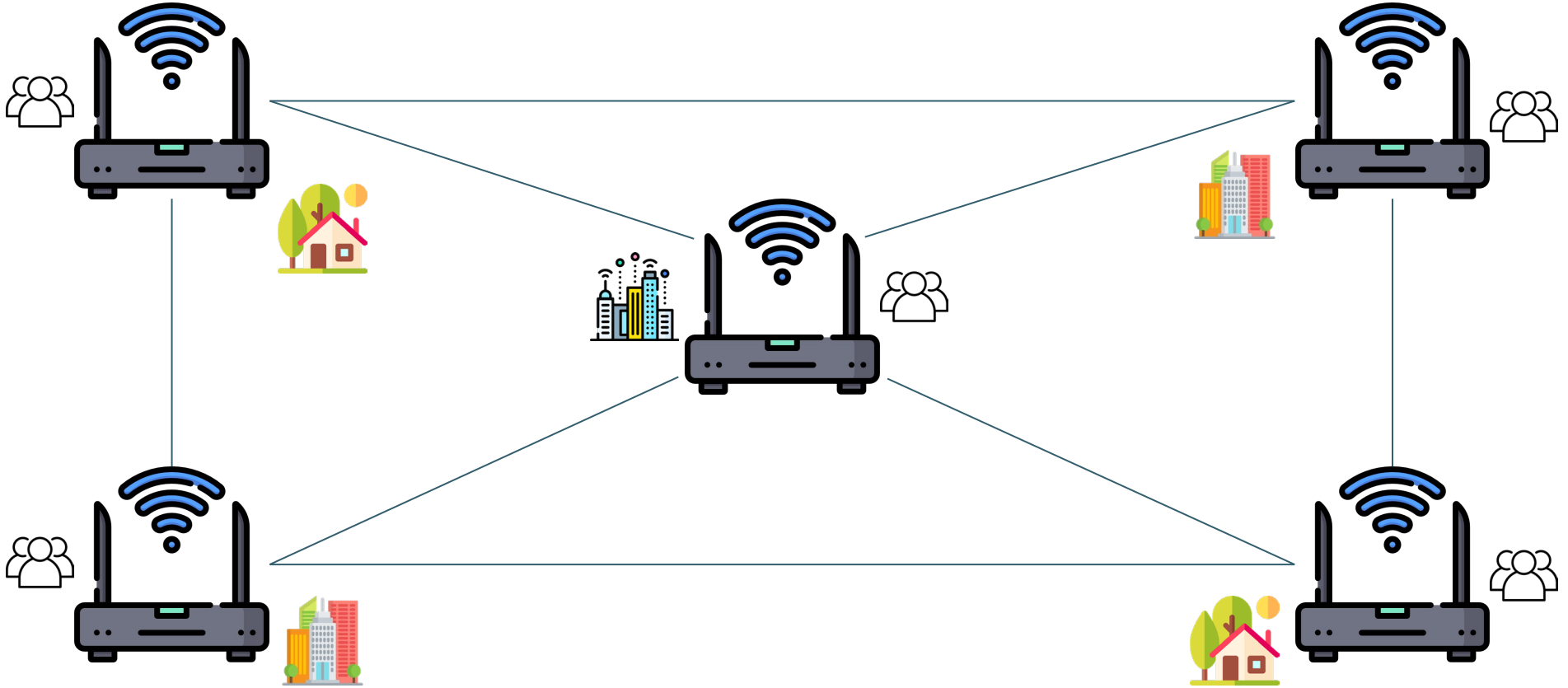


*acz25@cam.ac.uk

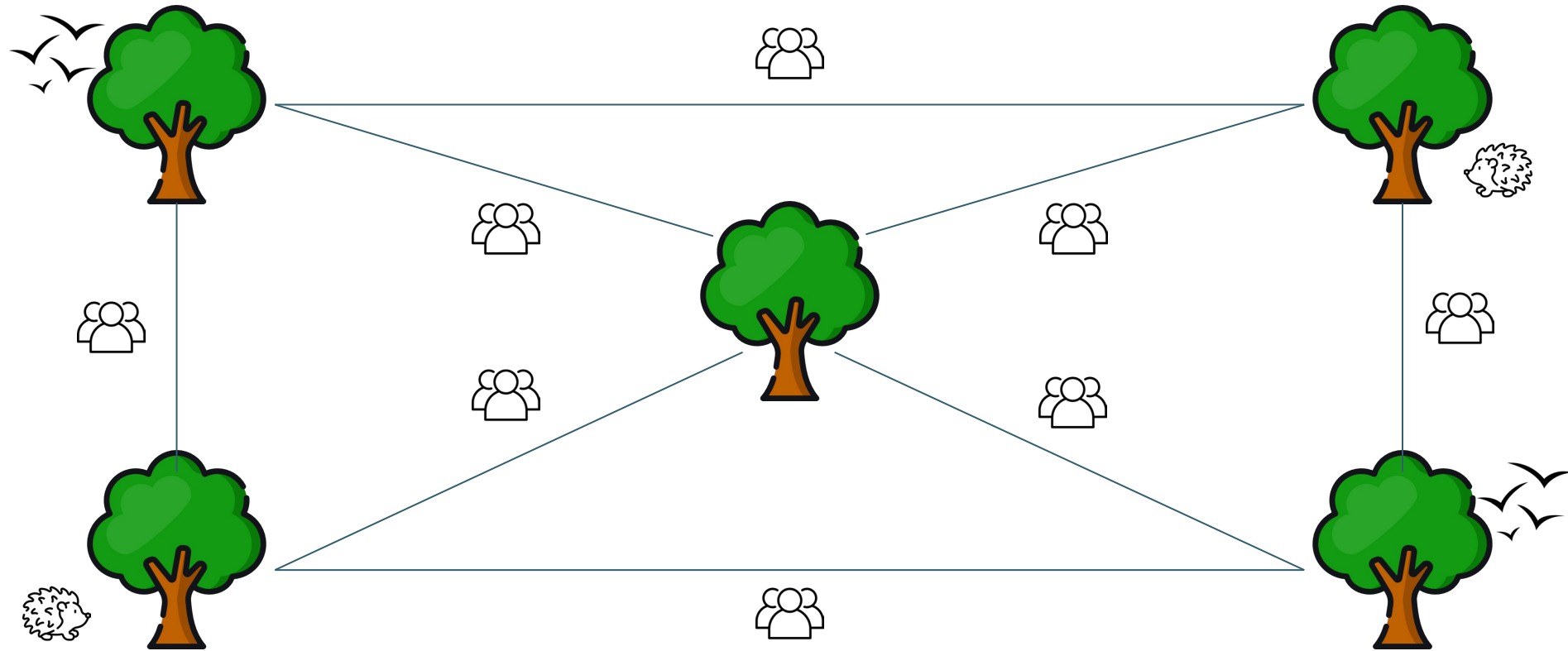
What do *hedgehogs* have to do with a network of *routers* in *urban systems*?



From Ground to Canopy: Integrating Ground-based Sensors with Remote Sensing to Improve Urban Tree Management



From Ground to Canopy: Integrating Ground-based Sensors with Remote Sensing to Improve Urban Tree Management



From Ground to Canopy: Integrating Ground-based Sensors with Remote Sensing to Improve Urban Tree Management



GEOBON

CEOS



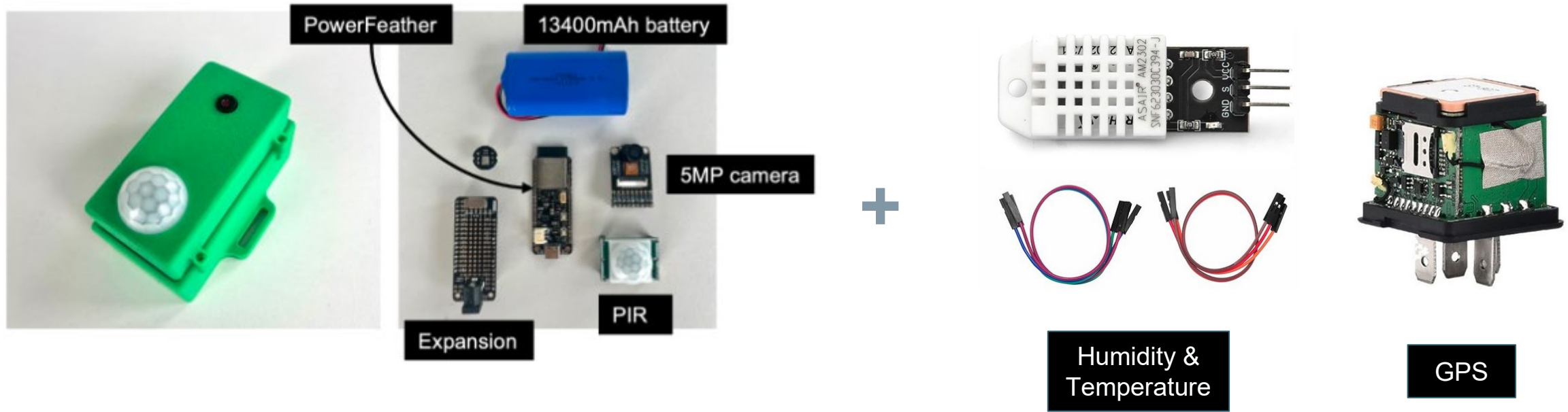
~393 M urban trees in England



LiDAR Vegetation
Object Model (1 m)
VOM

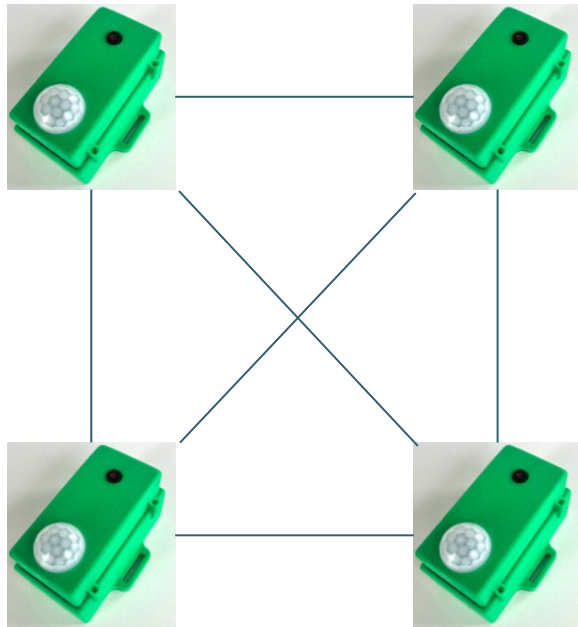


Meet the Terracorder



< £100

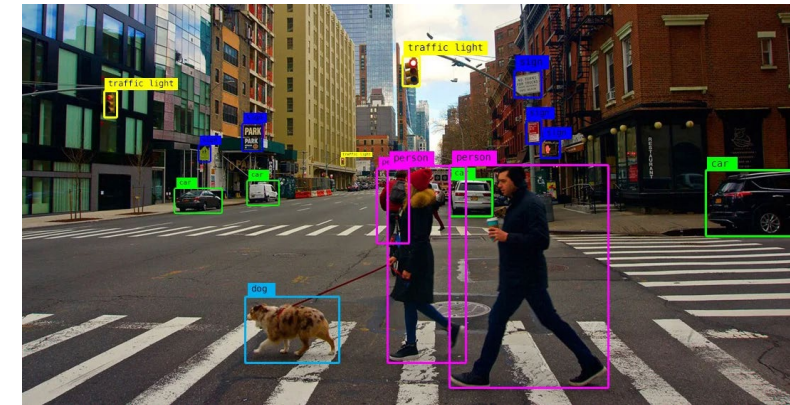
On-device Machine Learning



+



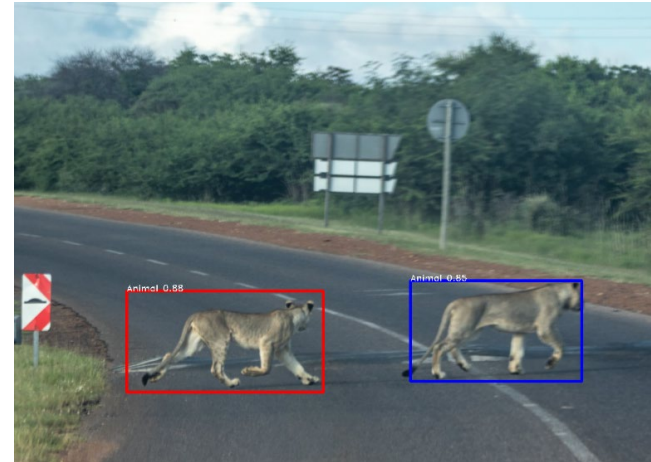
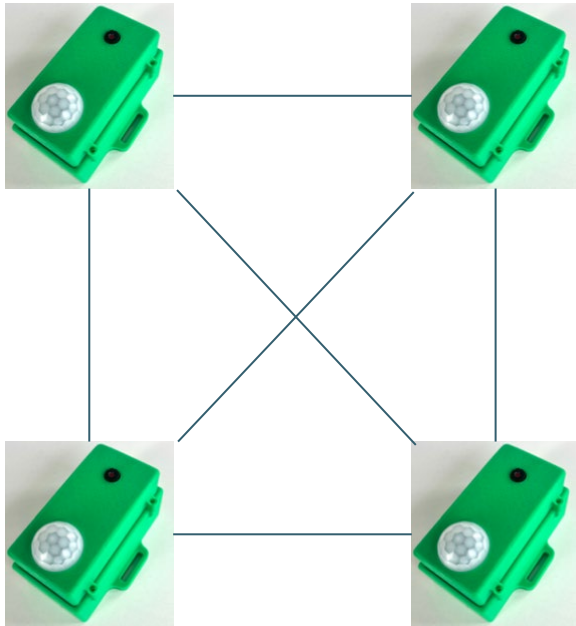
+



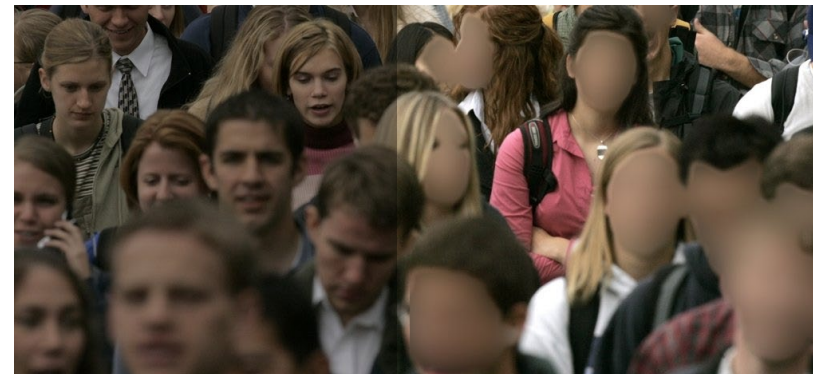
“Internet of Trees”



On-device Machine Learning

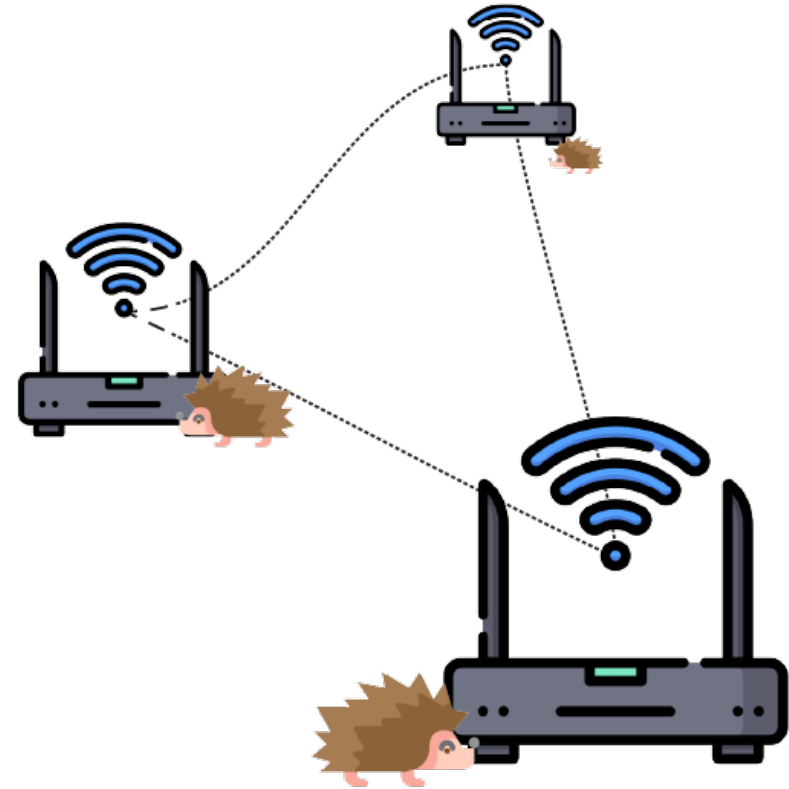


Animal tracking

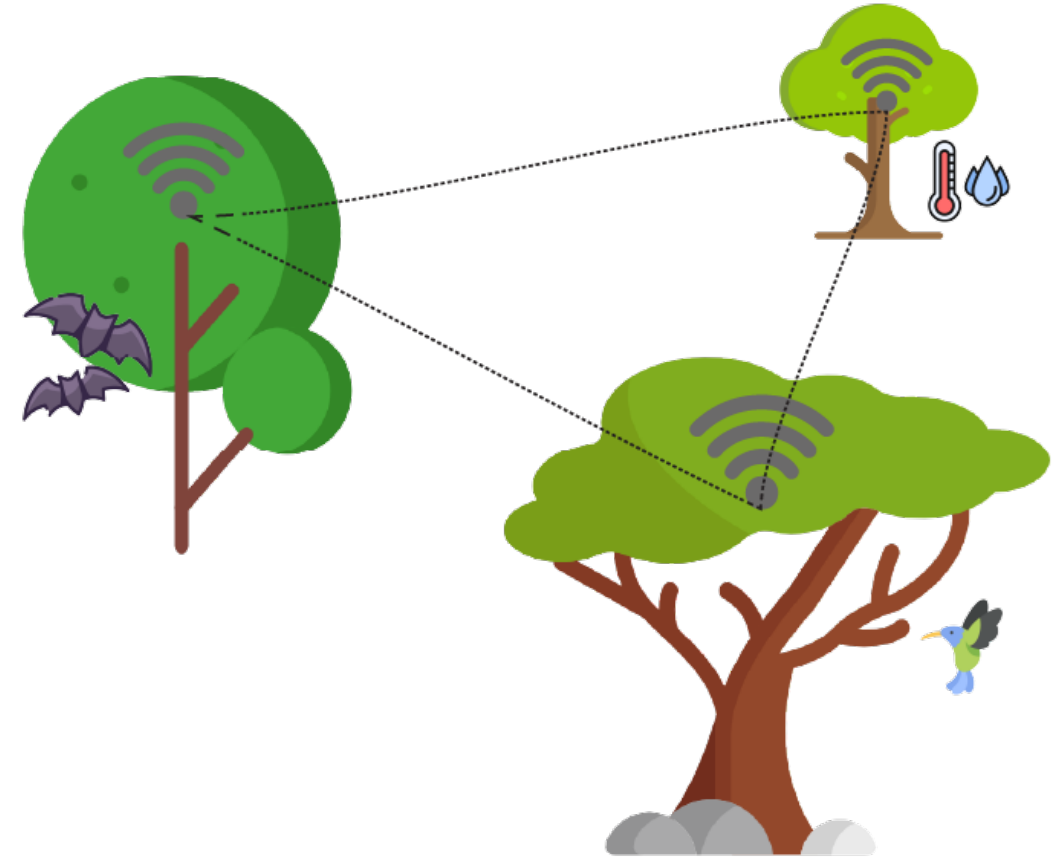


Privacy protection

What do *hedgehogs* have to do with a network of *routers* in *cities*?



What do *x species* have to do with a network of *trees* in *y ecosystem*?

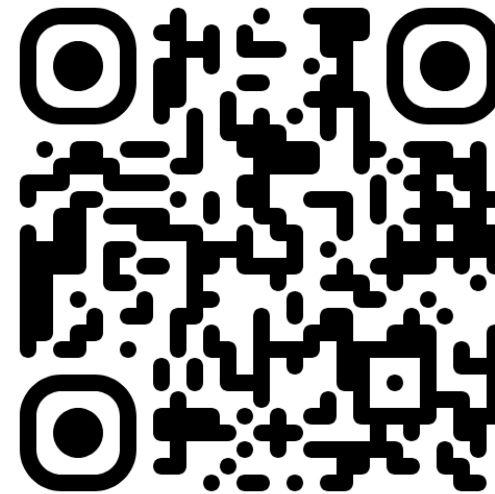


Future Work

- Deployment of Terracorder in Cambridge
 - Deployment of several devices
- Networked Cooperative Scheduling
- On-device and privacy-preserving Computer Vision models
- Easy-to-use API Design
- Audience applications (please reach out!)*

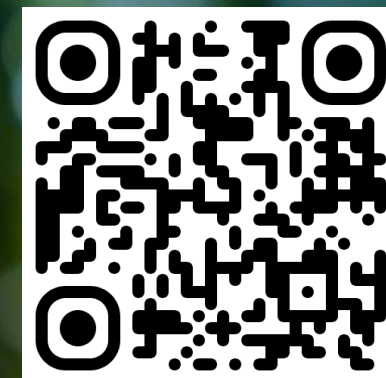
Recommendations for Organisers

- Organise sessions by presenter type (entrepreneurs, scientists, policymakers)
- Link technology developers with potential users (academics)



*acz25@cam.ac.uk

BioSpace25 - Biodiversity insight from Space
10 - 14 February 2025 | ESA-ESRIN | Frascati - Italy



From Ground to Canopy: Integrating Ground-based Sensors with Remote Sensing to Improve Urban Tree Management

Zúñiga-González, Andrés^{*1}, Millar Josh², Sethi S.², Haddadi H.², Dales M.¹, Madhavapeddy A.¹, Bardhan R.¹



¹ University of Cambridge - ² Imperial College London



*acz25@cam.ac.uk