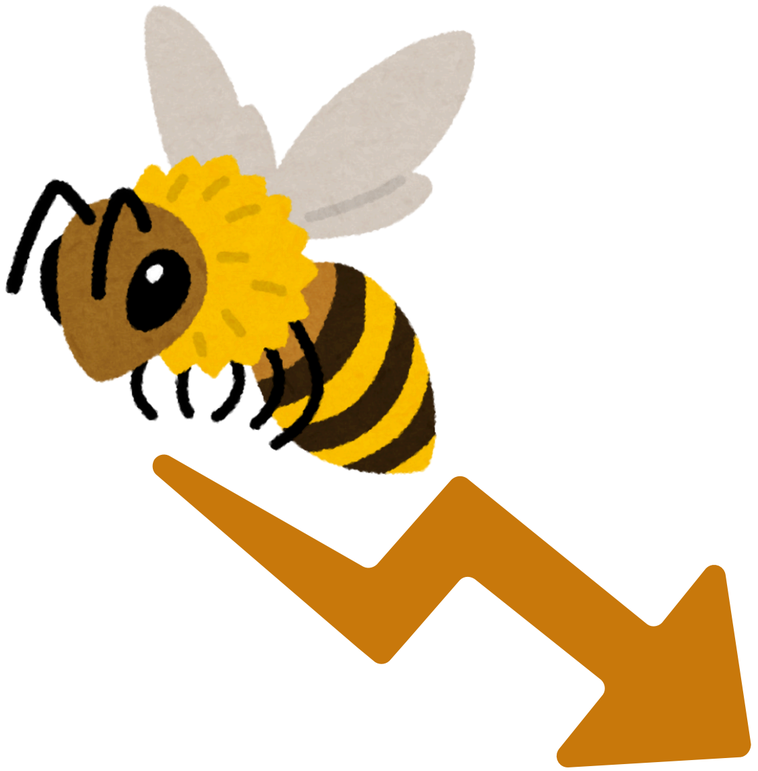
INVESTBRAMPTON
BRAM HACKS 2025
SPACE EDITION

POLLI-TECH

Autonomous Drone Pollination for a Bee-Safe Future



ONTARIO'S POLLINATOR **COLLAPSE**

49% OF ONTARIO BEE COLONIES DIED LAST WINTER — THE **WORST** YEAR ON RECORD.

- 16% higher loss than the Canadian average
- Scientists warn that these losses are unsustainable for pollination stability
- Colony collapse threatens food production across southern Ontario
- **1/3rd** of the food we eat depends on pollination.

Source: Ontario Beekeepers' Association (2025), OntarioBee.com

ONTARIO'S GREENY **COLLAPSE**

- **16.8% DECREASE IN VEGETATION SINCE LAST YEAR**
- **76,000 PLANTS NEEDED TO RECOVER 50% OF LOSS**
- **APPROXIMATELY 300,000 SQUARE METERS OF PLANTS**

Source: Ontario Beekeepers' Association (2025), OntarioBee.com

BRAMPTON
Flower City
brampton.ca

BRAMPTON'S "FLOWER CITY"

IS LOSING ITS POLLINATORS

BRAMPTON IS PROUDLY BRANDED AS **"THE FLOWER CITY."**

- Home to 19 community gardens and an ambitious 5-year pollinator garden plan
- City programs rely on bee and butterfly activity for plant growth and biodiversity
- Pollinators have become the heart of Brampton's sustainability vision

BUT LOCAL POLLINATORS ARE DISAPPEARING **FAST.**

- Gardeners are reporting fewer bees and lower harvest yields across sites
- Native wildflowers and pollinator gardens are failing to thrive
- Without intervention, Brampton risks losing its Flower City identity and food resilience
- Technology like **autonomous pollination drones** could help rebuild bee-like stability

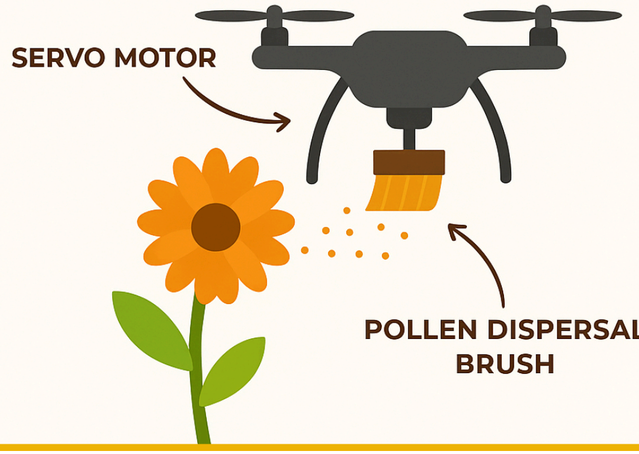
ABOUT OUR **MISSION**

Polli-Tech is an AI-powered drone system designed to restore pollination where nature is failing. Using computer vision, flight algorithms, and real-time vegetation data, our drones autonomously identify, navigate, and pollinate areas most in need.

- Trained CNN models identify flowers using onboard cameras powered by **OpenCV**.
- Drones release pollen via a **servo-controlled mechanism** when a flower is confirmed.
- Polli-Tech enables large-scale, precise, and data-driven pollination missions across **Brampton's parks and gardens.**

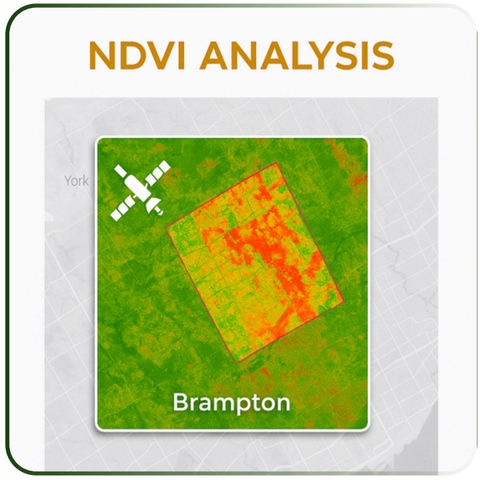
HOW IT WORKS

Using aerial missions and computer vision, our drone detects flowers and deposits pollen using its onboard brush.



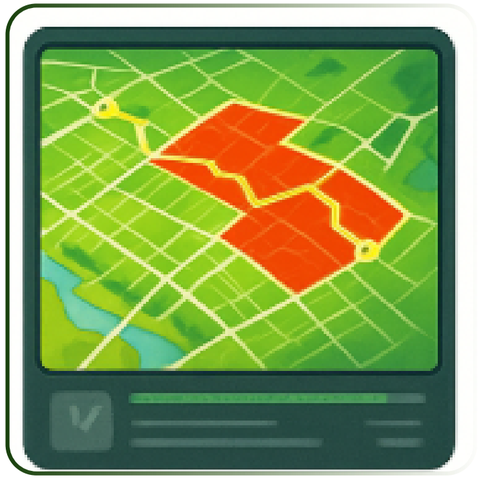
AI-generated image(s)

HOW BEES-NESS **OPERATES**



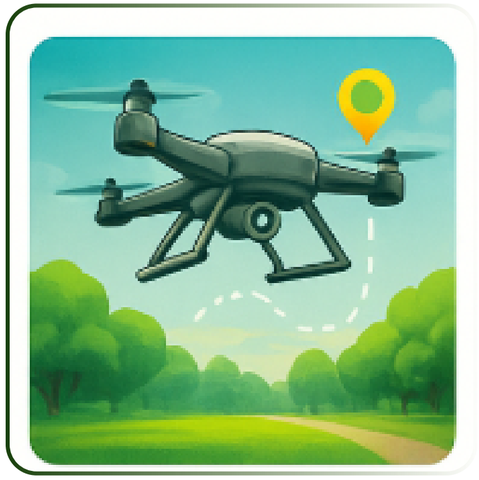
NDVI Analysis

We analyze satellite imagery to detect vegetation loss and growth across Brampton.



Mission Mapping

An AI model merges nearby affected areas to create optimized flight paths.



Autonomous Flight

Drones navigate to each mission zone using GPS and onboard sensors.

Smart Pollination

A CNN model identifies flowers and activates a pollen-release servo for precision pollination.

AI-generated image(s)

THE TECHNOLOGY BEHIND
POLLI-TECH

NDVI MAPPING - VEGETATION HEALTH DETECTION

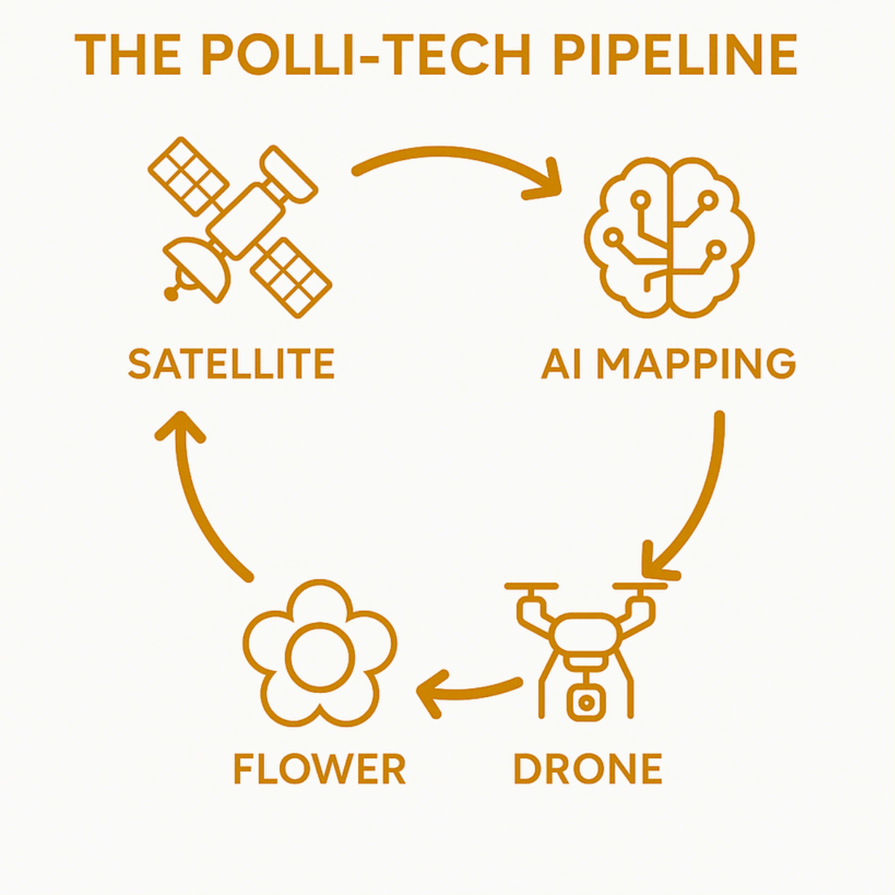
Uses satellite imagery to identify vegetation loss and recovery across some of the Peel region but mainly Brampton.
Helps target areas where pollination is most needed.

AI MISSION GENERATION - OPTIMIZED DRONE ROUTES

An AI model merges nearby low-vegetation zones and creates efficient flight paths, reducing energy use by up to 30%.

FLOWER DETECTION & POLLINATION SYSTEM

CNN (built with TensorFlow and OpenCV) identifies flowers in real-time.
When detected, the drone's servo opens the pollen chamber for precise delivery.



THE FUTURE OF POLLINATION **STARTS HERE**

Restoring Balance
Polli-Tech isn’t just a prototype, it’s a vision for cities like Brampton to restore pollinator ecosystems through innovation, precision, and care.

Technology with Purpose
Our autonomous drones combine AI vision and real-time mapping to pollinate flowers efficiently, supporting urban agriculture and biodiversity.

A Scalable Solution
From community gardens to city-wide ecosystems, Polli-Tech can expand across municipalities, ensuring sustainable growth for generations.

AI-generated image(s)

REFERENCES

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THANK YOU