Plan Bee Labs

The Plan Bee Labs project aims to build a groundbreaking decentralized network tailored for managing pollinator species in agroecosystems.

Our innovative system integrates IoT technology with blockchain traceability and is backed by Machine Learning and AI.

By focusing on pollinator recognition, stressor detection, and bee abundance estimation, we revolutionize traditional hive monitoring methods to prioritize pollination-specific metrics.

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The project is conceived of as having three main components:

Wild pollinators
bee.directory

A decentralized network of peer-to-peer monitoring nodes that employs AI and machine learning algorithms to detect and identify bees and pollinators, generating essential data for conservation efforts.

Bumblebees
pollination.buzz

A monitoring system enhancing measurability and exerting precise control over the pollination process facilitated by bumblebees in both greenhouse and crop field environments.

Honeybees
hivetribe.net

A monitoring system prioritizing pollination-specific parameters, including bee counts, mortality rates, identification of primary stressors, and nectar flow.

Bumblebees
pollination.buzz

Complete software system and hardware prototypes (version 1, pre-MVP) have been developed, and initial field tests have been successfully conducted. Version 2 is currently under development, incorporating insights gained from the field tests.

Honeybees
hivetribe.net

Similar to the bumblebee project, complete software system and hardware prototypes (version 1, pre-MVP) have been developed, with successful initial field tests. Version 2 is also in development, building upon the lessons learned from the field tests.
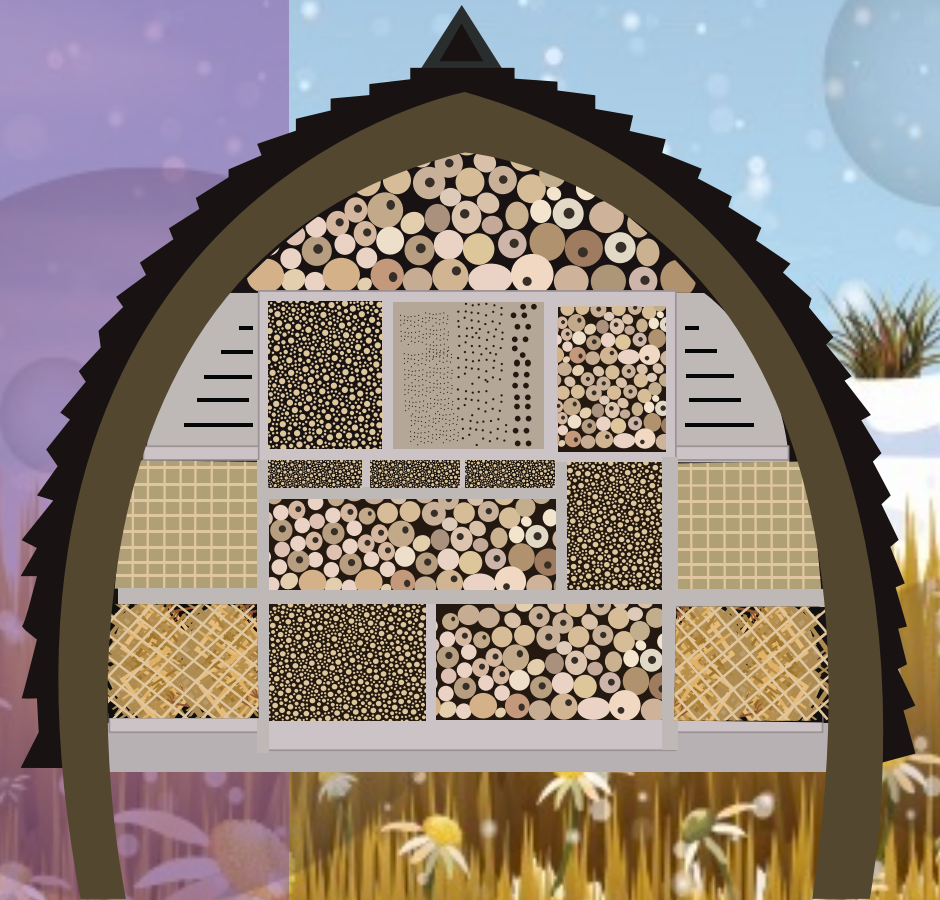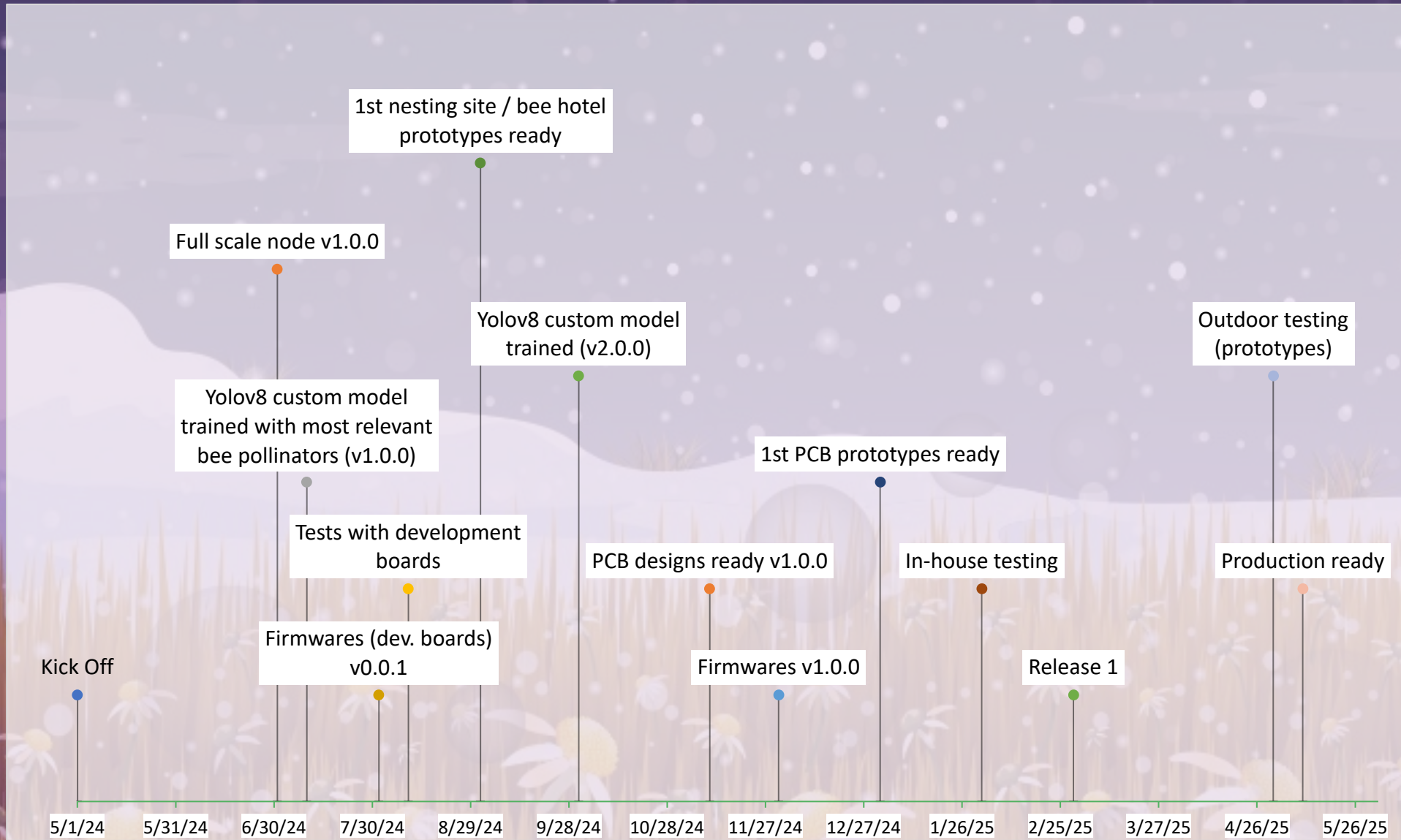
Wild pollinators

bee.directory

This project is in its early stages, focusing on planning, architecture construction, prototype development, and formulation of predictive models. Progress so far includes:

- Training of the first Yolov8 custom model using open iNaturalist datasets, enabling prediction and recognition of various species such as Apis cerana, Apis dorsata, Apis florea, Apis mellifera, and several species of Bombus.

- Programming and successful testing of the ESP32 module integrated with a camera against the trained model.

- Development of foundational elements for the full-scale node on libP2P, facilitating peering between nodes and operating a YOLOv8 prediction model, including the exchange of service catalogues containing dataset and service information.

- In progress: development of a mini node prototype utilizing the NVIDIA Jetson Nano Developer Kit for on-site operations in locations with reliable power supply.

- Initiation of the development process for a desktop application aimed at facilitating the operation of a full-scale node on a personal computer.

Roadmap

1st nesting site / bee hotel prototypes ready

Full scale node v1.0.0

Yolov8 custom model trained (v2.0.0)

Outdoor testing (prototypes)

Yolov8 custom model trained with most relevant bee pollinators (v1.0.0)

1st PCB prototypes ready

Tests with development boards

PCB designs ready v1.0.0

In-house testing

Production ready

Firmwares (dev. boards) v0.0.1

Firmwares v1.0.0

Release 1

Kick Off

5/1/24 5/31/24 6/30/24 7/30/24 8/29/24 9/28/24 10/28/24 11/27/24 12/27/24 1/26/25 2/25/25 3/27/25 4/26/25 5/26/25

Links & References

PLAN BEE LABS

Website:

https://0xbee.ai/

Whitepaper:

https://0xbee.ai/whitepaper

v1 honeybees and bubmlebees field tests apps:

https://apis.bee4.me/

https://bombus.bee4.me/

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