CARPE DIEM

A Lifelong Learning Tool for Automated Wildlife Surveillance

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WATERFALL MACHINE LEARNING

Typical lifecycle of ML applications:

1. Acquire data,
2. acquire annotations,
3. build model,
4. validate model,
5. deploy.

APPLIED TO CAMERA TRAPS

A few problems might arise:

- Data acquisition in camera traps never really finishes.
- Producing annotations for *all* images is unrealistic and unnecessary.
  $\rightarrow$ Intelligent selection required.
- The real world changes over time, so any model becomes obsolete quickly.
- Constant re-training of large neural networks is expensive!

LIFELONG LEARNING TO THE RESCUE

Initial set of
labeled training data
(loosely related to the task)

Train initial
large-scale
model

Update model efficiently
(**incremental learning**)

Unlabeled
data

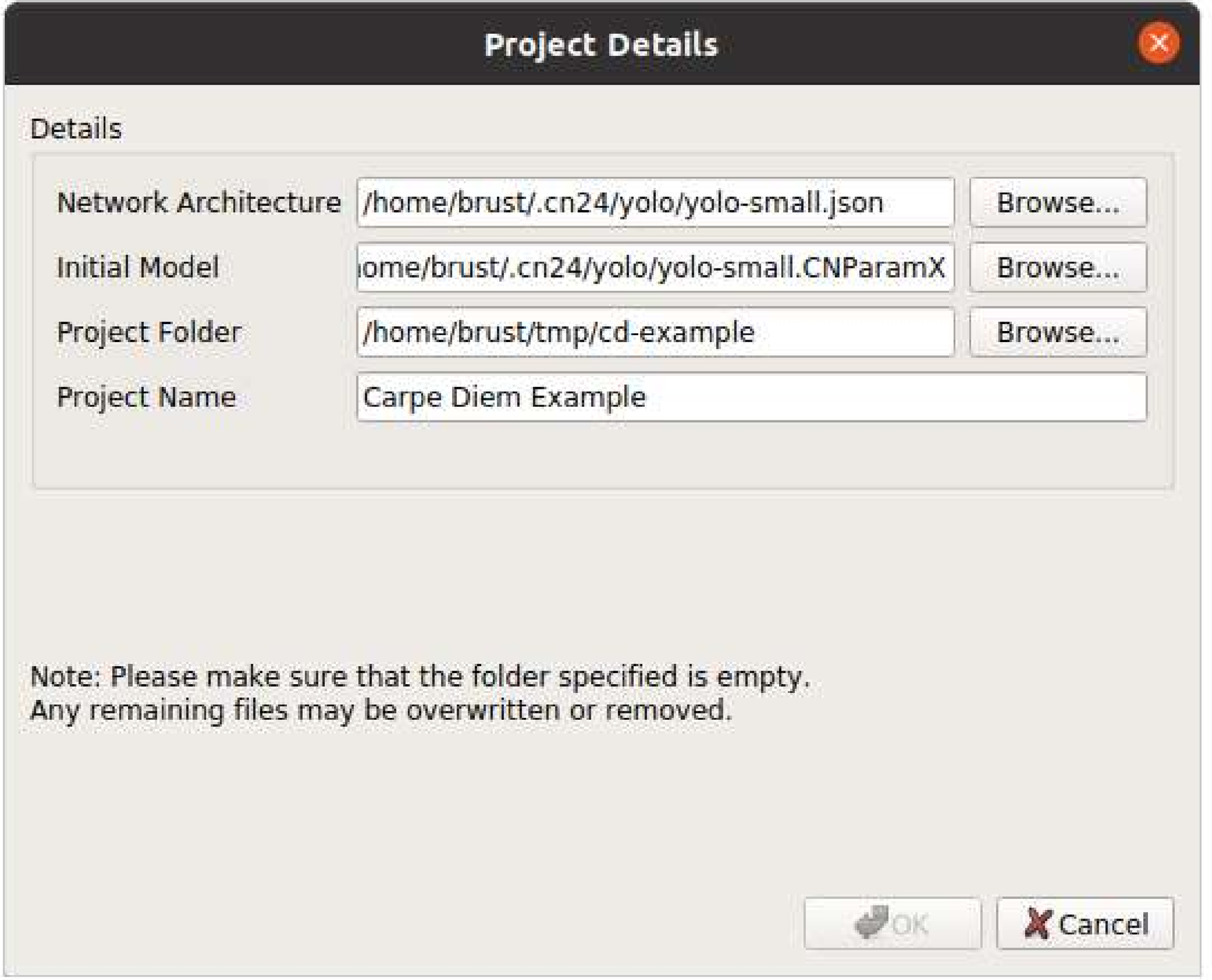
Select
valuable examples
(**active learning**)

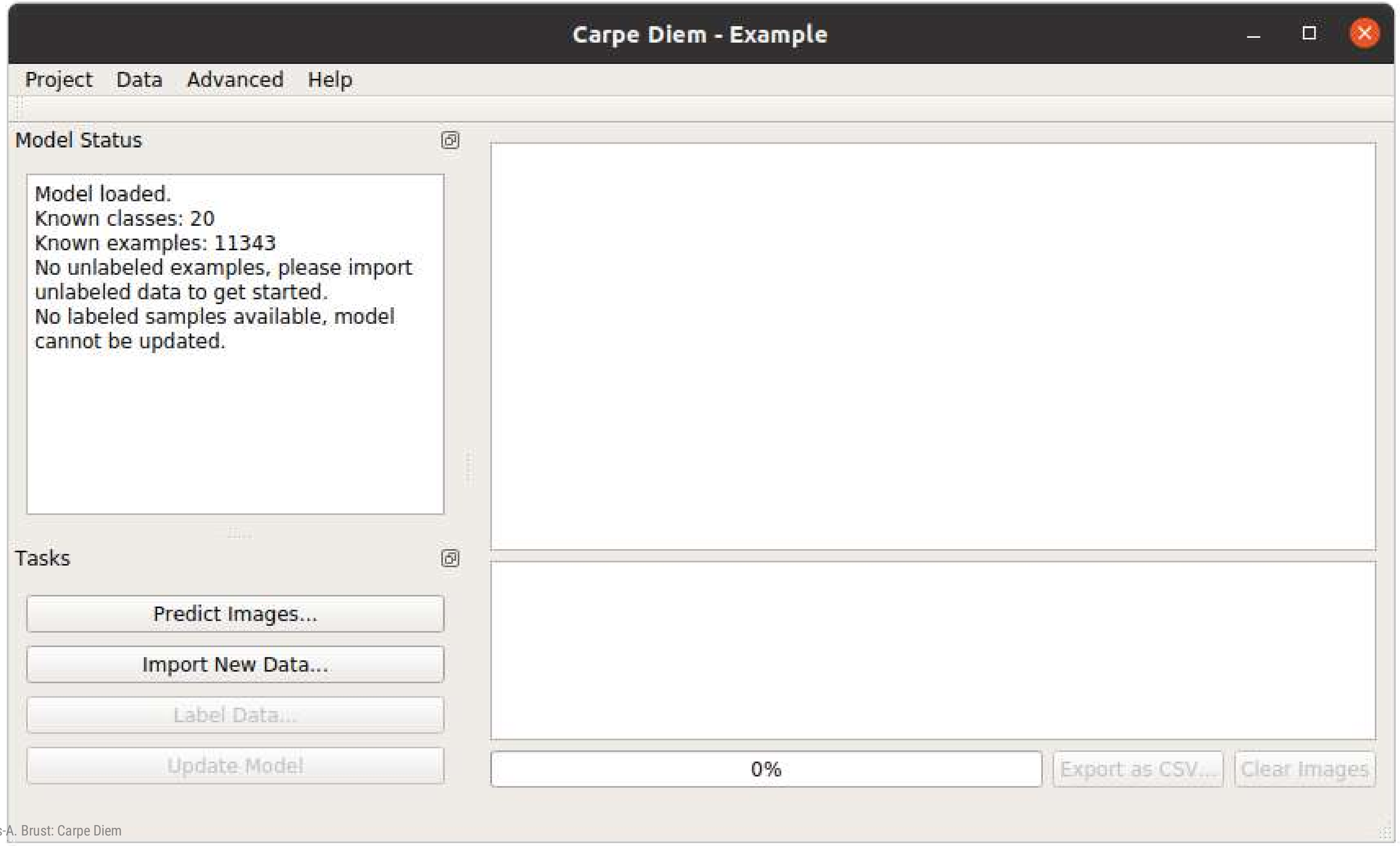
Acquire
annotations

INTRODUCING CARPE DIEM

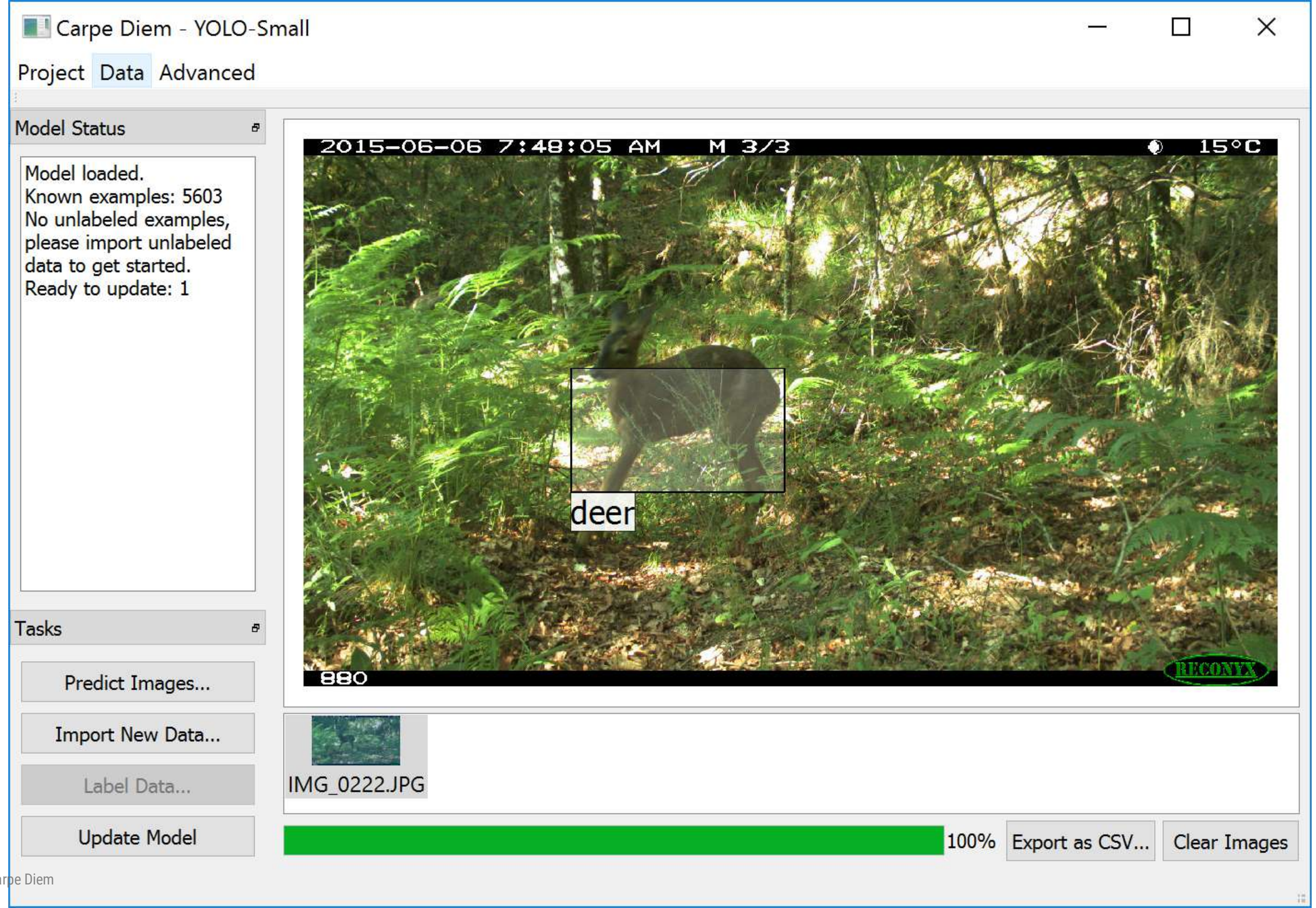
- Easy-to-use GUI tool for automated camera trap analysis.
- Performs detection and classification.
- Implements lifelong learning methods and principles out-of-the-box:
  - Active learning,
  - incremental learning and
  - transparent management of new categories, domain shifts etc.

- Free/OSS under 3-clause BSD license.
- Written in C++ using Qt, runs on Linux, Windows and macOS.


Project Details
Details
Network Architecture
/home/brust/.cn24/yolo/yolo-small.json
Browse...
Initial Model
ome/brust/.cn24/yolo/yolo-small.CNParamX
Browse...
Project Folder
/home/brust/tmp/cd-example
Browse...
Project Name
Carpe Diem Example
Note: Please make sure that the folder specified is empty.
Any remaining files may be overwritten or removed.
OK
Cancel


Carpe Diem - Example
Project
Data
Advanced
Help
Model Status
Model loaded.
Known classes: 20
Known examples: 11343
No unlabeled examples, please import unlabeled data to get started.
No labeled samples available, model cannot be updated.
Tasks
Predict Images...
Import New Data...
Label Data...
Update Model
0%
Export as CSV...
Clear Images


Carpe Diem
sheep (84.1%)
Is this prediction correct? To be correct, the bounding box has to match the object with an intersection over union of more than 50% and the class has to match the object's class.
<< Back (B)
Correct (Y)
Wrong Class (C)
Incorrect (N)


Carpe Diem - YOLO-Small
Project
Data
Advanced
Model Status
Model loaded.
Known examples: 5603
No unlabeled examples, please import unlabeled data to get started.
Ready to update: 1
2015-06-06 7:48:05 AM M 3/3
15°C
deer
880
RECONYX
Tasks
Predict Images...
Import New Data...
Label Data...
Update Model
IMG_0222.JPG
100%
Export as CSV...
Clear Images

COMING SOON

We're currently working on:

- Client/server separation,
- web-based GUI with
- multi-user support.

As well as:

- Hierarchical classification, and
- Support for imprecise annotations.

Thanks!

Interested?

Contact **Computer Vision Group Jena**:

🐦 @CvJena

📺 ComputerVisionGroupJena

🌍 https://www.inf-cv.uni-jena.de/