



**BRABANT
HACK_26**

TRACK PLANT-BASED 1

VDBORNE

WWW.BRABANTHACK.AI

DEVELOPMENT OF AN ALERTING AND REGISTRATION APP FOR (PROBLEM)WEEDS

Your mission: develop an app that alerts farmers or agricultural contractors to the presence of (problem) weeds on a field, and that allows them to record the presence of problem weeds on a field so that management actions can be adapted accordingly.

CASE CONTEXT

Dutch agriculture is confronted with various problem weeds. An increasing number of weeds are difficult to control due to their vigorous growth, resistance to control measures, or because they contaminate the harvest. It is therefore important to prevent the spread of these weeds. Weeds pose a problem for growers because they compete with the main crops and serve as a source of diseases and pests, which can negatively affect crop yields.

Weeds can be divided into perennial (root/tuber) weeds and seed-propagated weeds. Root and tuber weeds are more difficult to control than seed weeds. They spread through rhizomes, runners, or tubers. When a hoe or plough cuts through the roots of a root or tuber weed, new plants grow back from the fragments. Examples of perennial weeds include horsetail (*Equisetum arvense*), curly dock, couch grass, creeping thistle, purple nutsedge, meadow buttercup, and peat weed. Seed weeds produce thousands of seeds per plant, which can survive in the soil for many years. Examples of seed weeds include ragwort, black-grass, fat hen, redshank, and black nightshade.

Within Integrated Pest Management (IPM), diseases, pests, and weeds are controlled using a range of methods. Priority is given to prevention and non-chemical measures, with minimal use of crop protection products. Prevention is a crucial first step within IPM. It focuses on breaking the life cycle of the plant (preventing seed production) and stopping its spread (via rhizomes or tubers). Machine hygiene plays a crucial role in this process, as agricultural machinery is a major source of spread for weeds such as purple nutsedge and couch grass.

An alerting and registration app can play a key role in prevention. Drone imagery can be used during the development of the app to distinguish crops (such as potato plants) from weeds at an early stage. However, current drone images are not yet detailed enough to automatically identify specific weed species. In the future, camera images from equipment such as field sprayers could be used for this purpose. At present, weed identification still requires action in the field by the grower or contractor. They take a detailed photo at locations identified by drones. By linking this photo to a weed database, the data is enriched with the species name and can be registered in the app.

In this way, the app becomes the "eyes and ears" of a region. It can be used by farmers, contractors, water authorities, and nature management organizations. When farmers, contractors, and organizations such as water boards use the app, a digital map of problem weed locations is created. The app enables earlier intervention to prevent further spread of weeds, supports improved machine hygiene practices, and promotes better cooperation between agriculture and nature management within a region. One

potential function of the app is to provide immediate management tips upon weed registration. The development of an alerting and registration app for (problem) weeds can therefore play an important role within Integrated Pest Management.

WHAT DO TEAMS BUILD?

You will develop a mock-up of an app that not only facilitates field-specific registration and alerting of problem weeds, but also functions as an area-wide warning system. Relevant stakeholders—such as neighboring farmers, agricultural contractors, and water authorities—are automatically notified within a defined radius when a new observation is recorded.

WHAT DOES VAN DEN BORNE PROVIDE?

- Field boundaries: Boer en Bunder
- Weed data sources:
 - Waarneming.nl
 - <https://gd.eppo.int/taxon/2WEED>
 - [https://www.beeldenbankgewasbescherming.nl/space/BEEL/9045071/Onkruiden+data+base+\(A-Z\)](https://www.beeldenbankgewasbescherming.nl/space/BEEL/9045071/Onkruiden+data+base+(A-Z))
 - <https://www.irs-onkruidherkenning.nl/>

Datasets:

- Drone imagery of weeds via Solvi

SUCCESS CRITERIA

Core KPI

Weed recognition must be accurate, with at least 85% of the weeds correctly identified.

Hard Requirements

Alerting about a problem weed upon entering a field must be extremely fast. This means that as soon as a grower drives his tractor onto the field, he should immediately receive a notification if a problem weed has been detected. This timely alert enables him to adjust his working method on the spot to the current situation in the field.

The app must function in locations where no 4G/5G connection is available. Even without 4G/5G connectivity, a farmer must still receive notifications and be able to take a photo of a weed in order to identify it. The app must remain fully operational without 4G/5G.

Privacy and data ownership are essential, and there must be no direct one-to-one link to exact geolocation. An alert should be triggered when a weed is present within a radius of X kilometers, but it must not be possible to determine on which specific field the weed was found. A farmer should be able to see very precisely which problem weeds occur on his own fields, while neighboring farmers should



not receive field-level information. They should only receive a notification indicating that the weed has been detected within a radius of X kilometers.

CONTACT

- Marnik van Geelen (marnik@vdbornecampus.com)

WWW.BRABANTHACK.AI