

# InsectUp : Crowdsourcing Insect Observations to Assess Demographic Shifts and Improve Classification

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## InsectUp : an Insect Identifier Mobile Application

The screenshot shows the InsectUp mobile application interface. On the left, a hand holds a smartphone displaying a butterfly. The app's interface includes a navigation bar with 'IDENTIFICATION' and 'RÉSULTATS'. Below this, a card for 'Papilio machaon' (Machaon) shows a detailed image of the butterfly and its wings. A 'CONFIRM' button is at the bottom. To the right, a large image of a butterfly is shown on a stem. Below the main card, there are sections for other species: 'Papilio hospiton' (Porte-Queue de Corse), 'Papilio alexanor' (Alexanor), and 'Iphiclides podalirius' (Flambe). Each section includes a small image and a 'CONFIRM' button.

AI assisted classification

Playful features to attract users

Feed to share and identify photos with the community



### InsectUp Motivation

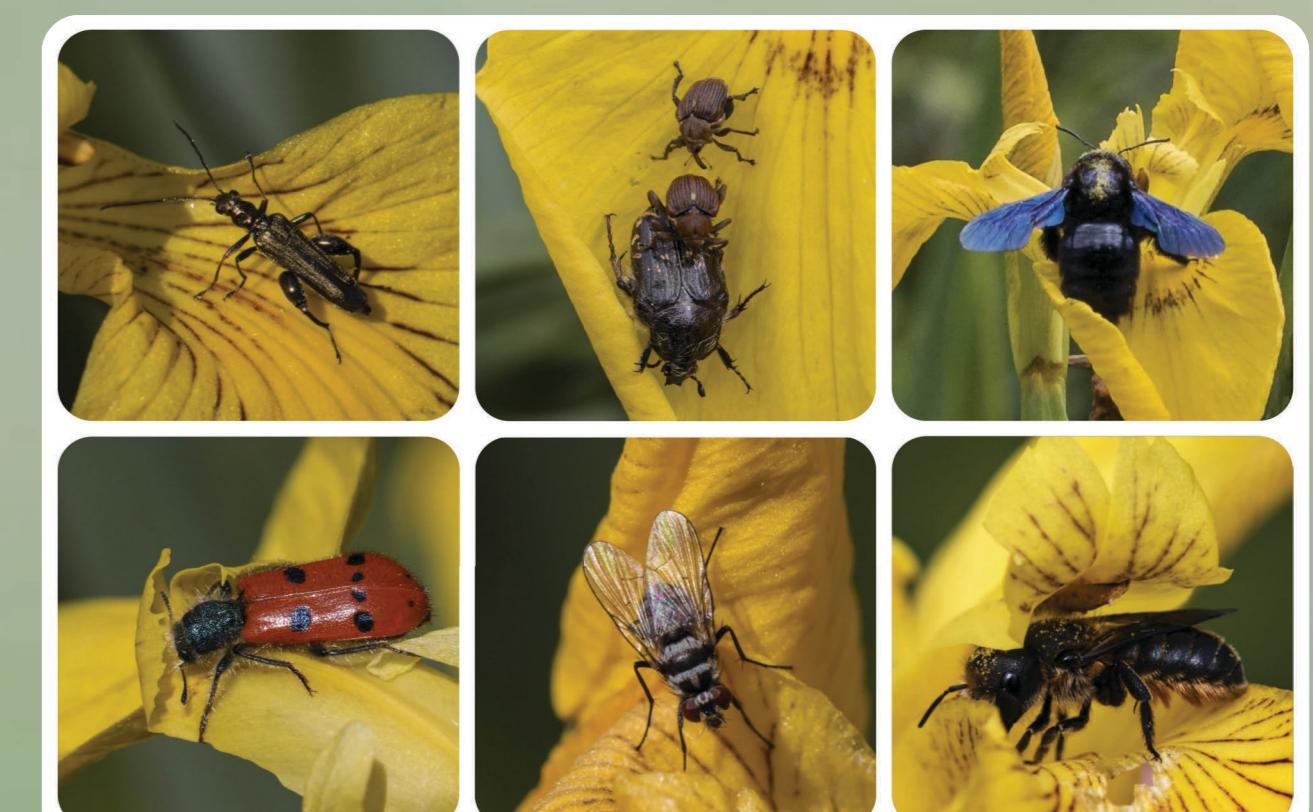


Insect demography shift causing devastating consequences for agriculture and ecosystems



Difficulties to evaluate insect demographics

### The Original Dataset



- 150k labelled photos of 403 European species of insects.
- Dataset provided by the SPI POLL, a program from the French National Museum of Natural History.



### InsectUp Mission



Crowdsource insect observations



Provide data to researchers to mitigate environmental threats



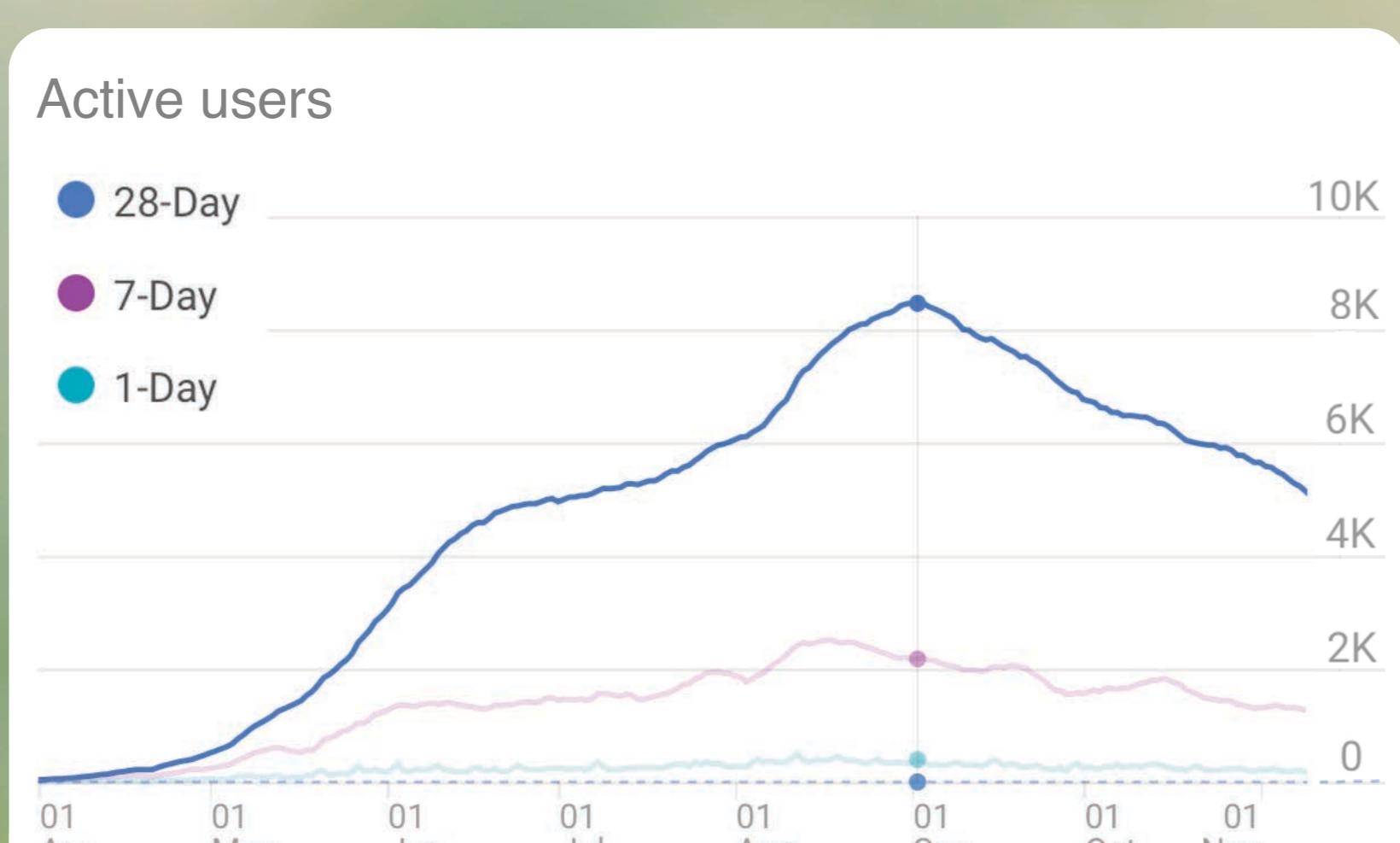
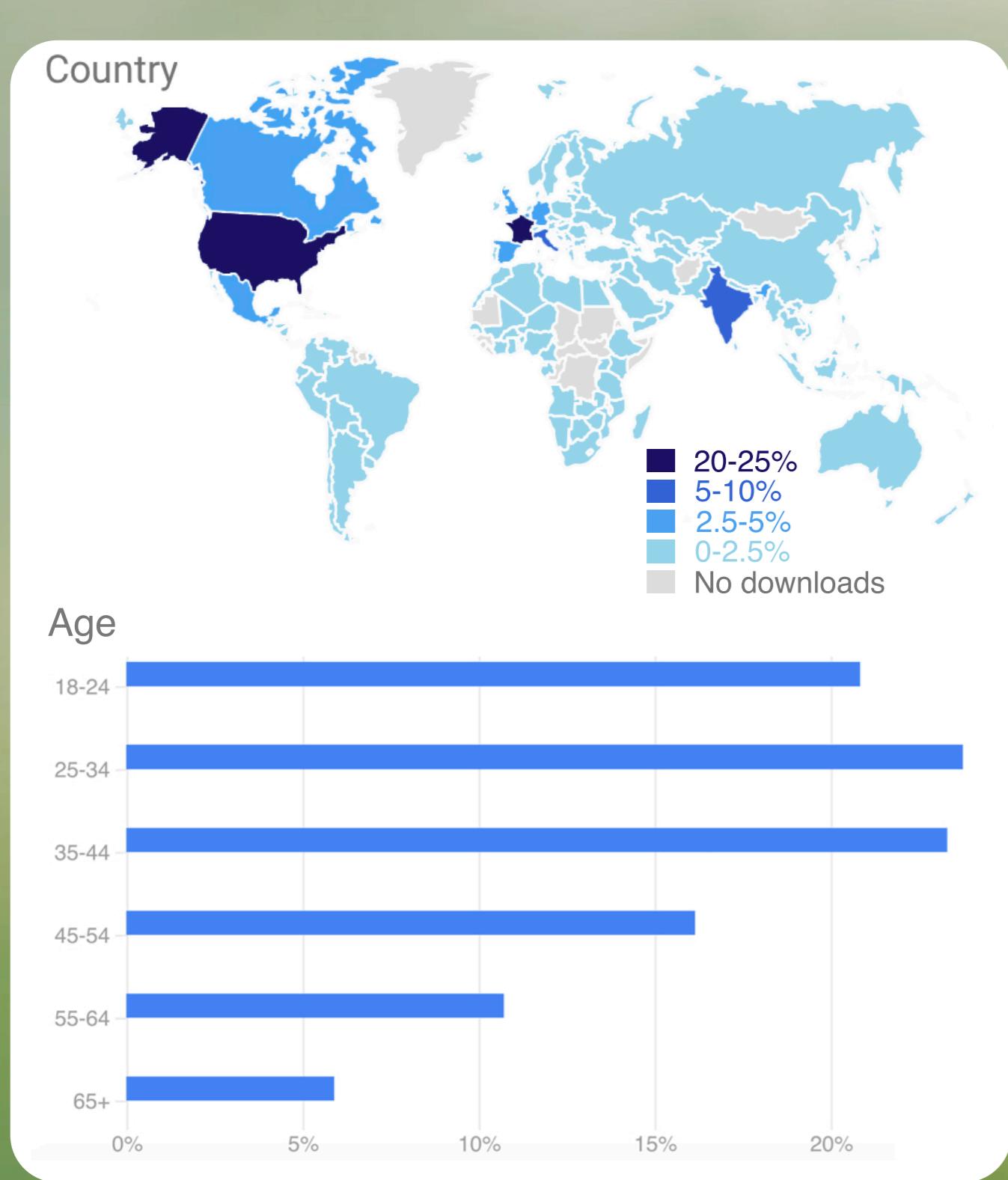
Raise people's awareness about the upcoming danger

### The Classification Algorithm

CNN architecture	Top 1 Accuracy
Inception v4	87%
ResNet152	84%

Transparent workflow using RampStudio platform

## InsectUp Success



Left: Age and geographic distribution of InsectUp users.  
Right: Active users from April to Nov. 2018 during the alpha phase.

## Challenges & Potential Solutions

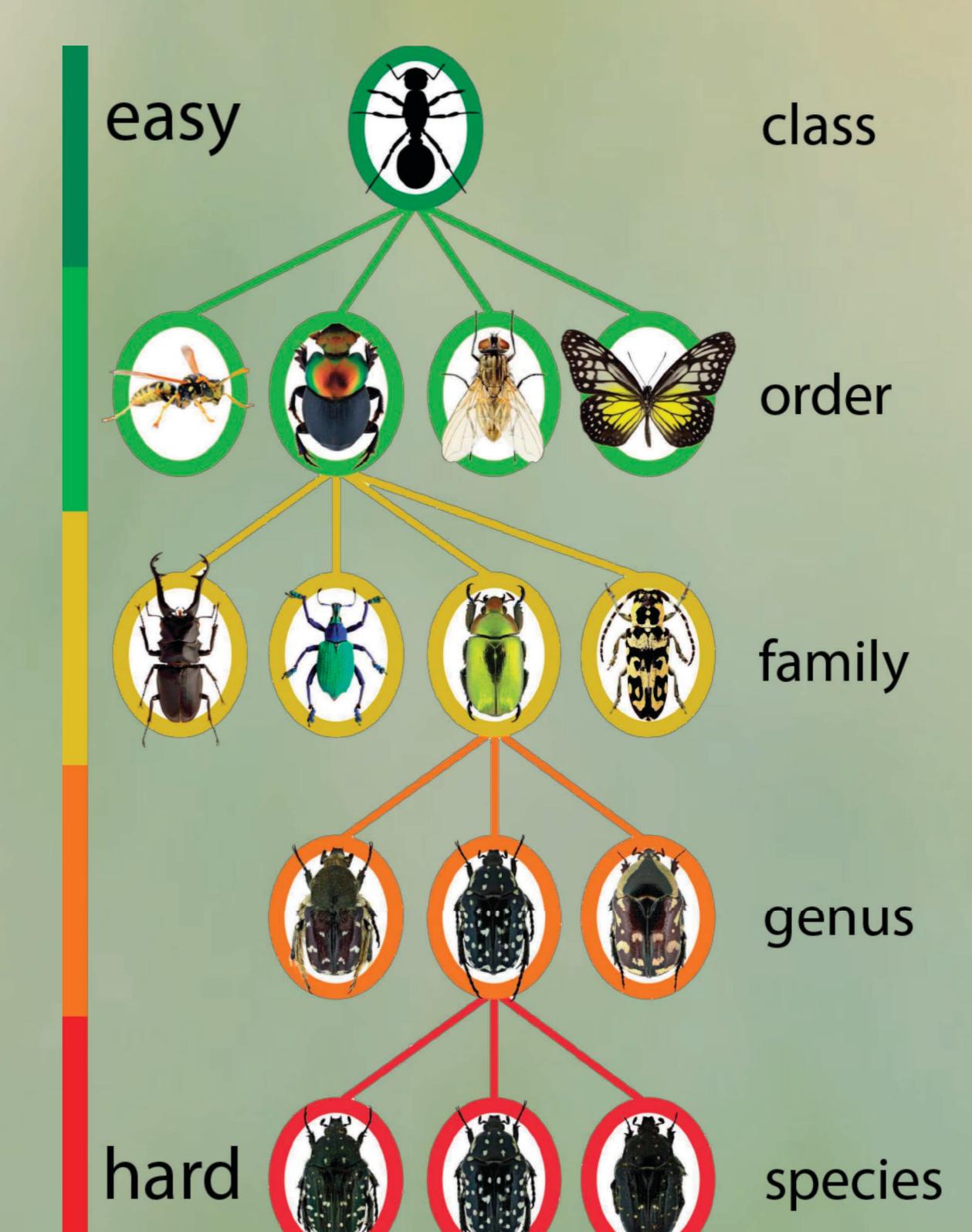
Algorithm capable of recognizing all 1 million known insect species

Species class balance highly variable.

Observer bias: some species will be reported more than others.

Few-shot learning

Less refined classification



Build a rigorous annotation pipeline to avoid erroneous identifications

Manual annotations from humans with different levels of expertise

High level of similarity between some species.



Handle false observations

Use reputation score

Use multiple identification suggestions

Attract entomologists for high quality identifications

Moderated feed

Anomaly detection

Educate people

## Data Collected



45k photos uploaded during the alpha phase.  
Photo quality and insect species are very variable.

Degrades data quality and user experience