ROTHAMSTED RESEARCH

North Wyke Farm Platform

Sensor innovation and development; A Sensor Test Bed

CONNECTIVITY

CAPABILITY

What's the issue?

The ability to measure and thus understand the biological process that operate in agricultural ecosystems is increasingly reliant on sensors. Furthermore, land managers are increasingly likely to be either rewarded or penalised based on the provision of environmental goods and services, a market is developing for sensor technology that might measure indicators of environmental performance.
Sensor technology is also essential for providing the data required to create and validate environmental models that underpin fundamental science and the future of digital support systems.

What did we do?

As one of the most richly instrument farmed landscapes in the world the North Wyke Farm Platform (NWFP) is uniquely place to trial, validate, and field test new sensor technologies. This is because we have the long-term datasets and real-time data collection from deployed sensors against which to assess performance. Alongside this we have the science and laboratory capability to ground reference the results of new and emergent sensor technologies and designs; the statistical capability allowing us to critically appraise sensor deployment; the computing science and machine learning expertise facilitating the incorporation of AI into sensor design.
We have sought to respond to the demand of private sector companies and academic researchers who wish to use this capability. One case study is presented here.

What did we achieve?

The NWFP team, working with the University of Cambridge Sensor Technology Centre for Doctoral Training https://cdt.sensors.cam.ac.uk/ set the 2024 'Sensor Challenge' for the incoming cohort of 15 PhD students. The challenge set was to develop an animal mounted bio-diversity sensor.
At the end of the 12-week challenge, a working prototype sensor, AI image recognition and prototype digital user interface was created, deployed and reported on at one academic and one industrial and stakeholder seminar. All the code is published and freely accessible:

10.5281/zenodo.13369136 (Dataset Creation)
10.5281/zenodo.13369154 (Device Firmware)
10.5281/zenodo.13369163 (Model)
10.5281/zenodo.13369171 (GUI)

Ongoing work and cevelopments

- The collaboration identified the need / opportunity for the NWFP to create a high quality agri-environmental image data base as none currently exist. This is essential to future AI development in sensors.
- A working prototype, which could be taken to further development and commercialisation.
- Key contacts made at the Cambridge Centre that has led to two further sensor deployment and test projects (one with Cambridge University, one with Imperial College).