

Fieldguide: Building Communities Through Image Recognition AI

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Fieldguide

**Fieldguide provides a suite of functions
that integrates a deep learning neural network
to aid in biodiversity identification**

Computer Vision Identification of Lepidoptera



Non-Profit Company



LepSnap



NSF-ADBC Thematic Network

APPS iOS • Android • Web

MOTHERSHIP: FOR EVERYONE



Fieldguide

- Bugs
- Birds
- Plants
- ∞ Custom guides

SATELLITES: FOR AFFINITY GROUPS



Bugs



Birds



Plants

...

Fieldguide

A family of **apps** for identifying
and cataloging flora & fauna

APPS iOS • Android • Web

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Fieldguide

SATELLITES: FOR AFFINITY GROUPS



Bugs



Birds

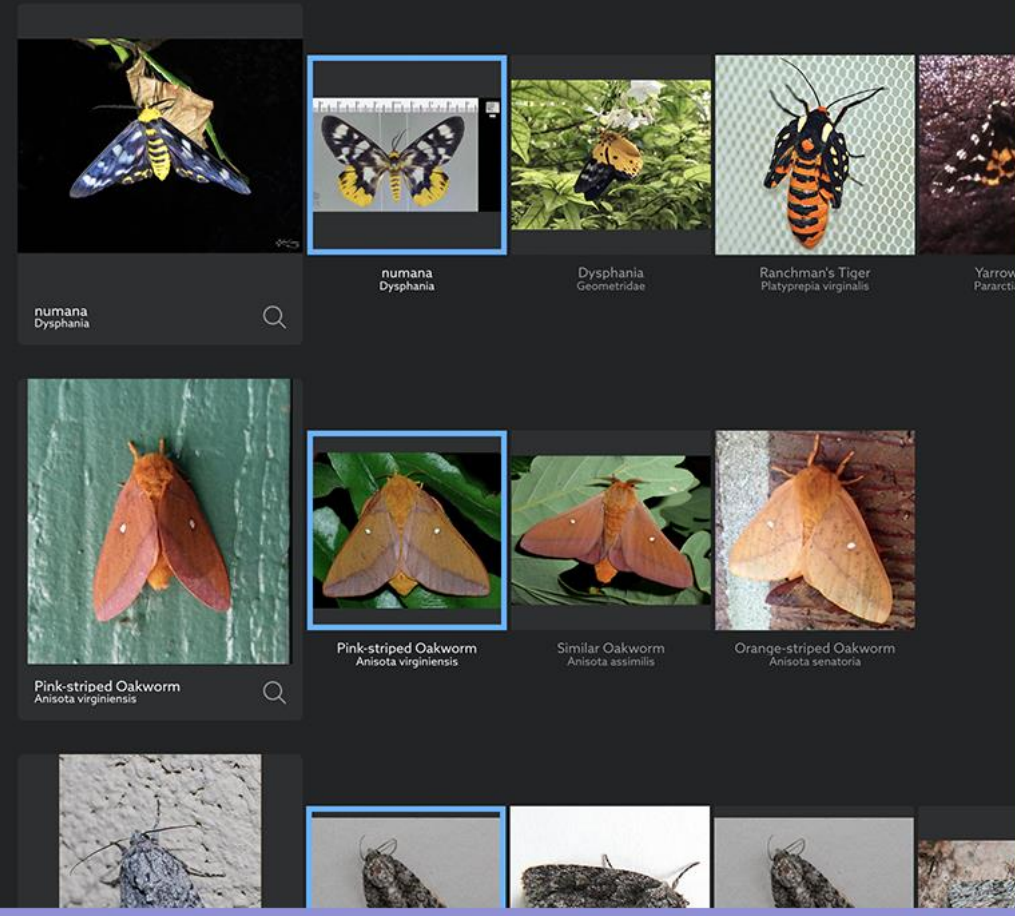


Plants

...



API Fg Batch • Fg Search



Fieldguide

A machine learning platform that provides an image recognition **API** to third-party applications

APPS iOS • Android • Web

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Fieldguide

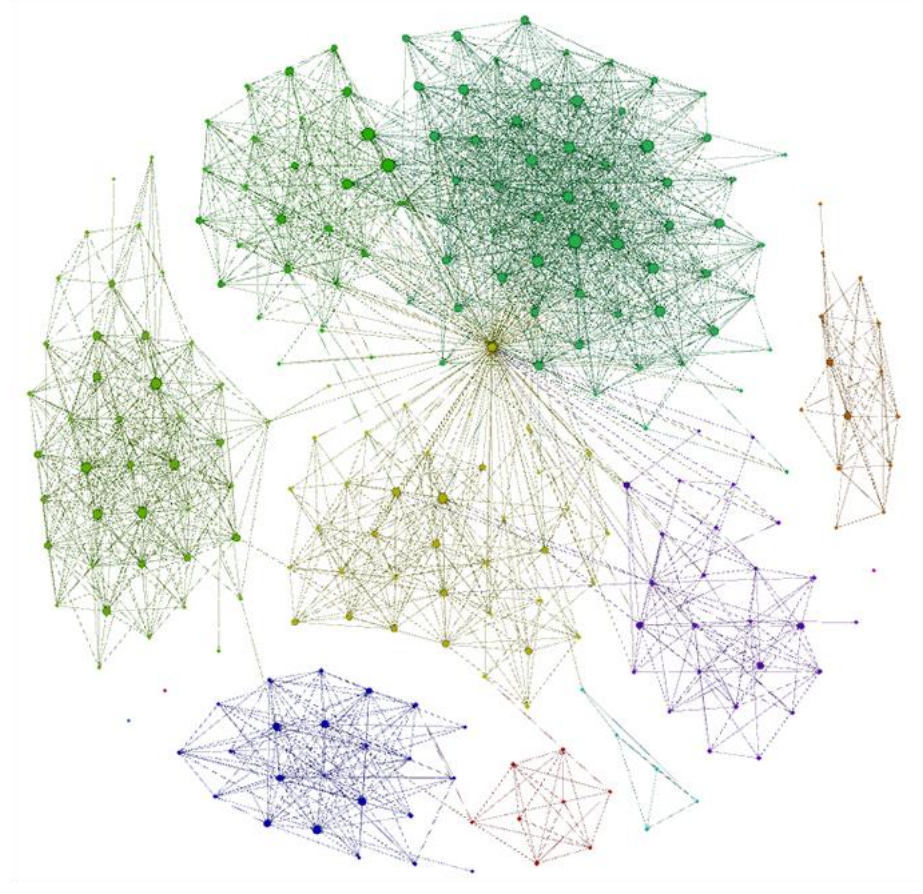
SATELLITES: FOR AFFINITY GROUPS





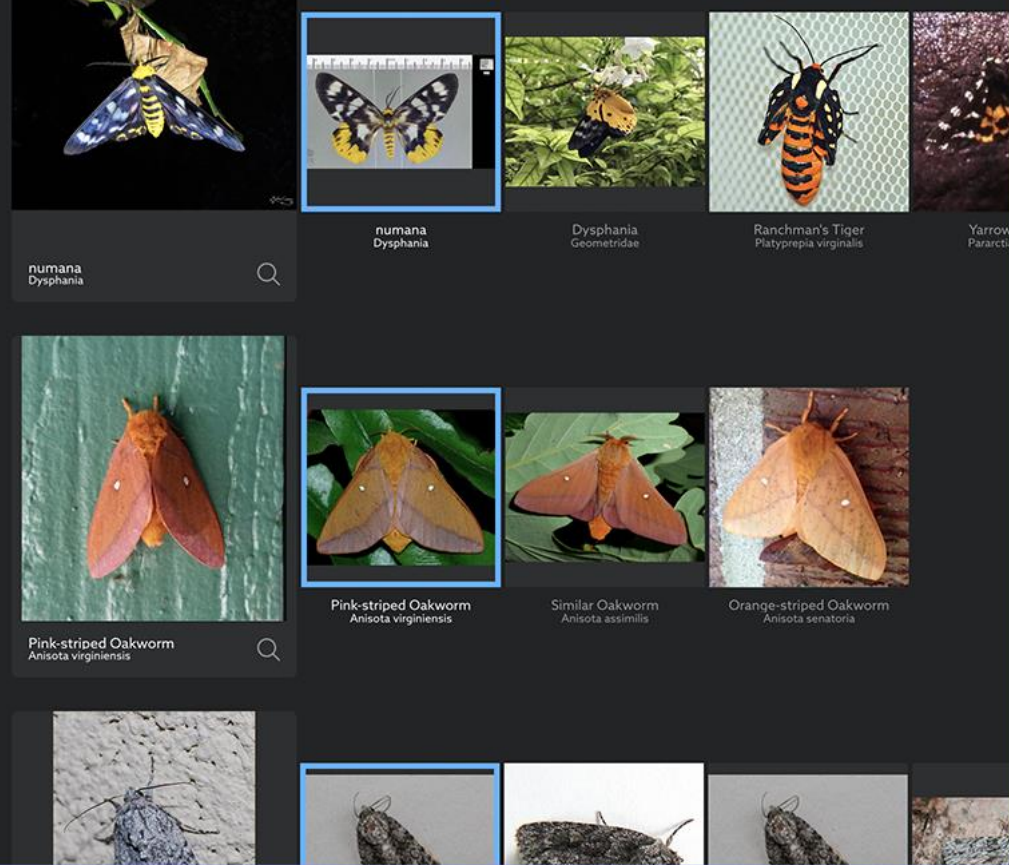
Bugs Birds Plants ...

NET >100K classes • TensorFlow



Fieldguide

API Fg Batch • Fg Search



One of the world's largest and most accurate **neural nets** for biodiversity research

APPS iOS • Android • Web

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Bugs



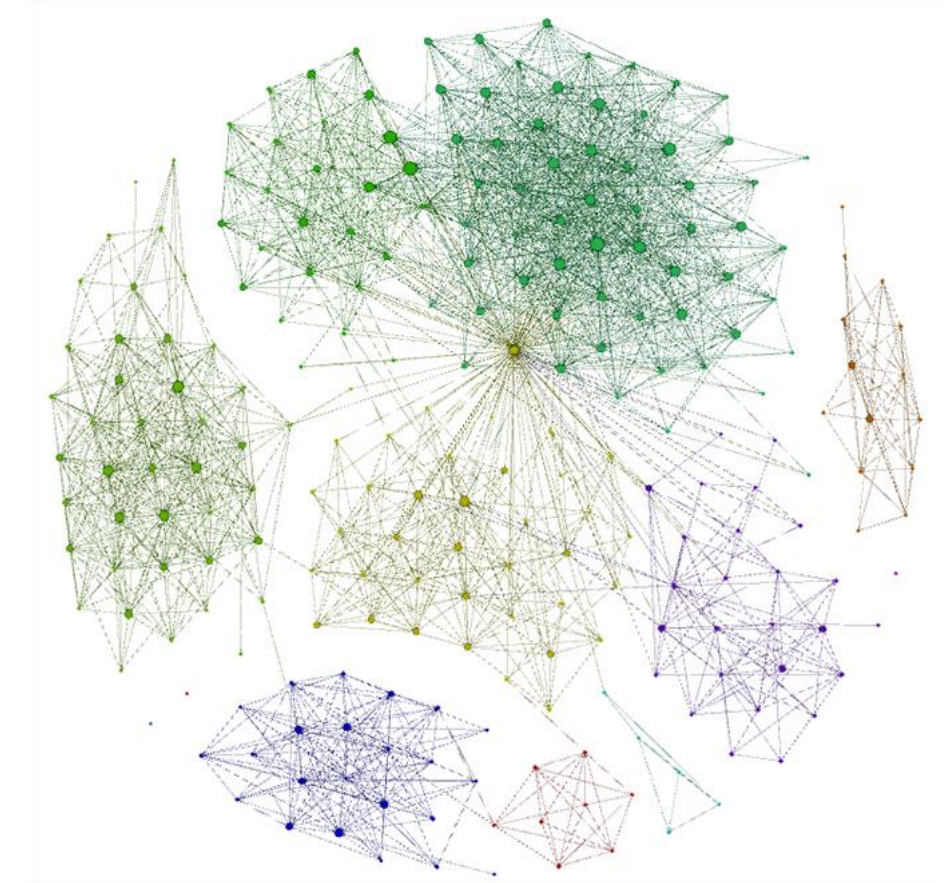
Birds



Plants

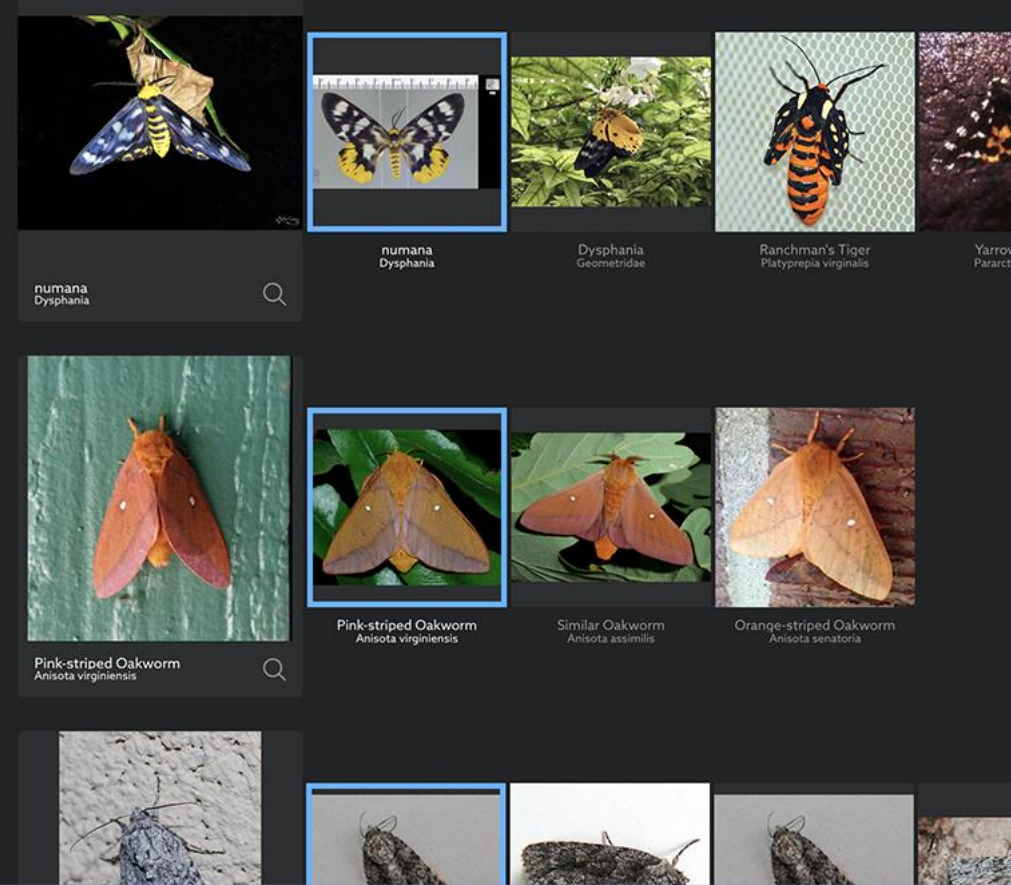


NET >100K classes • TensorFlow

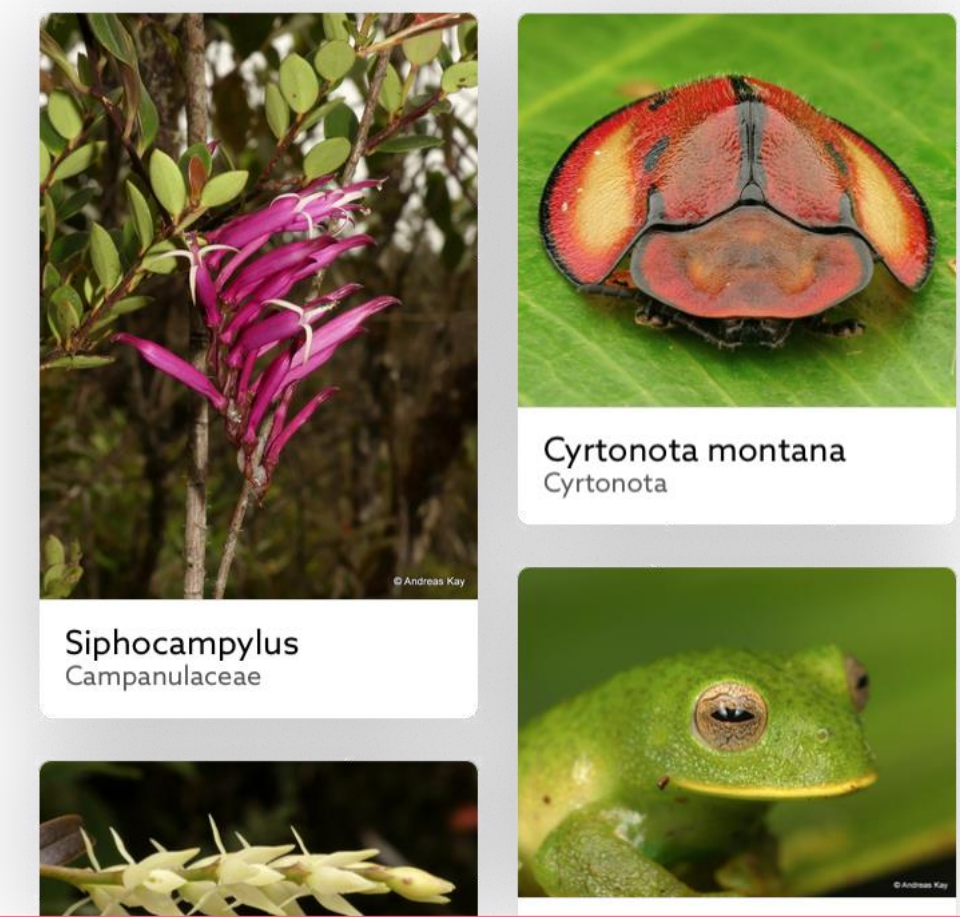


Fieldguide

API Fg Batch • Fg Search



DATA >20M images • 10 img/sec

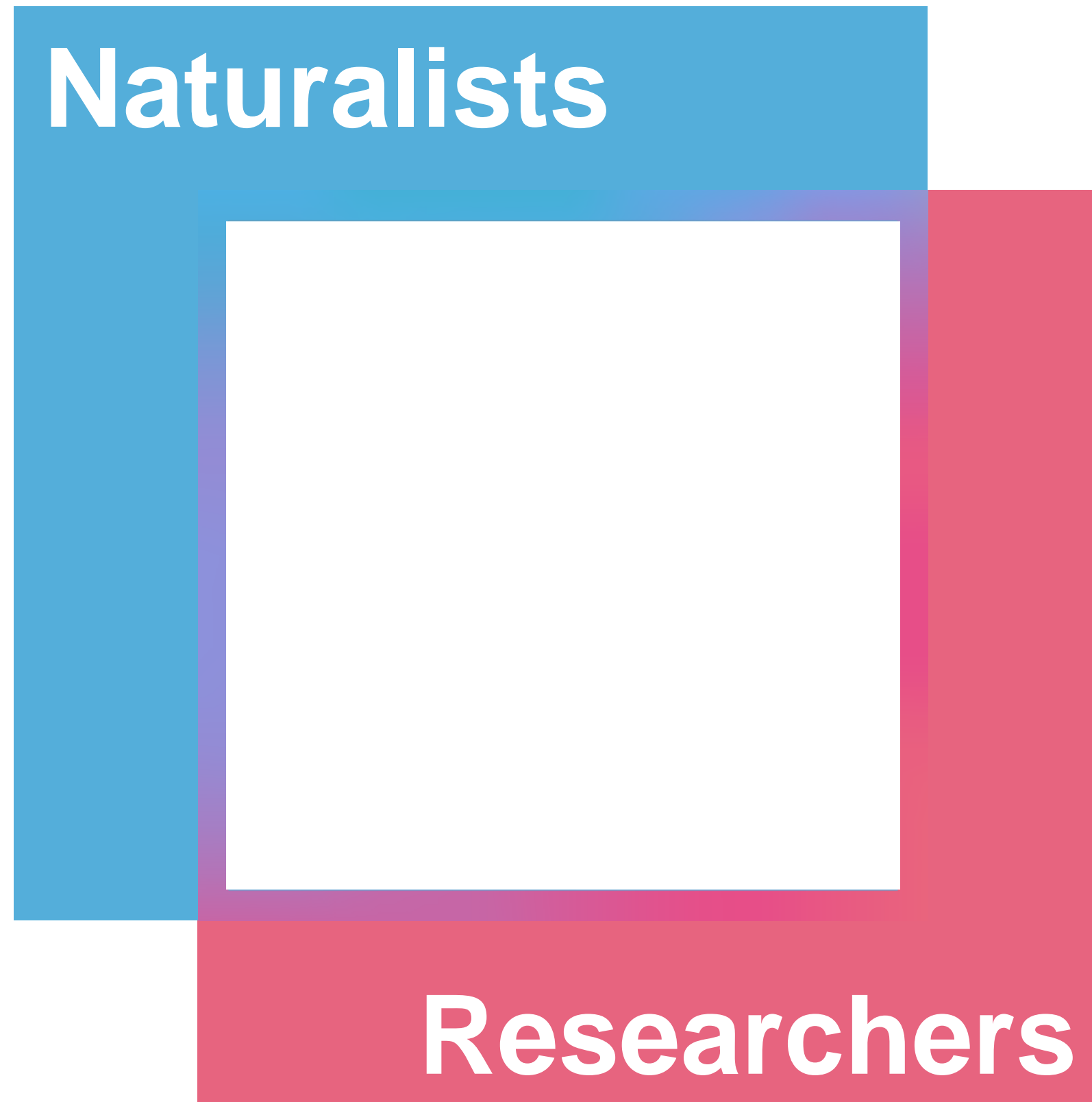


A massive database of annotated and geo-referenced images of plants, animals, and anatomy/morphology

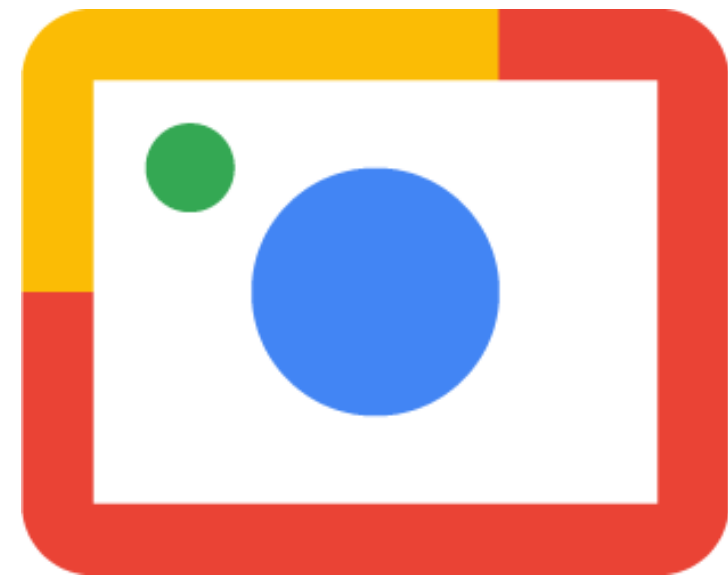


Who is Fieldguide for?

Fieldguide connects people based on interest & expertise: “the knowledge network”



Fieldguide in the Ecosystem of Image Recognition



Google Lens

- **General look-up**
- **Incredible OCR**
- **Especially useful for product discovery**

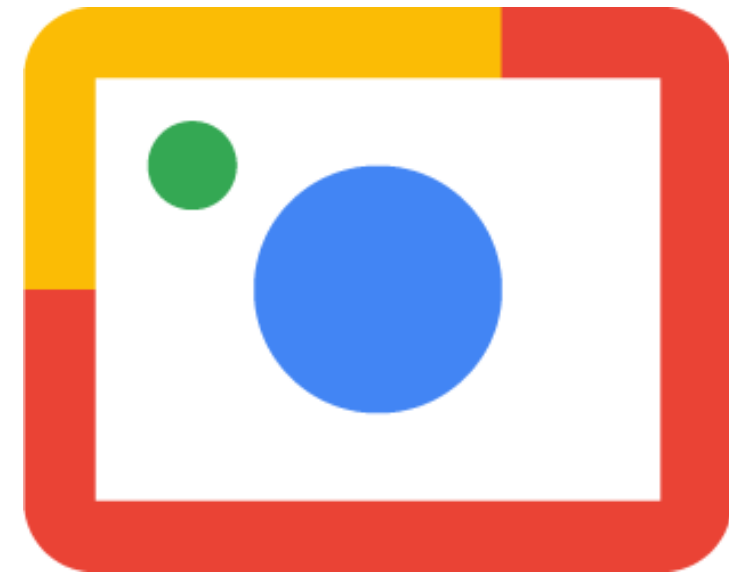


Visipedia

- **For developers**
- **CV toolkits**
- **Products & nature**

Fieldguide in the Ecosystem of Image Recognition Tools

Google Lens



Visipedia

**Scores of
specific organismal
“Computer Vision”
projects**



iNaturalist

- Citizen scientists
- Field observations
- Flora & fauna

Fieldguide

Fieldguide

- Citizen scientists & museums
- Field observations & specimens
- Flora & fauna

- Bumblebees
- Parasites
- Plants etc.



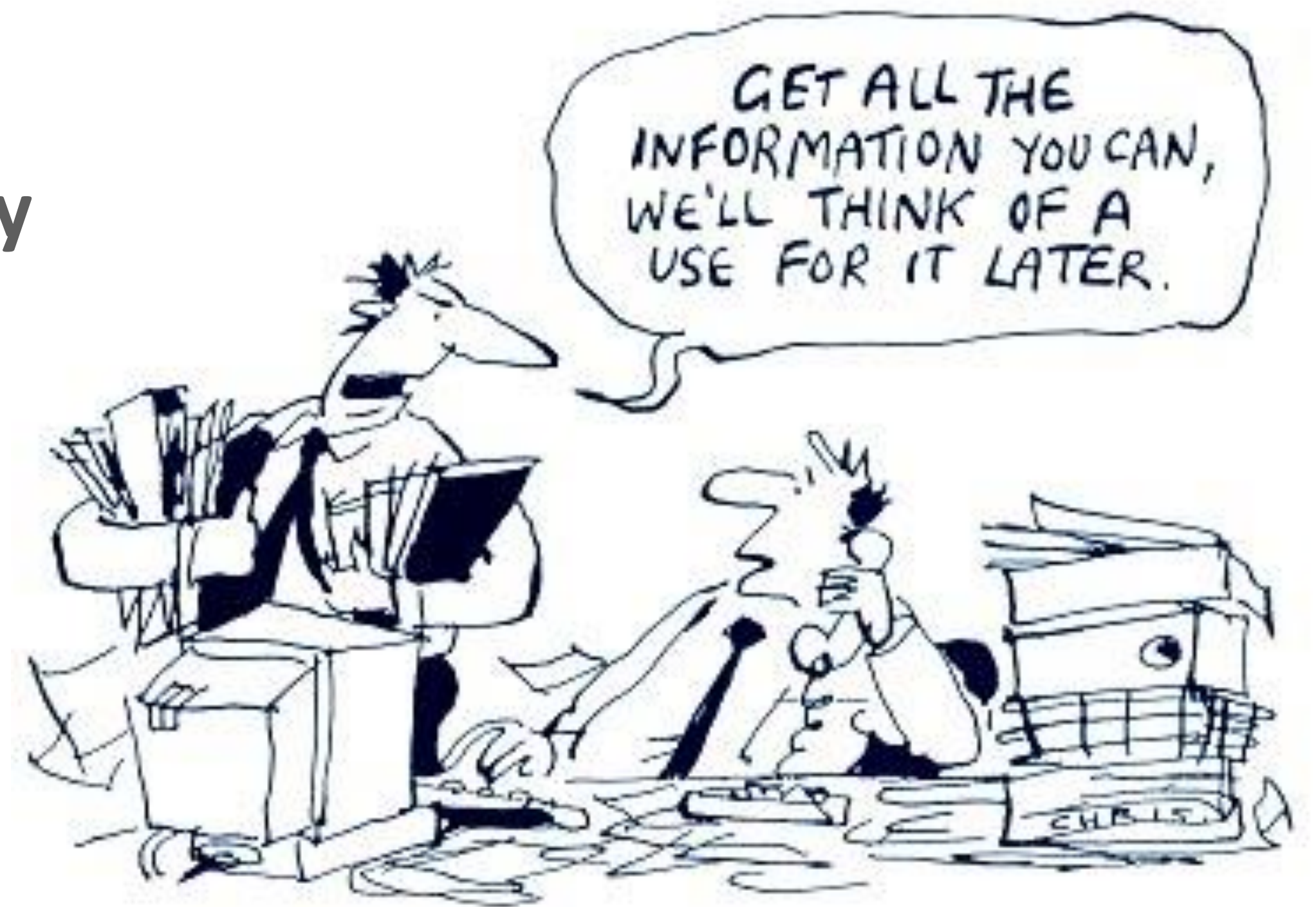
Fieldguide

What does Fg offer, more specifically?

DATA

Fieldguide is building and learning fast...

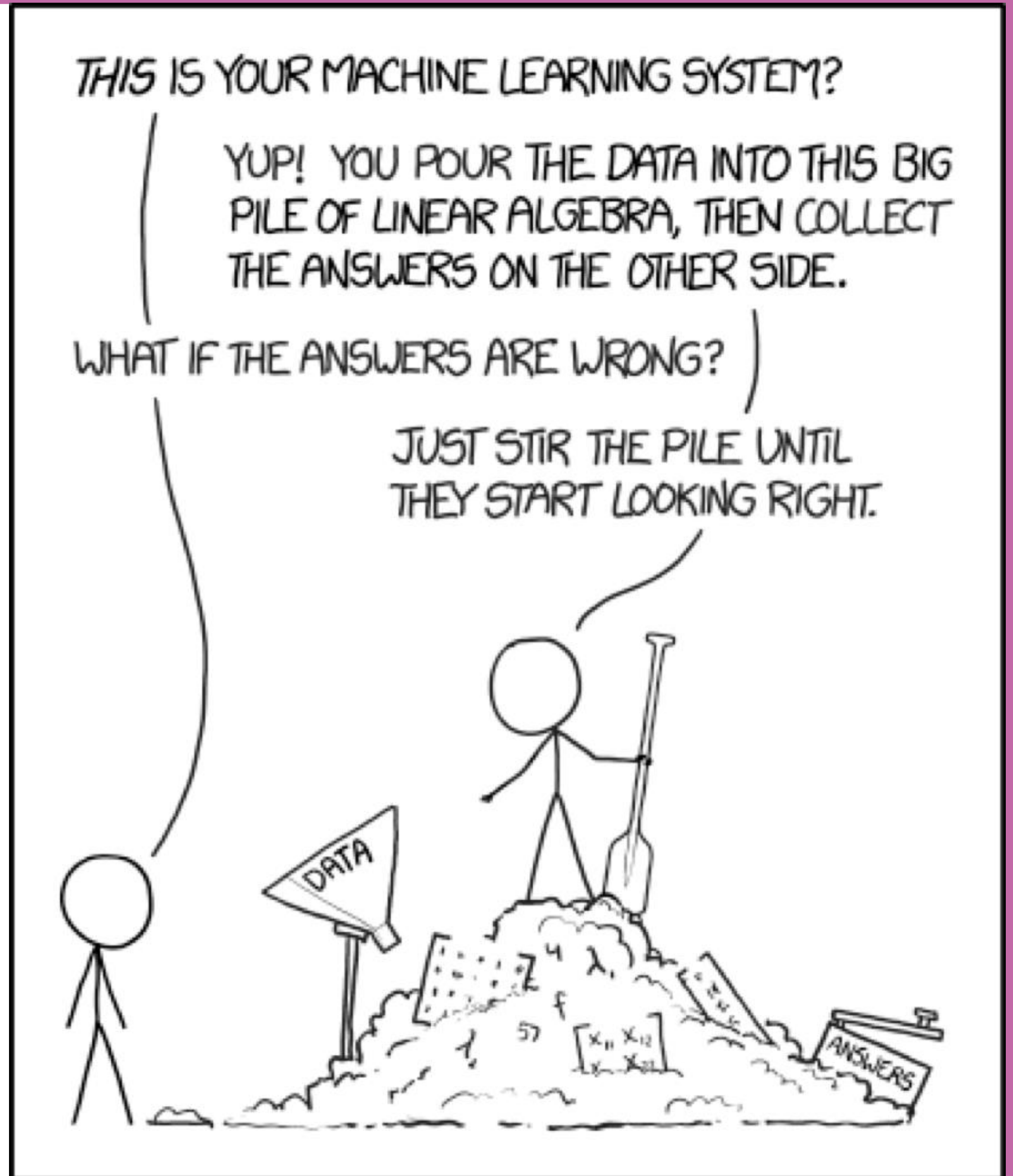
- >2 million public reference images
- >50,000 species represented
- >50 museums and >700 authors
- Currently training on 1 million images per day
- Will train on >100 million images in 2018



NET

FgNet is a “super net”

- FgNet can scale to >1M classes
- Can perform highly fine-grained IDs
- Accurate as specialty nets, faster at scale
- Scalability reduces CV fragmentation
- Neural nets only as good as the data



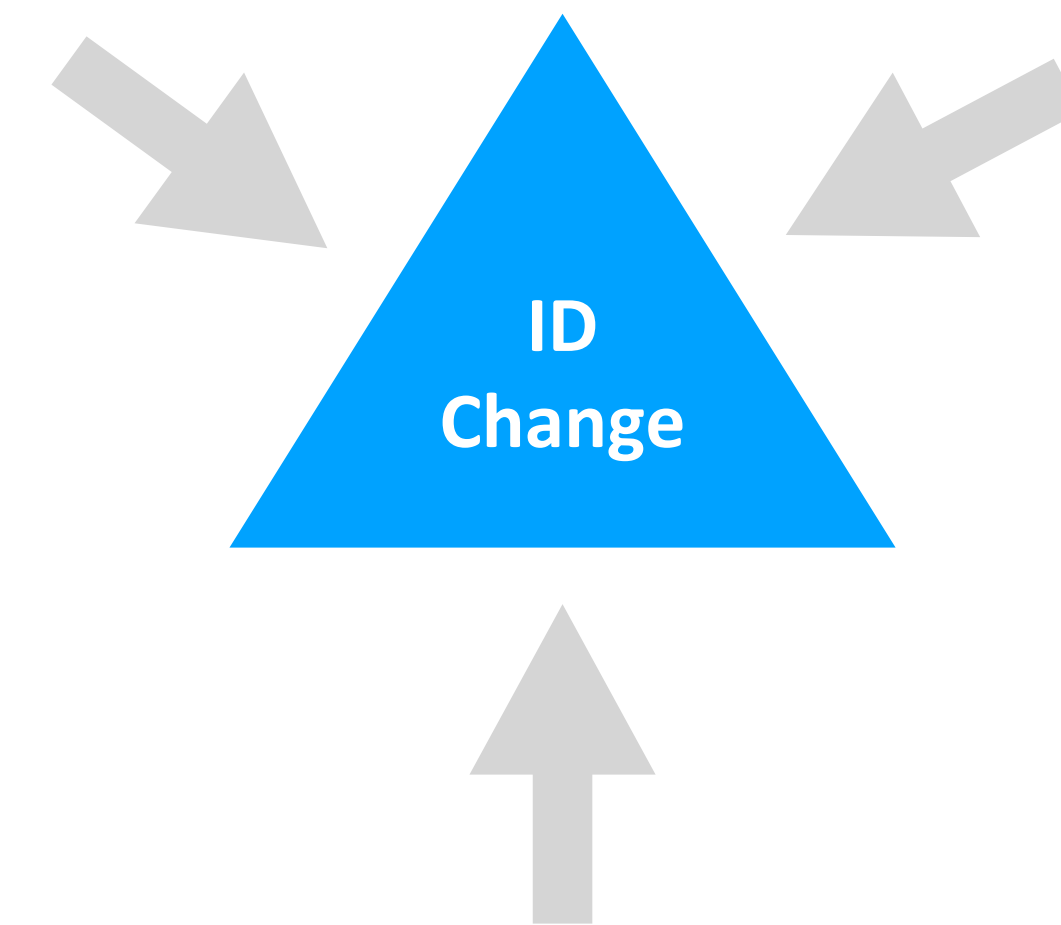
NET

What if it's misidentified?

- There will always be errors 🤯
- Fg relies on people: experts & amateurs
- Add more accurate data vs fixing errors
- “FgBot” is an automated data janitor
- Experts can customize their “review queue”

Author can approve
ID suggestion made
by another user

Expert can directly
update the ID,
author is notified

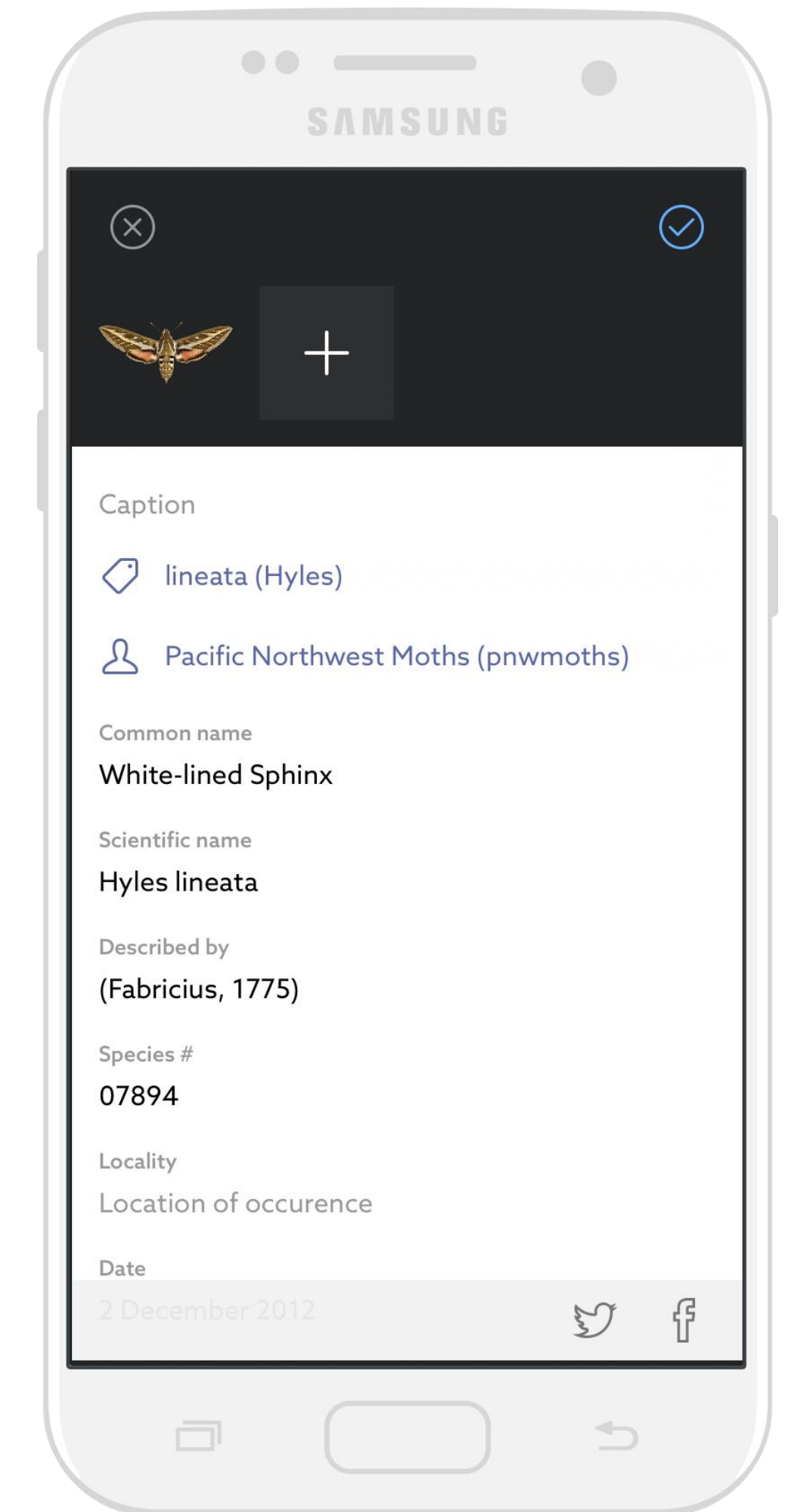
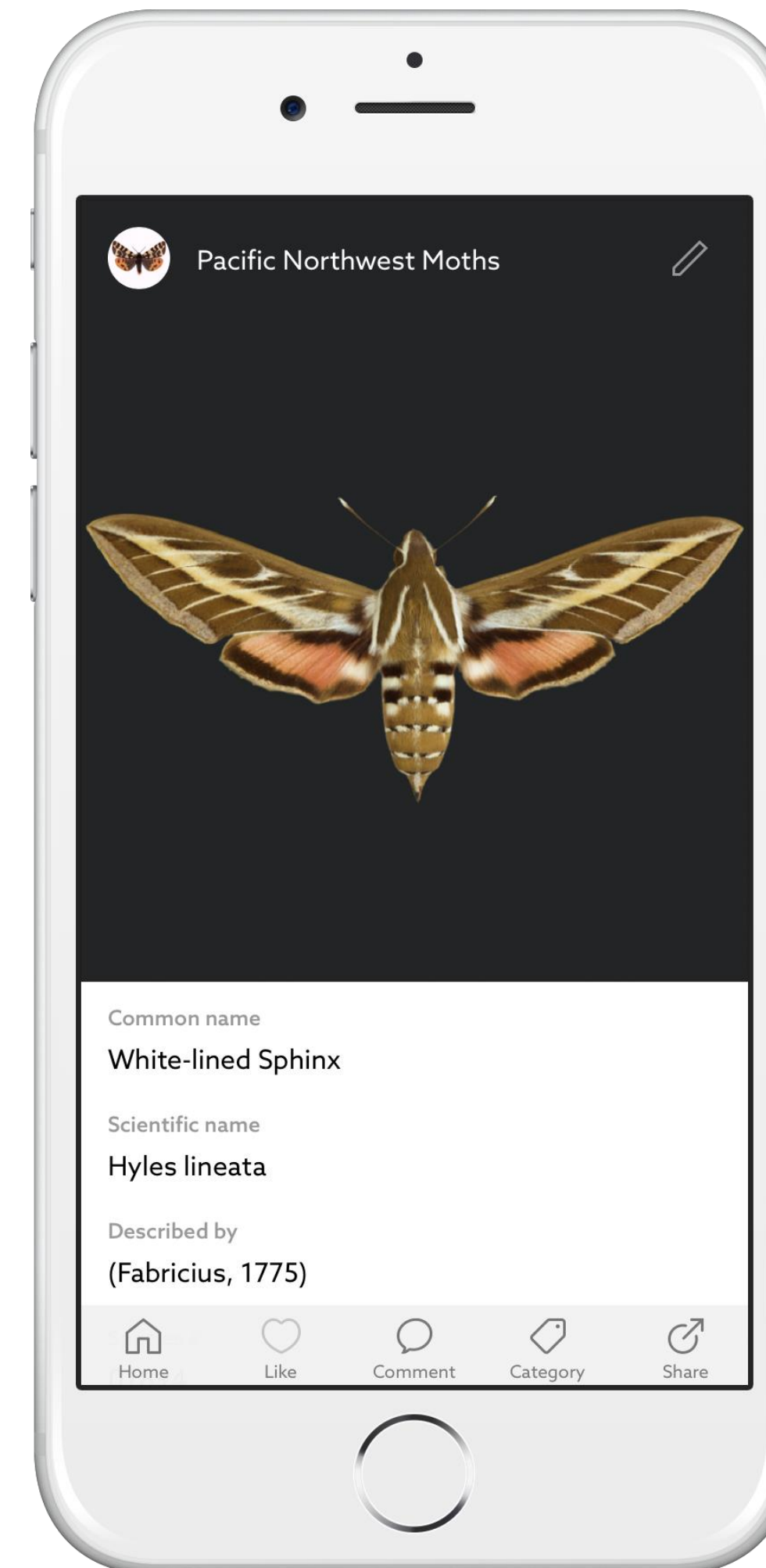


FgBot reports a
possible misidentification,
suggests stronger matches,
author & expert can respond

APPS

Proof of Concept: Leps by Fieldguide

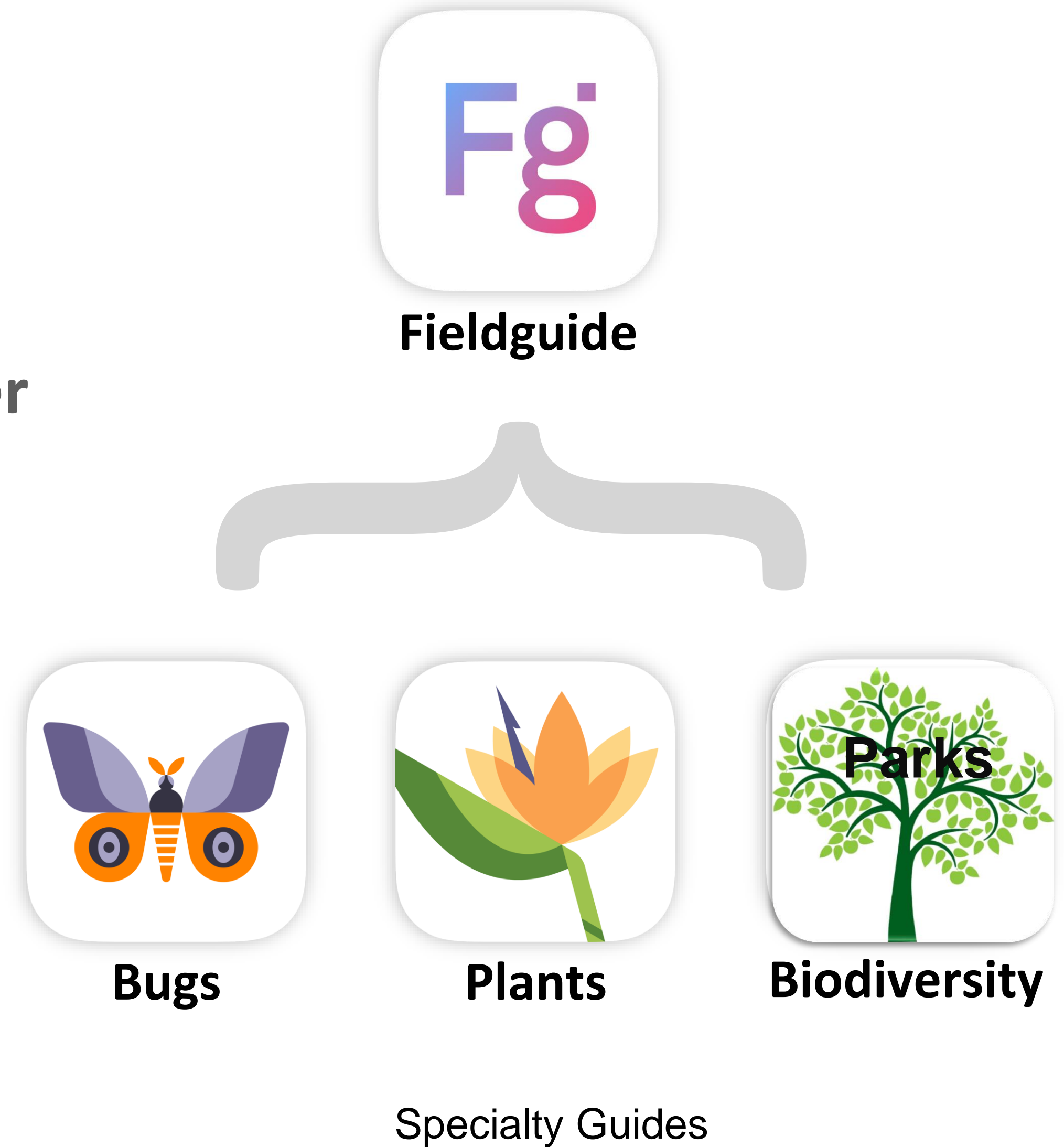
- Trained on >2M moth/butterfly images
- >84% accurate on North American leps
- On pace to reach >70% on worldwide ssp
- Integrated with Symbiota & iNaturalist
- On iPhone, Android & LepSnap.org



APPS

Beyond Leps: Main & Specialty

- Specialty apps are filtered views of Fg proper
- All apps use the same neural network
- Single user account accesses everything
- Create “custom guides” on Fg proper
- Launches **July 2018** on all platforms



hello@fieldguide.net

Connecting people

Fg

beadle



David Beadle
97 followers

Following

Figures 4,309

Categories 4

Following 43



Pacific Northwest Moths

Following



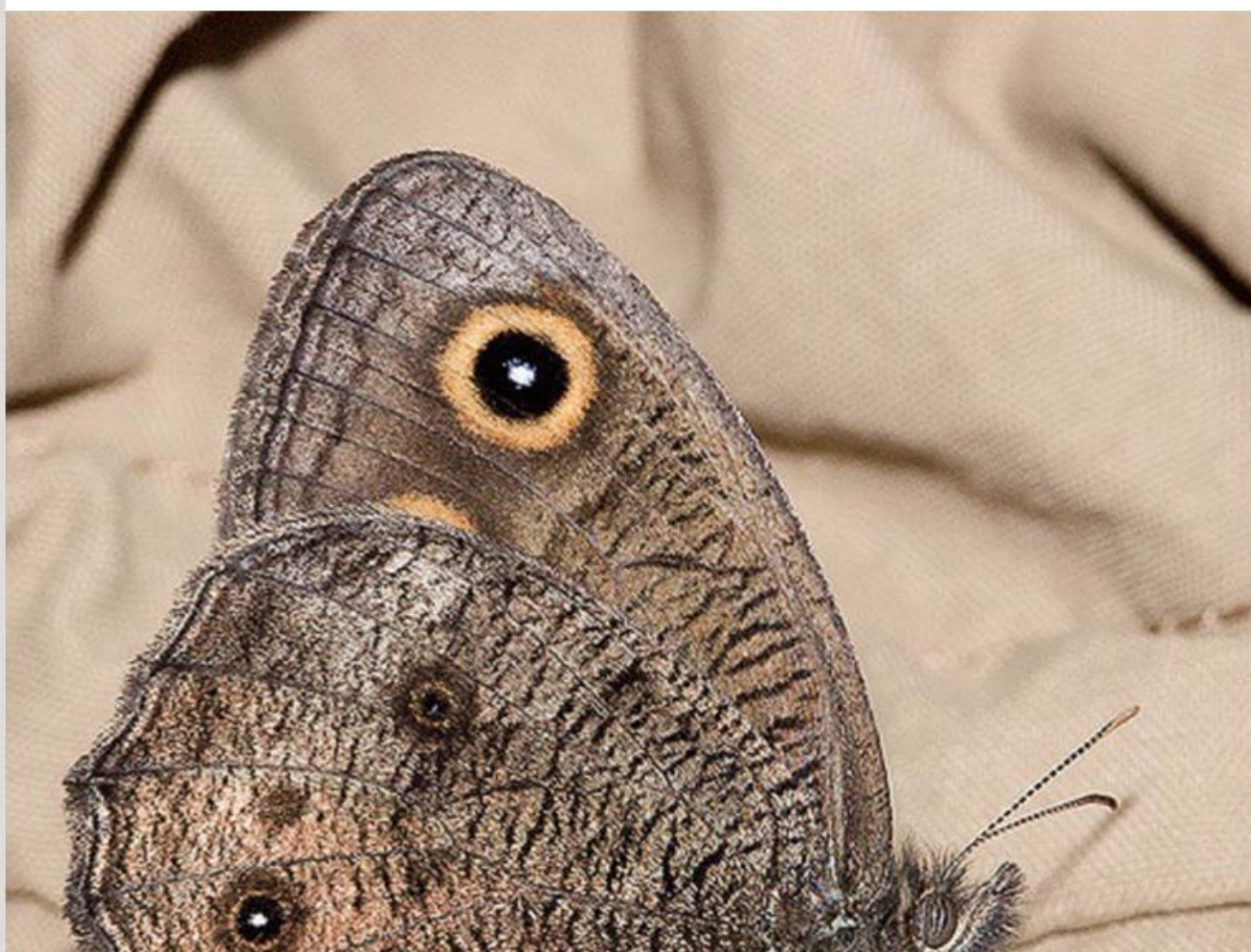
Figures 1785

Small Bail
Baileya aust



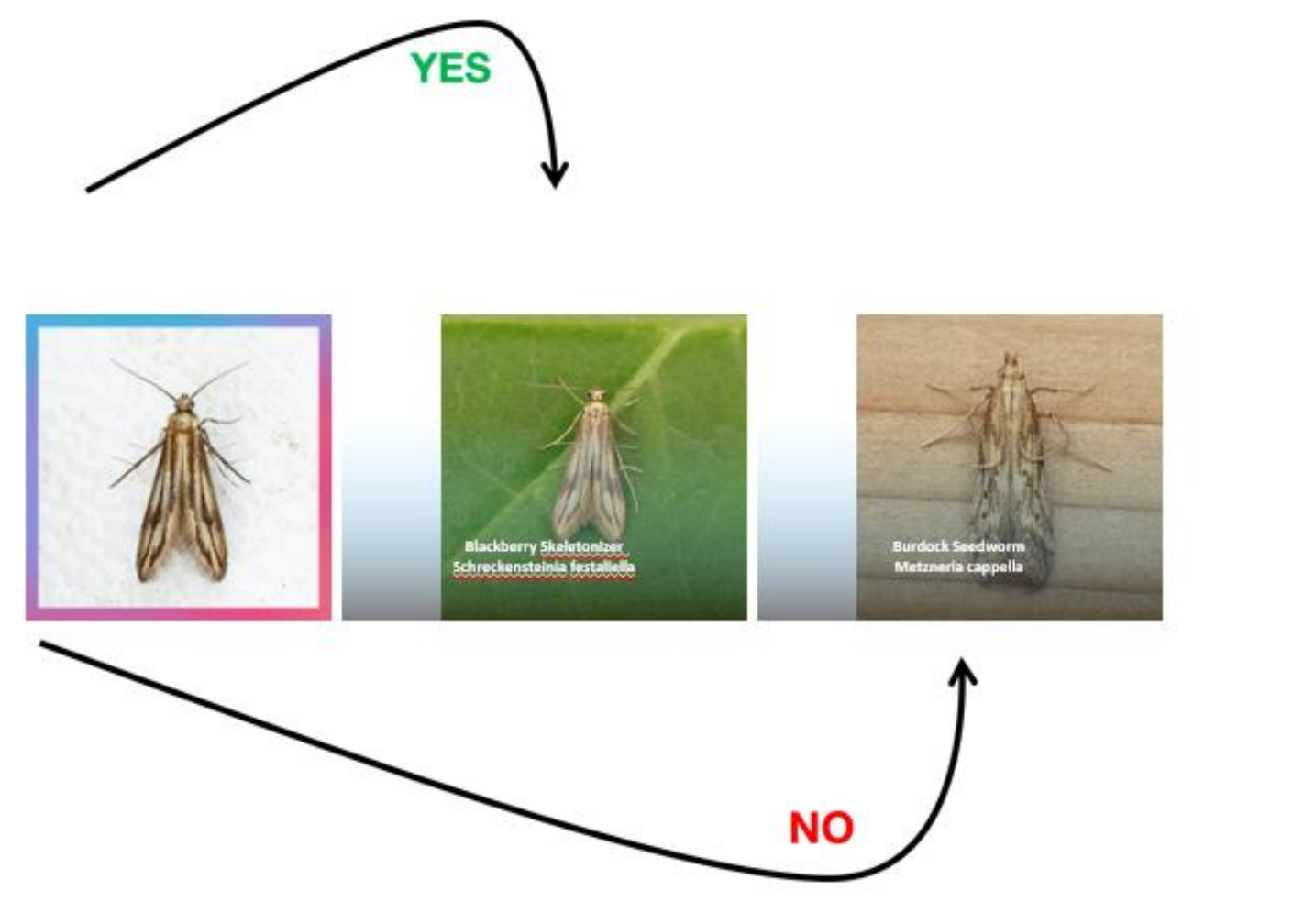
John Davis

Following



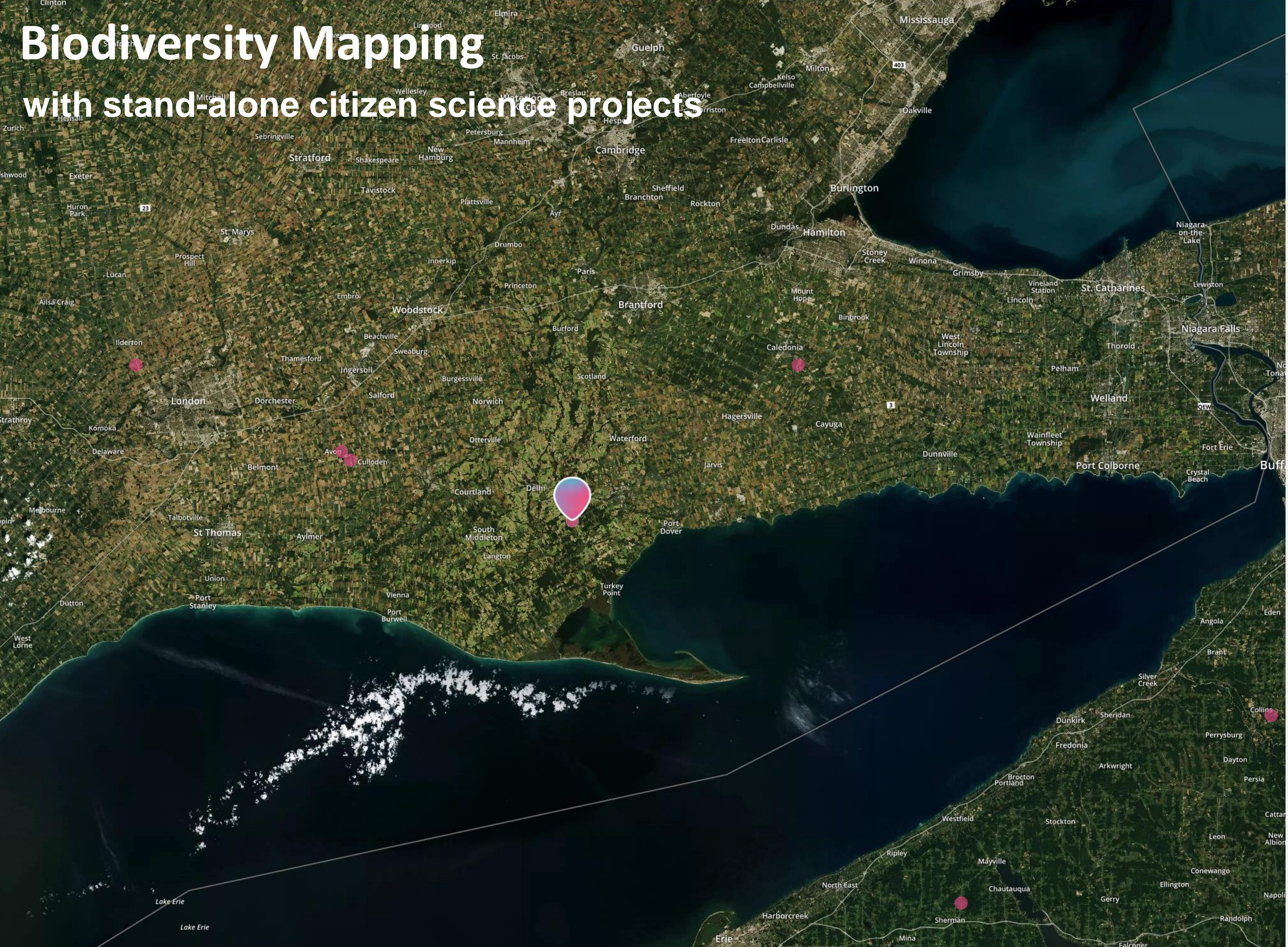
2

Computer-aided Identification



Biodiversity Mapping

with stand-alone citizen science projects



API

How do museums use the Fieldguide API?

- Use phone app to photograph specimens and publish directly to Symbiota
- Screen material from expeditions for initial curation
- As a check on human identifications of existing material (FgBatch)
- As a visual search widget for look-up and streamlined publishing (FgSearch)
- API is RESTful and standards-compliant, public documentation in progress

API

FgBatch is a free AI-powered tool



Home >> Collection Management >> Fieldguide Results Viewer

C.P. Gillette Museum of Arthropod Diversity (CSU-CSUC)

Full Results Filtered Results

[Download CSV](#)

Use the checkboxes to select the records you would like to add determinations, and the radio buttons to select which determination to add.

1 to 100 of 246 Results

[NEXT 100 RESULTS >>](#)

Record ID	Inst. Code	Coll. Code	<input type="checkbox"/>	Current Identification	Family			Fieldguide Identification	Fieldguide Training Images
22888608	CSU	CSUC	<input type="checkbox"/>	Parnassius smintheus	Papilionidae	View Image	<input checked="" type="radio"/>	Parnassius smintheus sayii	110
								Parnassius smintheus Current determination	462
23496776	CSU	CSUC	<input type="checkbox"/>	Papilio eurymedon	Papilionidae	View Image		Papilio eurymedon Current determination	980
23496788	CSU	CSUC	<input type="checkbox"/>	Papilio eurymedon	Papilionidae	View Image		Papilio eurymedon Current determination	980
23513180	CSU	CSUC	<input type="checkbox"/>	Papilio eurymedon	Papilionidae	View Image	<input checked="" type="radio"/>	Eurytides marcellus	944
								Papilio eurymedon Current determination	980
23513185	CSU	CSUC	<input type="checkbox"/>	Papilio eurymedon	Papilionidae	View Image		Papilio eurymedon Current determination	980
							<input checked="" type="radio"/>	Eurytides marcellus	944
23513202	CSU	CSUC	<input type="checkbox"/>	Papilio eurymedon	Papilionidae	View Image		Papilio eurymedon Current determination	980
							<input checked="" type="radio"/>	Eurytides marcellus	944
23513208	CSU	CSUC	<input type="checkbox"/>	Papilio eurymedon	Papilionidae	View Image		Papilio eurymedon Current determination	980



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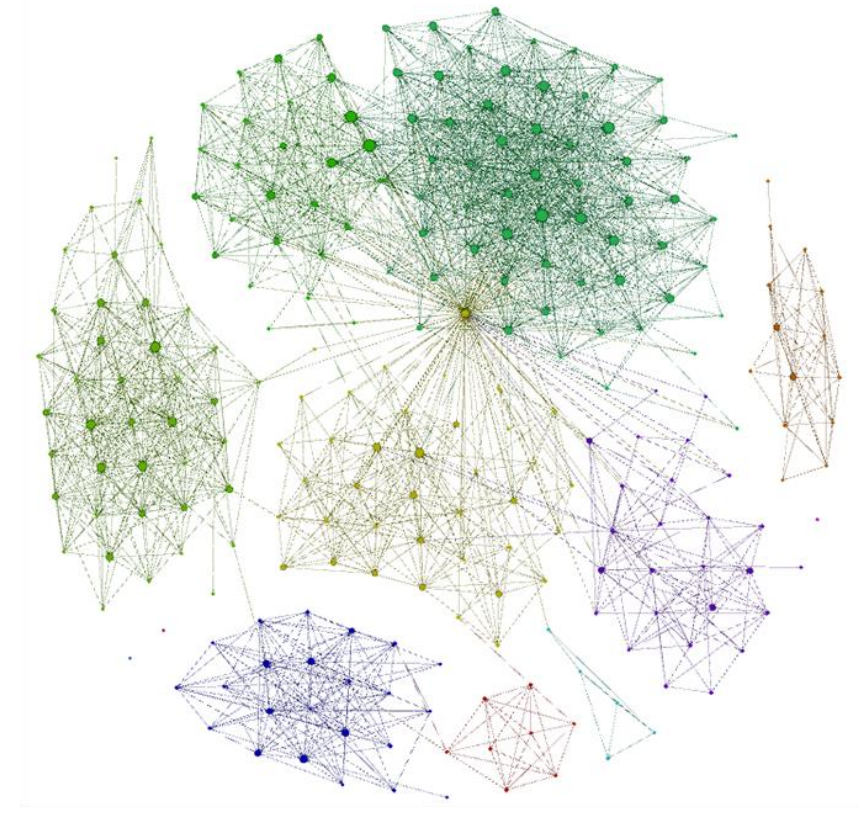
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...

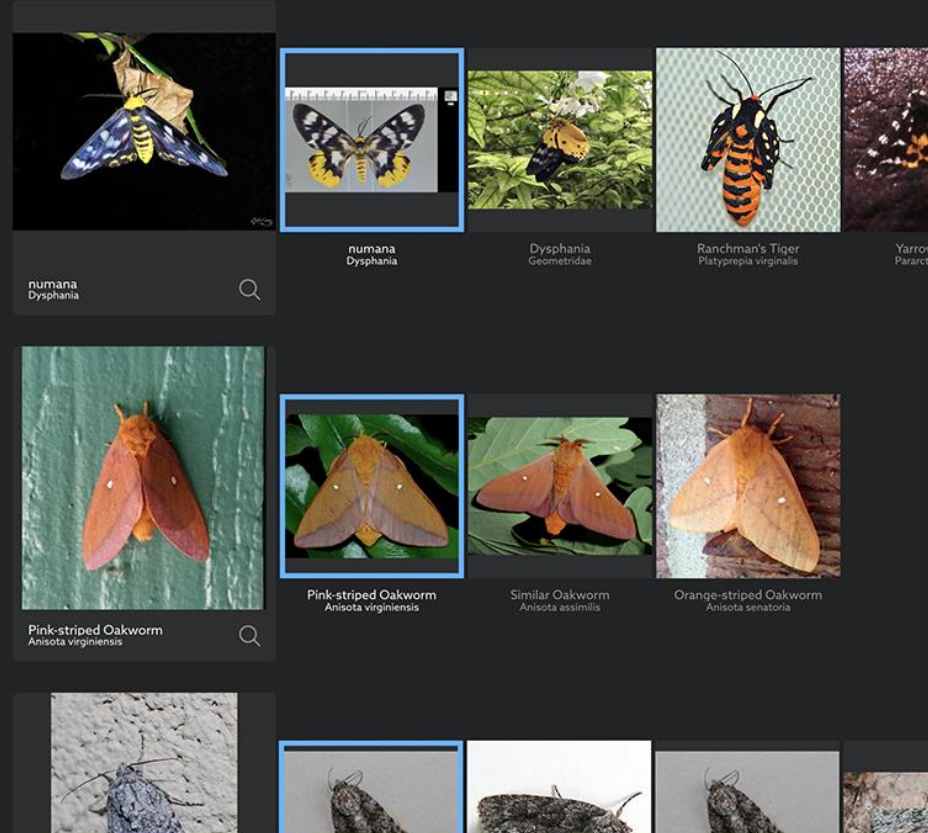
Future Focus (2018-2019)

1. Incorporating geographic & phenological filters
2. Integrating multiple images into decision process
3. Expand anatomy/morphology images
(e.g., genitalia)

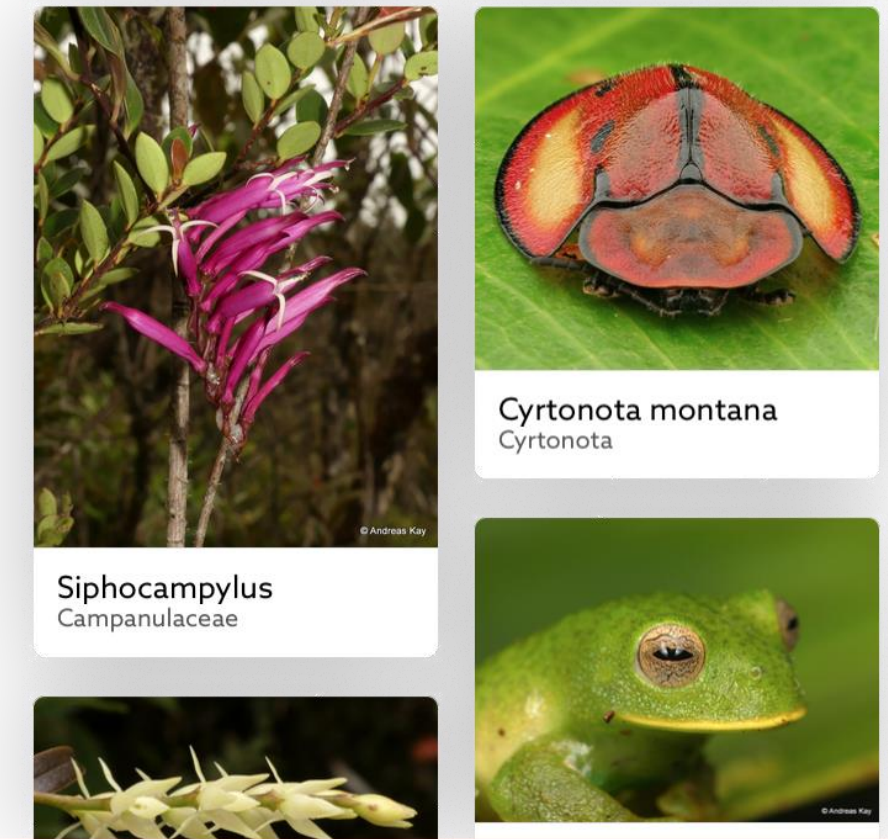
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