Hackathon Summer Edition 2025

Bonemeal

A mathematical and generative approach
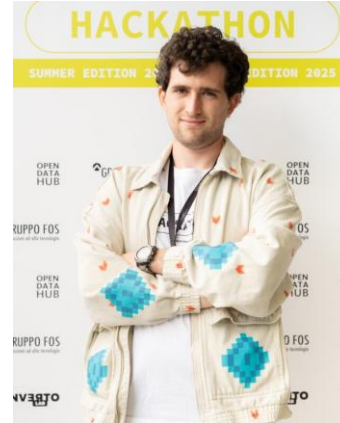
Our team

Valentina

Input image analysis

Future image generation

Francesco

Plant growth simulation

Web app

Our project - BoneMeal

Description

This project lets a user provide a plant photo and some conditions as input and returns both a realistic future image of the plant and a text description of its state.

Goal

We wanted to use a more deterministic and scientific approach for the given task, to make it more reliable.

Technologies used

PlantCV
Extracts traits (leaf area, height, color) from plant photos.

ControlNet
Keeps output consistent with the structure foreseen by OpenAlea.

Stable Diffusion
Generates realistic future images of the plant.
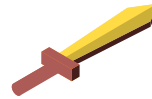
OpenAlea (HydroShoot)
Simulates vine growth using L-systems and environment data.

Tips to start playing

Mercury

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than the Moon

Venus

Venus has a beautiful name and is the second planet from the Sun. It's hot and has a poisonous atmosphere

Main challenges

- **AI non-determinism** → Stable Diffusion often produced inconsistent outputs; solved by using ControlNet to constrain structure.
- **Conflicting library requirements** → PlantCV (NumPy ≥2) and Diffusers (NumPy <2) could not coexist; solved with separate Python environments.
- **Realism vs. creativity trade-off** → prompts sometimes gave unrealistic plants; solved by fine-tuning prompt wording and negative prompts.
- **Data translation** → PlantCV gives raw pixel metrics, HydroShoot needs physiological parameters; solved by building JSON adapters.

Concept results