Progressing toward

ODOMATIC

Automatic species identification of Odonata from *in situ* photographs

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THE FINAL
COUNTDOWN

Home | My OC | Checklists | Maps | Photos/ID | **Records** | Resources | Publications | DSA

Submit Record | Browse Submitted Records | Dot Map Project Records | My Records | Stats

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Records

158034 record(s) found

Filters

User Filter: All User-Submitted Records

Status Filter: All Statuses

Taxa Filter:

Jurisdiction Filter:

Lookup by OC#:

Apply Filters

Instructions: Below is a listing of records that meet the criteria abov. You can sort the records below by clicking on the appropriate column heading. When sorted in ascending order, the column heading will have an up arrow ↑ next to it. When sorted in descending order, the column heading will have a down arrow ↓ next to it. To togg between sorting in ascending and descending order, simply click the same column heading again.

Photo	Species	Collected	Submitted	Vetted	Actions
	Scientific Name: *Sympetrum vicinum* **Common Name:** Autumn Meadowhawk	**Collected On:** 2017-Oct-28 **Collected By:** Michael Sheehan **Jurisdiction:** Fairfield County, Conne cticut, United States at 41.14744° N 73.380 86° W **Favorite:**	**Submitted By:** Michael Sheehan **OC#:** 474592	**Vetted By:** N/A **Decision:** Pending	
	Scientific Name: *Erythemis vesiculosa* **Common Name:** Great Pondhawk	**Collected On:** 2017-Oct-25 **Collected By:** Steven Mlodinow	**Submitted On:** 2017-Nov-2 **Submitted By:** Steven Mlodinow	**Vetted On:** Unknown Date **Vetted By:** N/A	

- 158K records
- 110K images
- 578 ~N American spp
- distribution maps
- county checklists
- field guides
- power Dragonfly ID app

Crowd-sourcing identification

- large pool of workers
- fast
- scales well
- IDs may be inaccurate

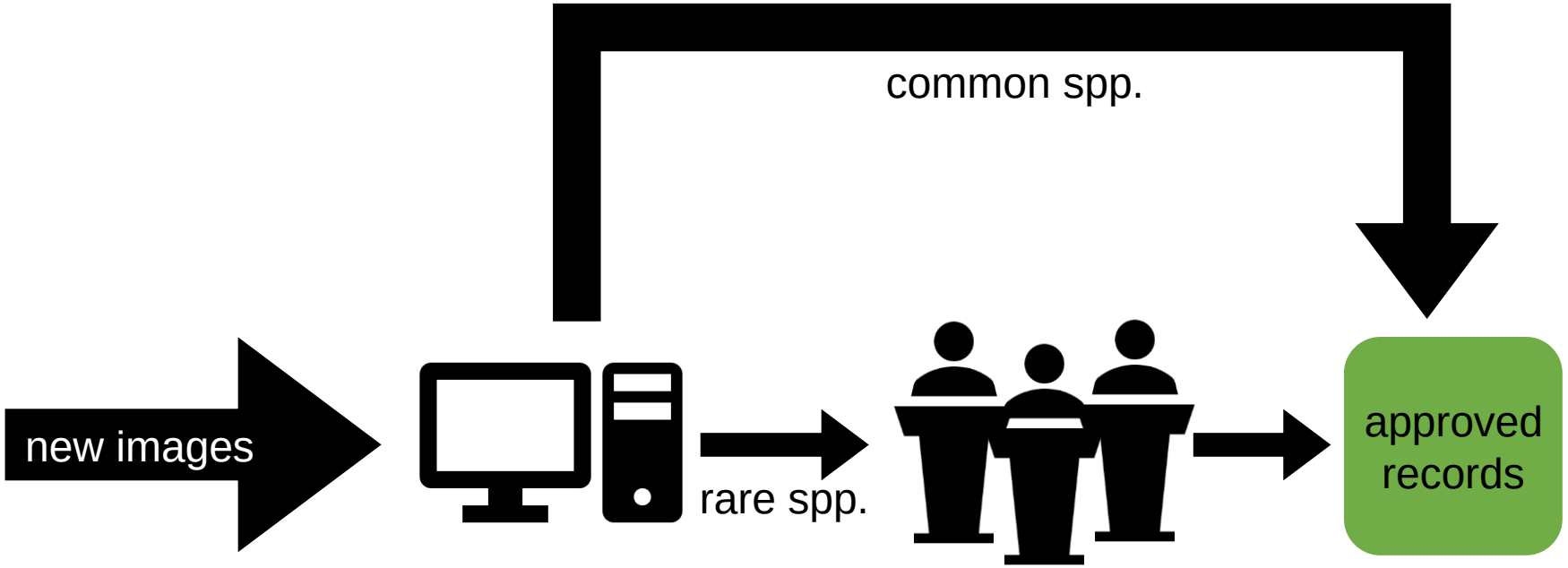
Expert-sourcing identification

- small pool of workers
- slower
- scales poorly
- IDs very accurate

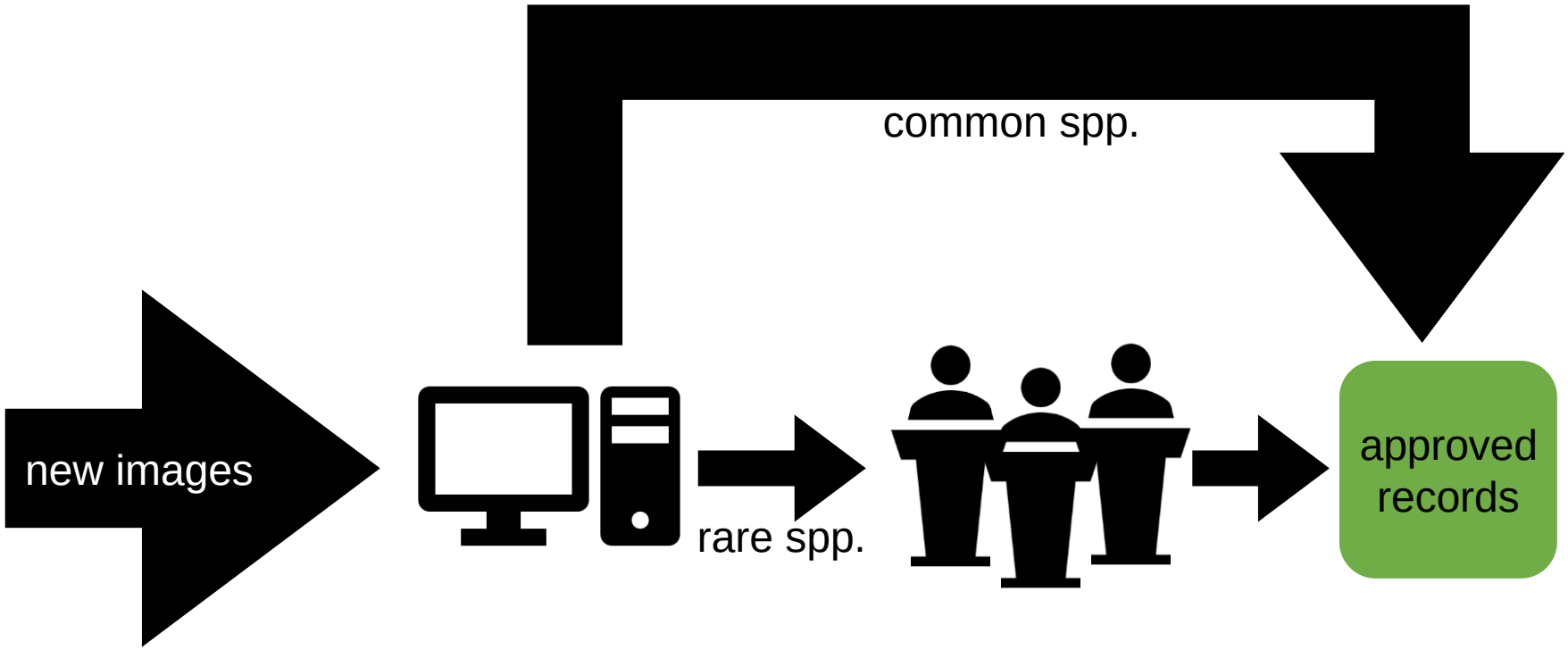
Automated identification

- no workers needed
- extremely fast
- scales extremely well
- IDs accurate but only with >>> training data

ODONATA CENTRAL

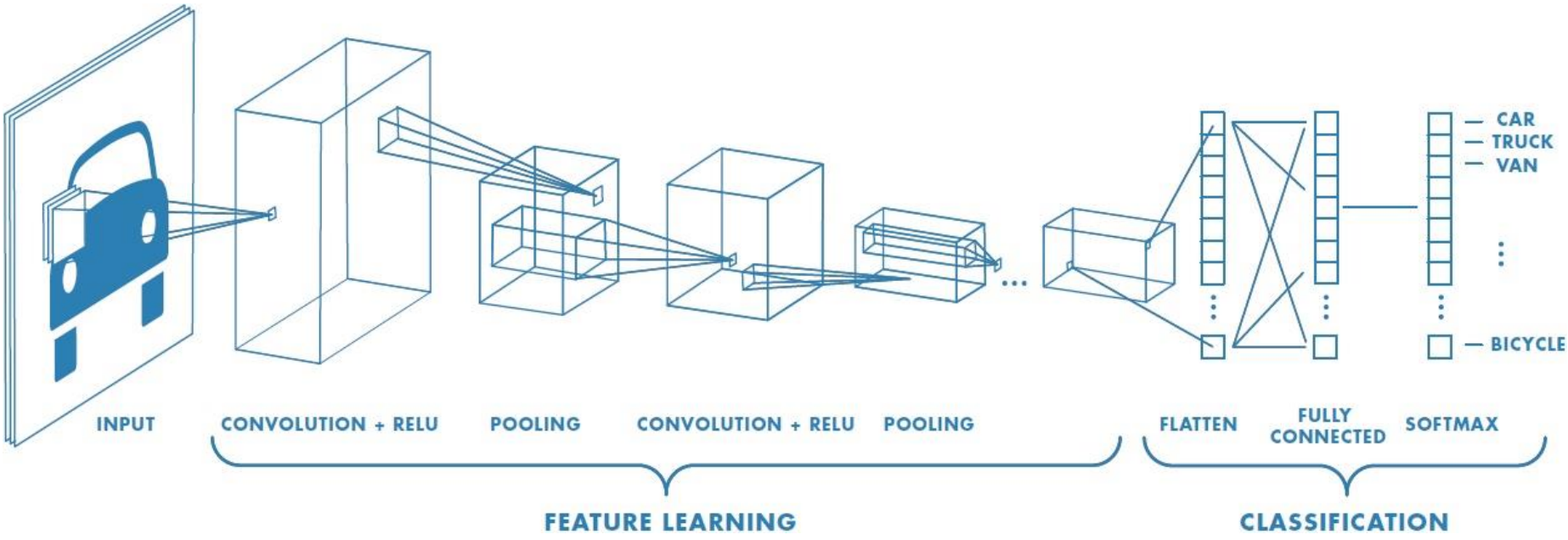


ODONATA CENTRAL



+ Magic! = *Erythemis simplicicollis*

Convolutional neural networks



MathWorks

Convolutional neural networks

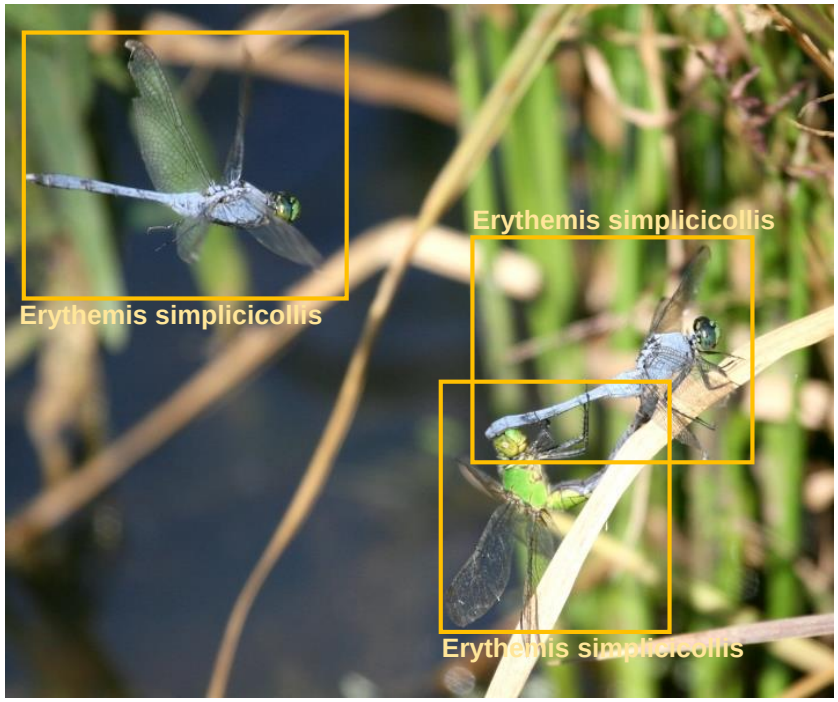
Low-Level Feature → Mid-Level Feature → High-Level Feature → Trainable Classifier

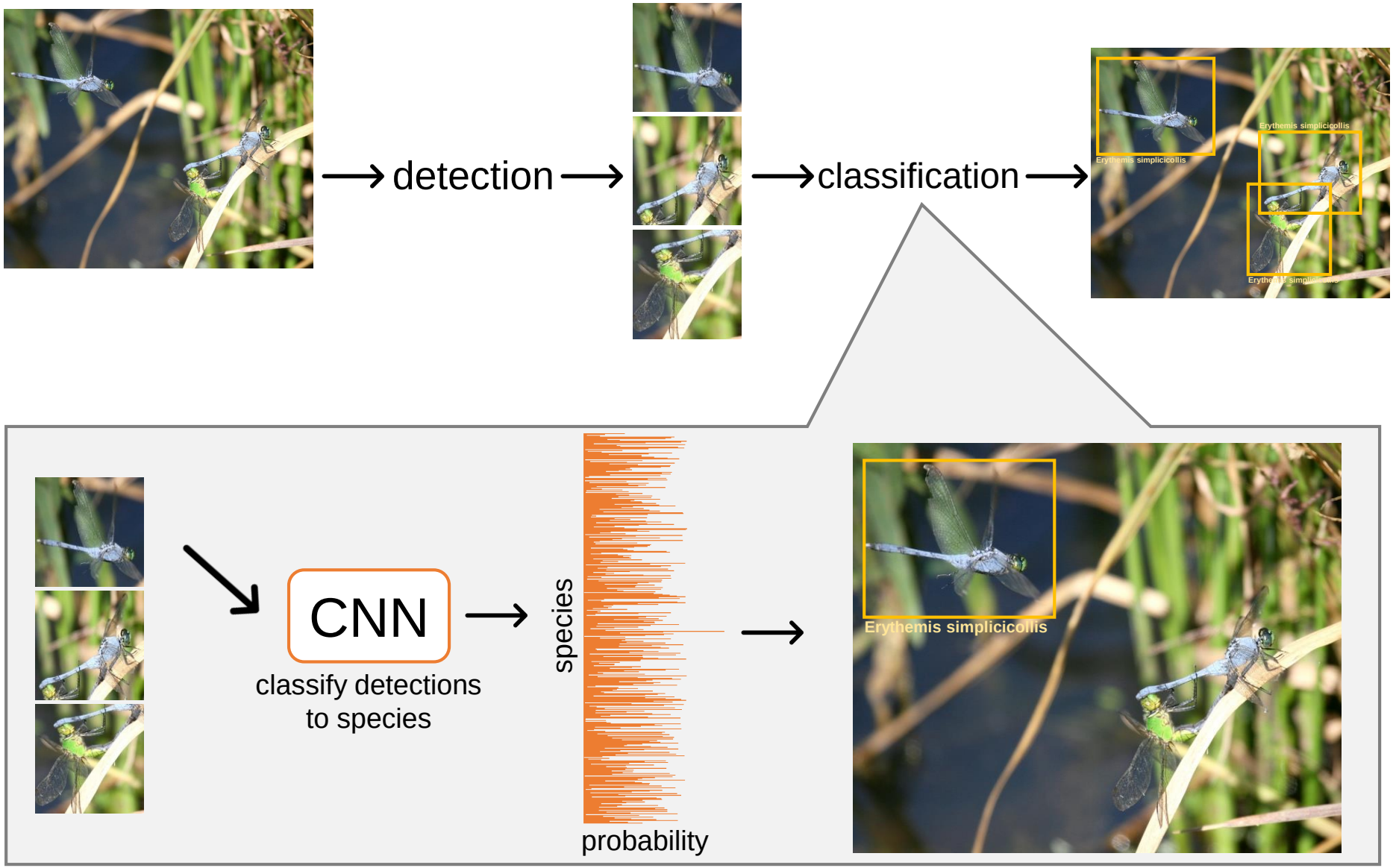
Magic!

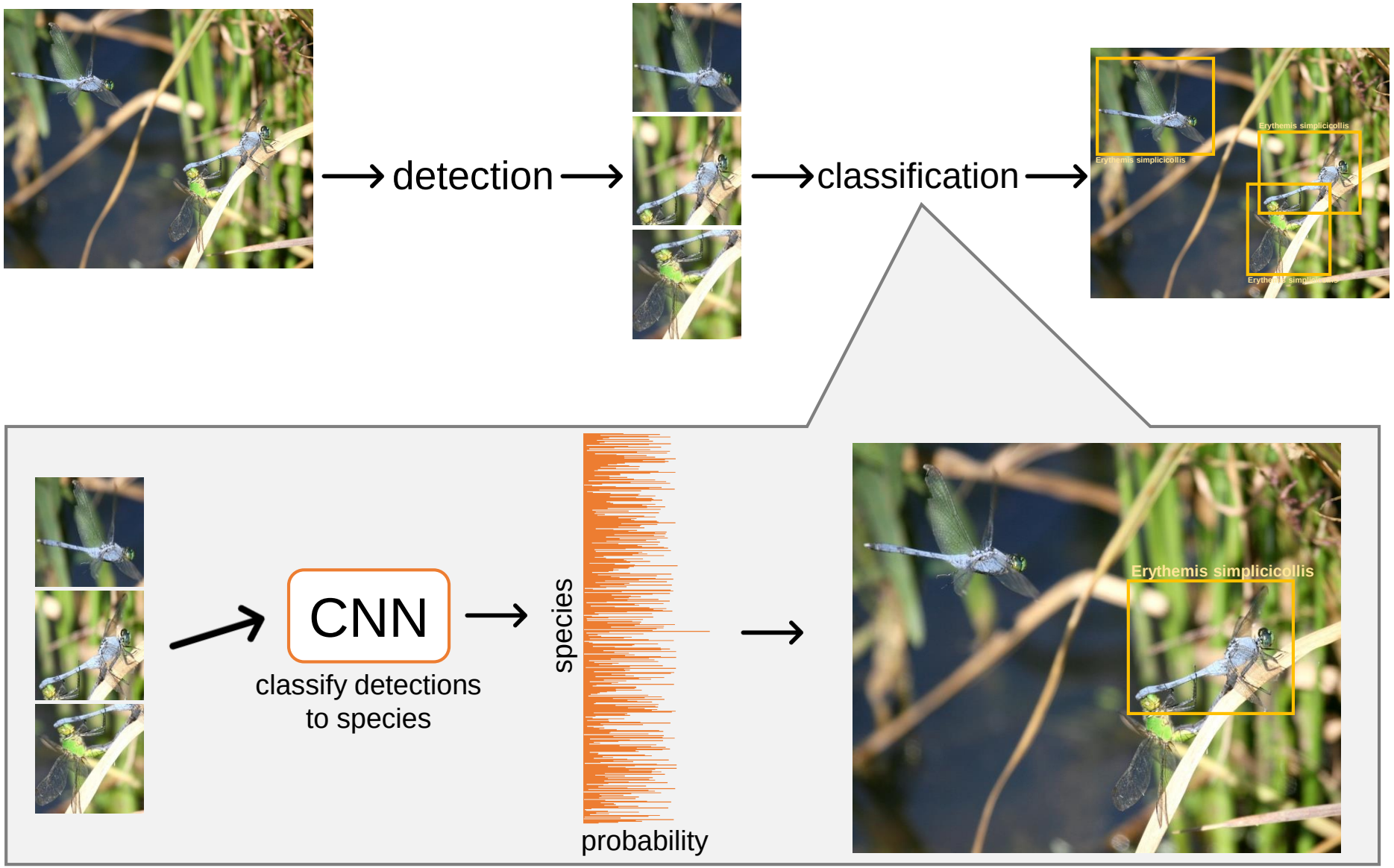
Feature visualization of convolutional net trained on ImageNet from [Zeiler & Fergus 2013]

→ detection →

→ classification




detection
classification
Erythemis simplicicollis
Erythemis simplicicollis
CNN
classify detections
to species
species
probability
Erythemis simplicicollis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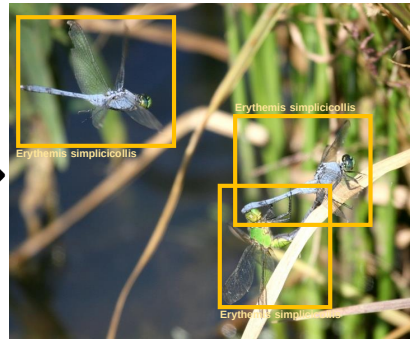
detection

classification



CNN

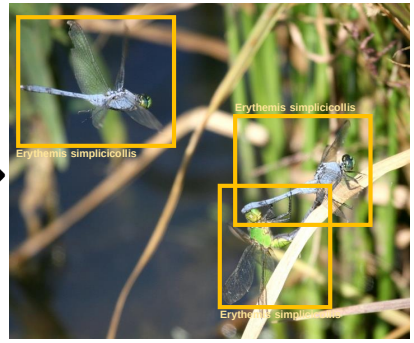
classify detections to species

species

probability

detection

classification

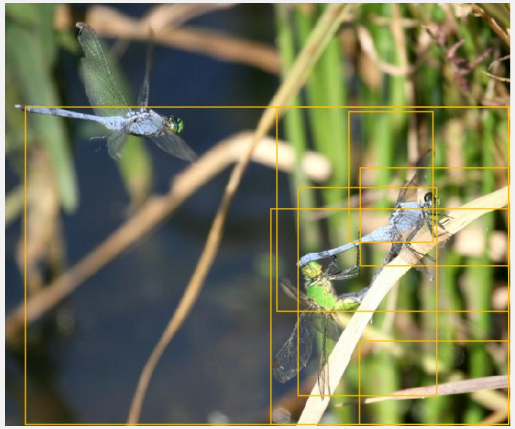


Get region proposals via SelectiveSearch [1]

CNN

classify regions as **odonate** or **background**

non-maximum suppression



Detected regions

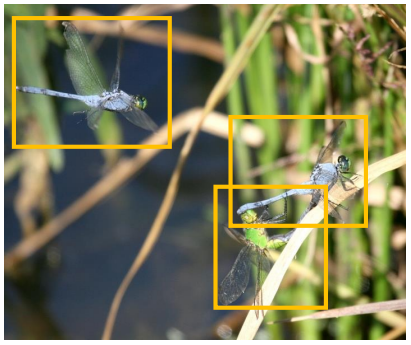
Adaptation of R-CNN [2]

[1] Uijlings et al. 2012, [2] Girshick et al. 2014

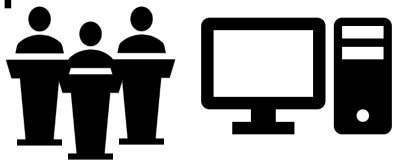
python
Odomatic
amazon web services
bitfusion.io
Caffe

Final remarks

- Odomatic under development

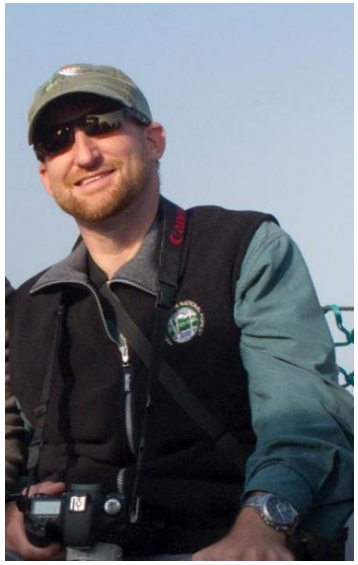


- Starting with odonate detection
- Combining automation with expert-sourcing in OdonataCentral



- Open-sourced, Python-based system
- Adaptable for digital collections of other taxa

Acknowledgements



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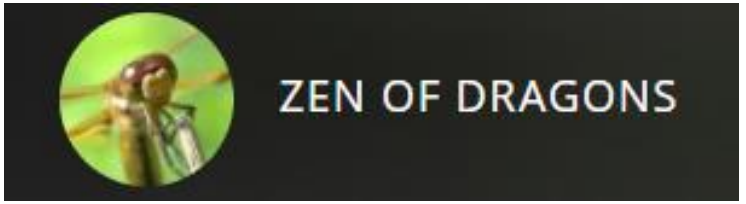

ZOONIVERSE

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