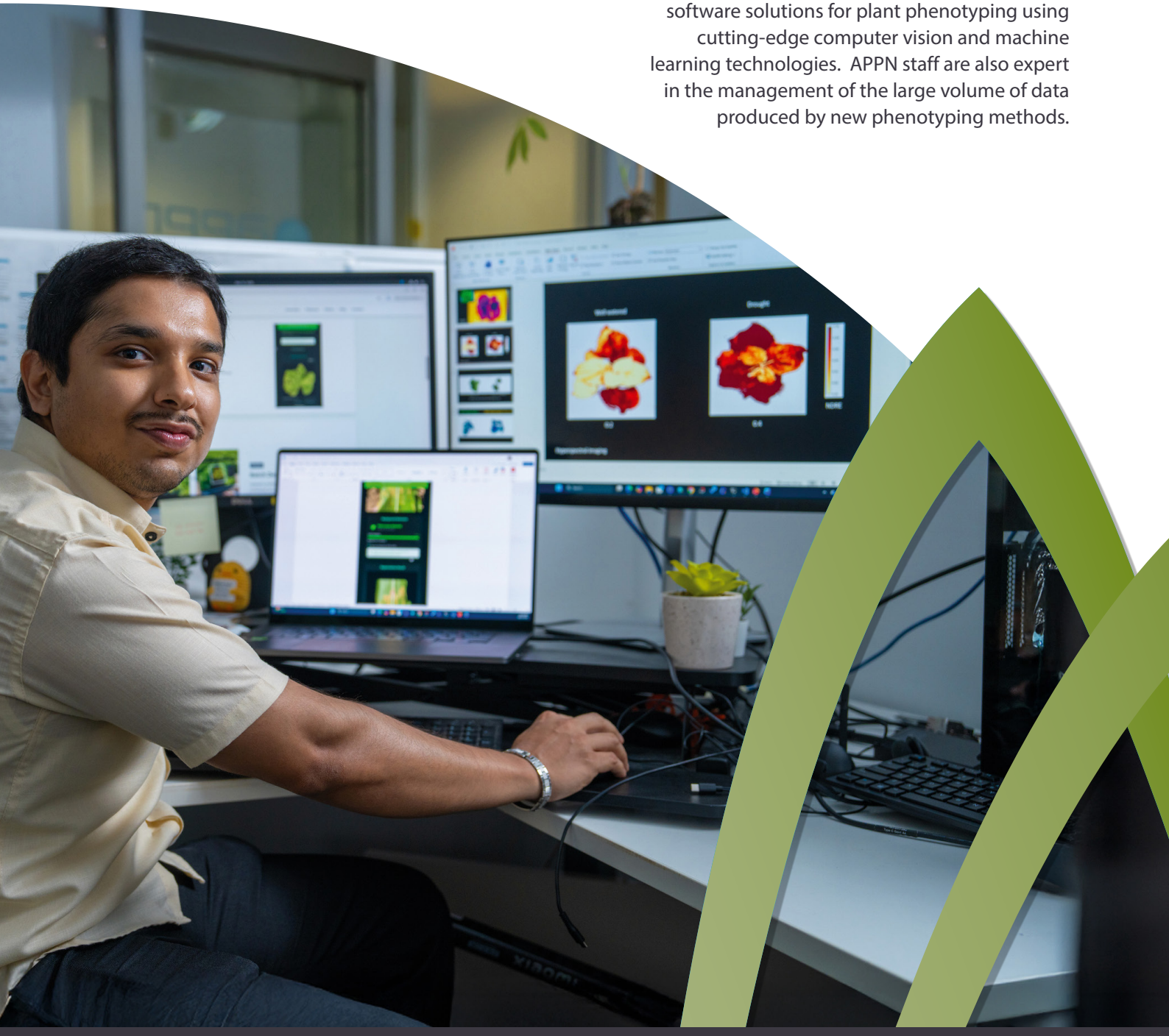
APPN
Australian Plant Phenomics Network

# Software solutions and data management services for plant phenotyping

Software is critical to efficient, high-throughput phenotyping – especially for image management and interpretation. APPN software specialists and computer scientists can provide various software solutions for plant phenotyping using cutting-edge computer vision and machine learning technologies. APPN staff are also expert in the management of the large volume of data produced by new phenotyping methods.



plantphenomics.org.au

APPN Australian Plant Phenomics Network
NCRIS National Research Infrastructure for Australia An Australian Government Initiative
Australian National University

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# Software solutions and data management services for plant phenotyping

**Experts at APPN ANU have developed open-source software solutions to facilitate visualisation and trait capture using our RGB and hyperspectral imaging systems. These powerful and easy to use tools enable efficient classification and analysis of plant traits from diverse imaging modalities.**

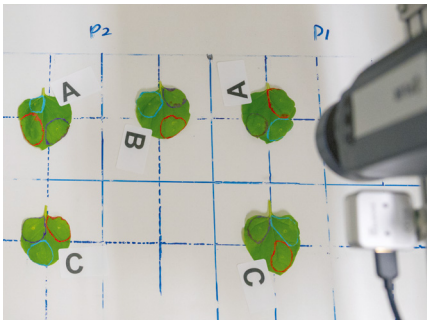
## Capability highlights

These tools are designed to automate the extraction of plant traits from high-volume image datasets. They use state-of-the-art computer vision and deep learning techniques to analyse RGB, thermal, hyperspectral, and 3D point cloud data.

Our software solutions support phenotyping workflows across laboratory, glasshouse and field environments for both shoot and root analysis, including segmentation, trait quantification, structural assessments and spectral interpretation.

These tools can be customised to suit individual experiments and we can support development of bespoke tools or analysis based on computer vision, machine learning, plant science, and software engineering.

Our team prioritises open-source development, integration with standard imaging hardware, and FAIR data principles to ensure wide usability and collaborative potential.




## Research benefits

Access to robust, automated analysis pipelines can significantly reduce the time and effort required for high-throughput phenotyping based on complex data products such as spectral or structural images. This enhances phenotyping efficiency and data accuracy, leading to more precise genotype-phenotype associations and improved selection in breeding programs.

## Expertise at ANU

Users can usually operate our software tools independently after their initial orientation or training session. Advanced users may request specialist support for model customization or workflow development.

The APPN ANU team can provide end-to-end support for the deployment, customisation and usage of our software tools – including training, troubleshooting, imaging hardware integration and supporting collaborative adoption by researchers, farmers, and other practitioners.

Our software services are supported by a range of data management services including:

- Data collection & management design
- Ontology (clear data structures and relationships for consistent interpretation and integration) development
- Data organisation
- Ethical & privacy compliance
- Access & security
- Backup & redundancy
- Metadata management
- Data processing
- Data visualisation

***Please contact us if you would like to discuss how we can assist you with the development of software tools or data management services.***

## Key software tools

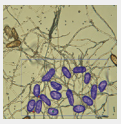
### PlantDis

An app that uses images of a plant leaf and deep learning models to identify the species and quickly and accurately diagnose plant diseases. Learn more at plantdis.github.io

### Leaf Analyzer

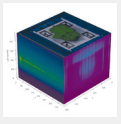
A fully automated, open-source software tool that delivers fast, high-precision leaf trait measurements at scale from RGB and hyperspectral images, empowering high-throughput plant phenotyping with minimal user effort. For example, Leaf Analyzer can assess leaf damage induced by disease or insects.

### SegMATE



A powerful AI-driven universal segmentation tool that can accurately extract any objects of interest, including roots, cells and micrographs, from RGB or hyperspectral images, dramatically streamlining image analysis across diverse applications. SegMATE can process root images from rhizoboxes and mini-rhizotrons.

### HyperView



A comprehensive hyperspectral imaging toolkit offering advanced capabilities—including index computation, hypercube visualization, calibration, cropping, super-resolution, and both supervised and unsupervised segmentation—to unlock deeper insights from spectral data.

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