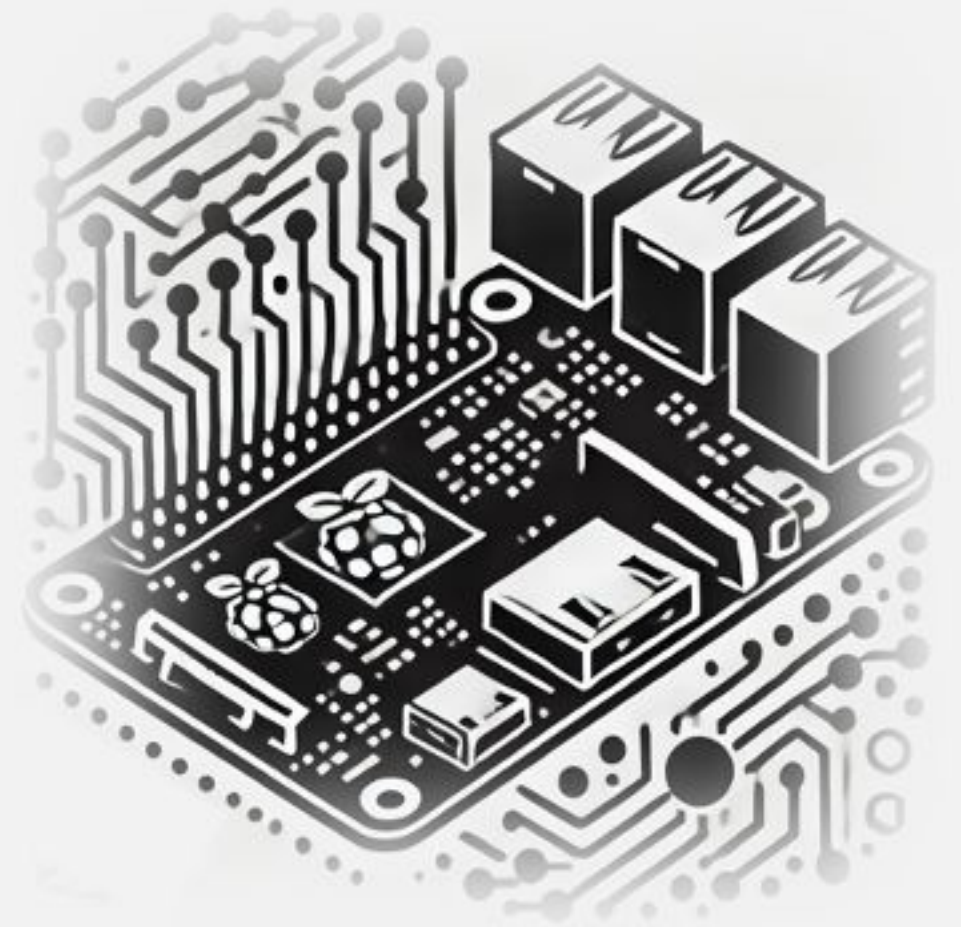


# IESTI05 – Edge AI

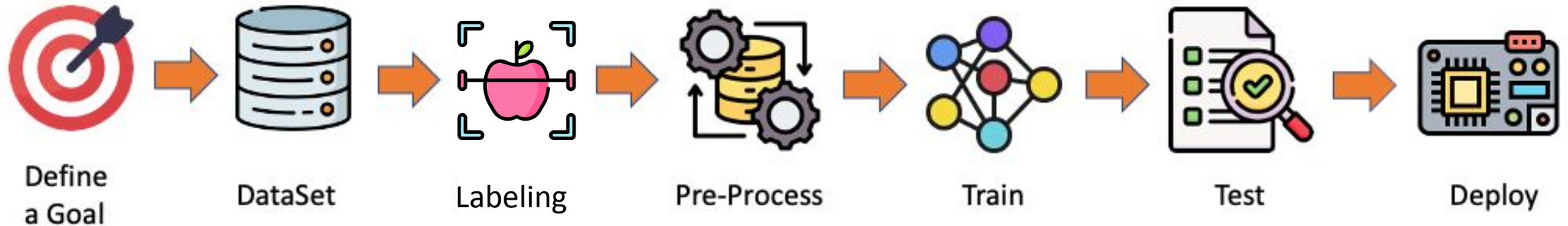
## Machine Learning System Engineering

---

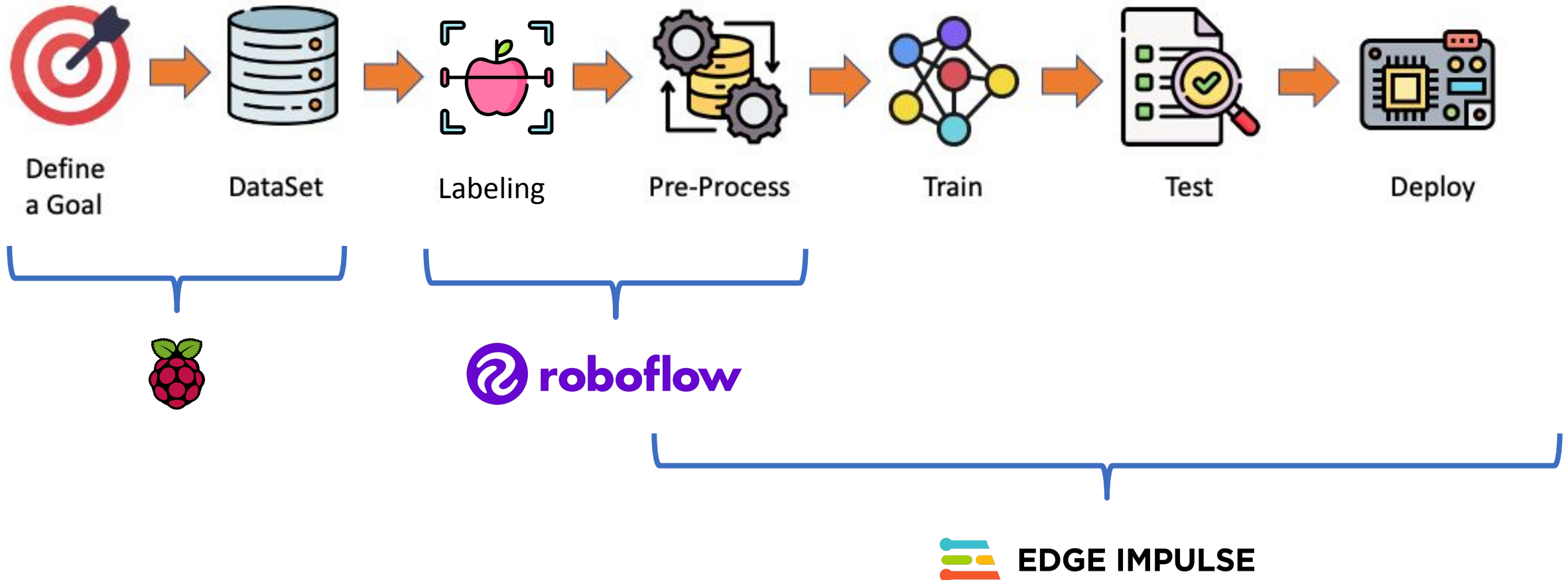
### 9. Object Detection Project: Goal, Data & Labeling



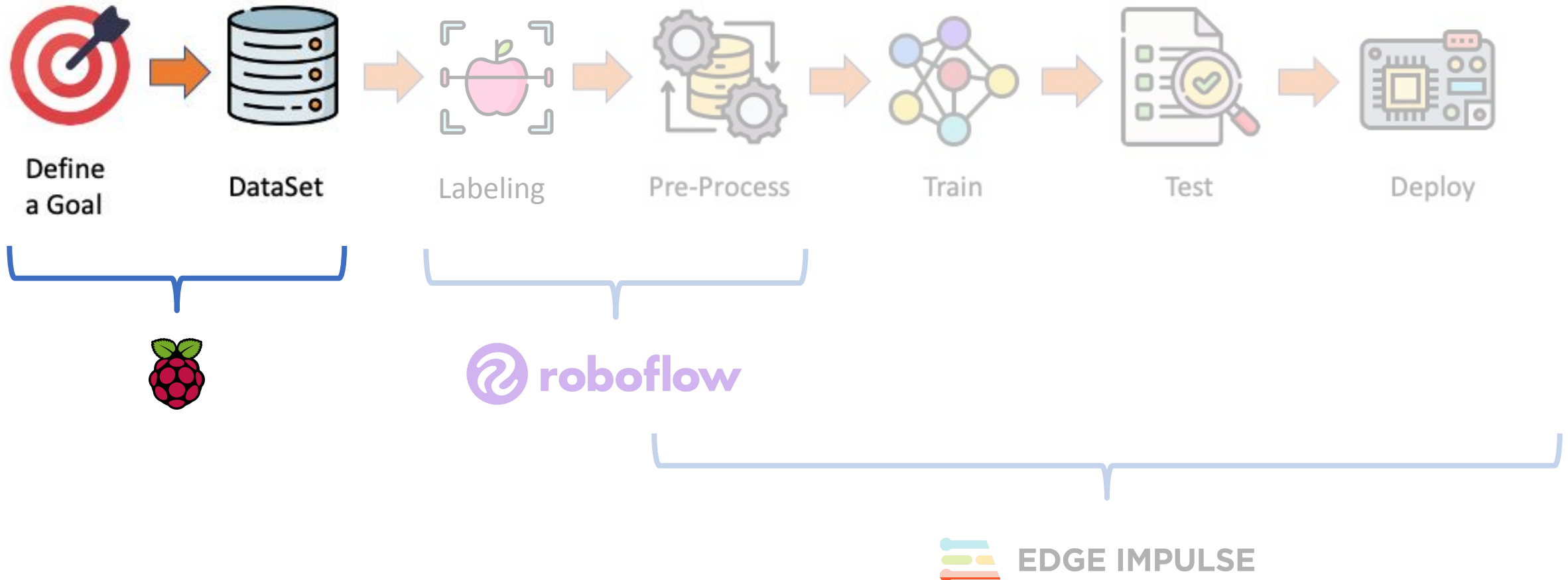
# Machine Learning Workflow



# Machine Learning Workflow



# Machine Learning Workflow



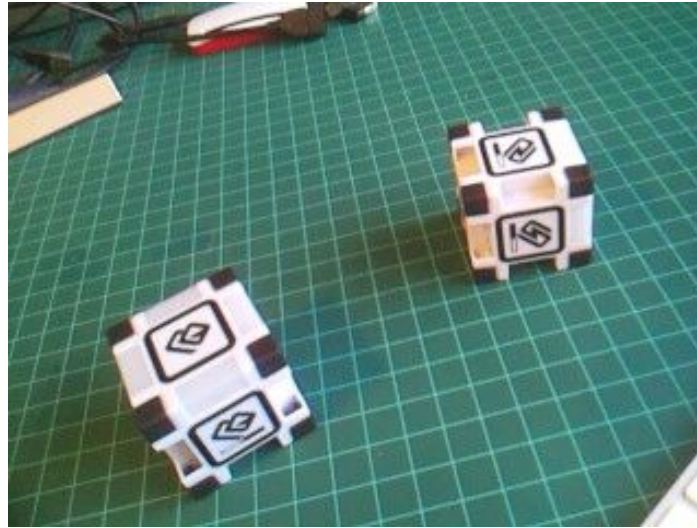
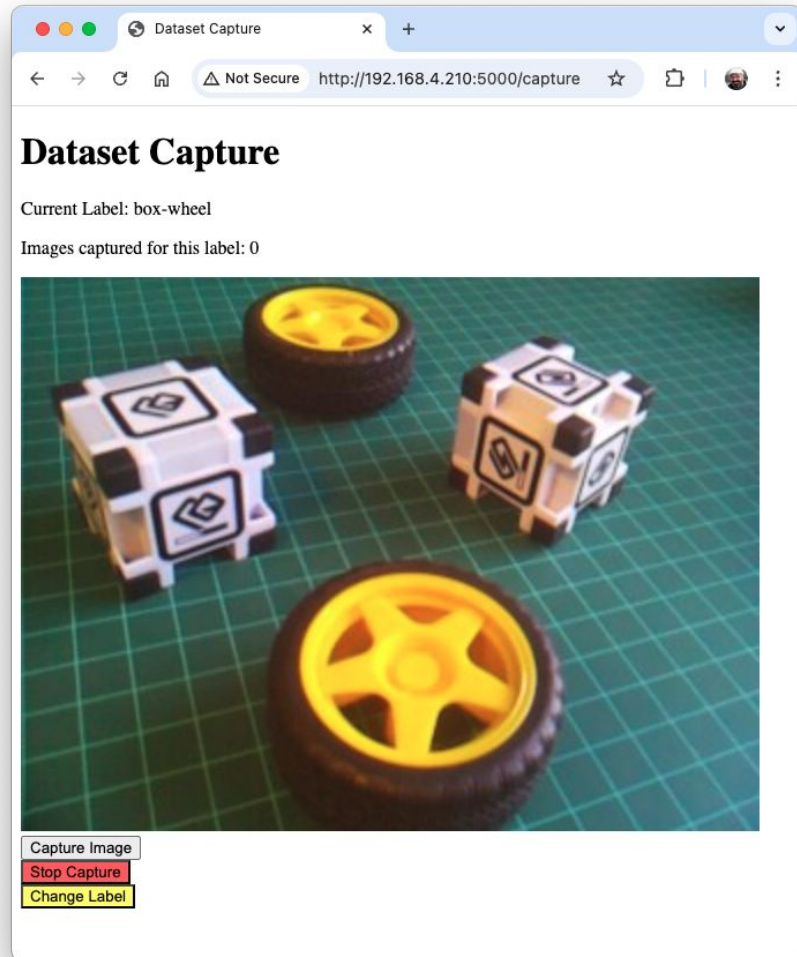


# The Goal

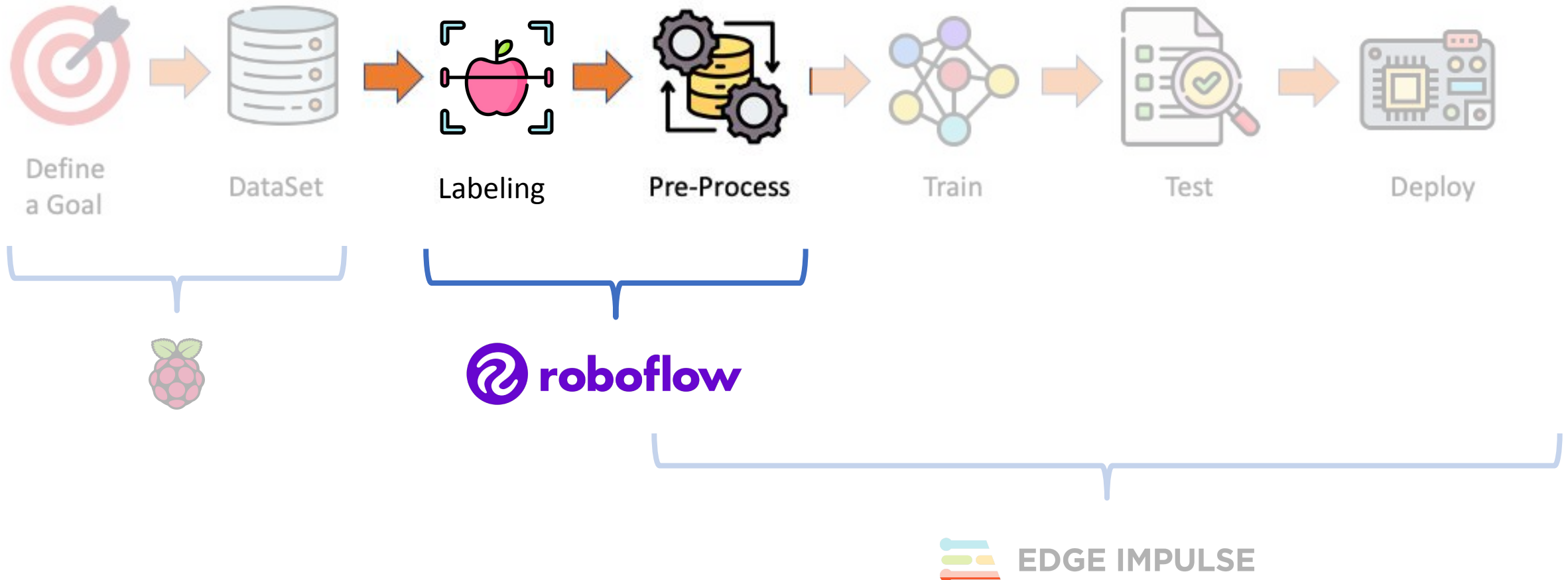




# Raw Dataset

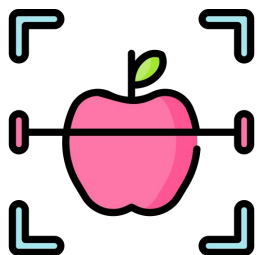


# Machine Learning Workflow





# Labeling



Create Project

https://app.roboflow.com/marcelo-rovai-riila/create

roboflow

ae

## Let's create your project.

Marcelo Rovai > Public Box versus Wheel

Project Name

Box versus Wheel

Annotation Group

Boxes-and-wheels

Visibility

Private

Public

License

CC BY 4.0

Project Type

Object Detection

Bounding Boxes

Counts

Tracking

Identify objects and their positions with bounding boxes.

Classification

Image Labels

Filtering

Content Moderation

Assign labels to the entire image.

Single-Label

Multi-Label

Instance Segmentation

Polygons

Measuring

Odd Shapes

Detect multiple objects and their actual shape.

Keypoint Detection

Skeleton Structure

Pose Estimation

Identify keypoints ("skeletons") on subjects.

Multimodal

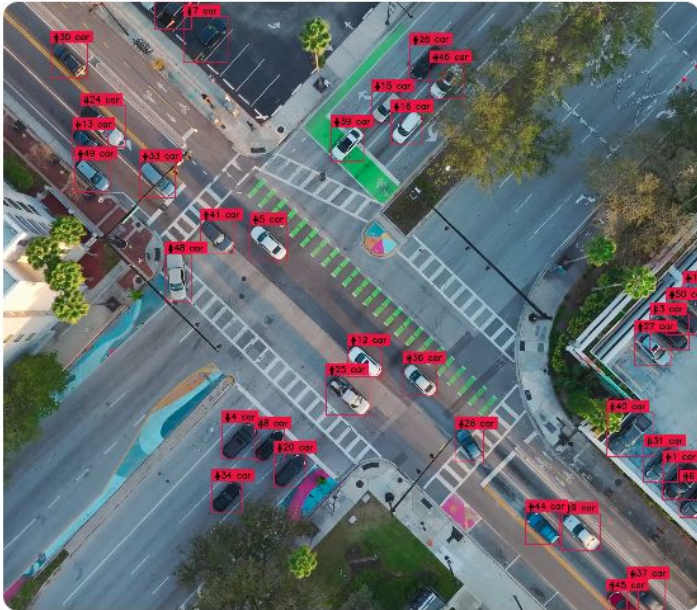
Prompts

Visual Question Answering

Captions

Describe images using text pairs.

Show More

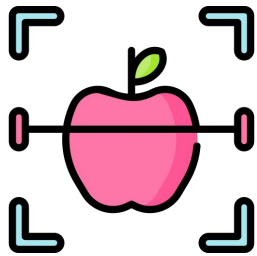


Cancel

Create Public Project



# Labeling



Box versus Wheel auto dataS

https://app.roboflow.com/marcelo-rovai-riila/box-versus-wheel-auto-dataset/annotate/batch/3yjVeG1FmDROBjI3JNNx/...

← MARCELO ROVAI

← Annotate > Batch  
Uploaded on 09/01/25 at 12:53 pm  
Uploaded Sep 1, 2025 (12:53 PM)

Box versus ...  
Object Detection

DATA  
↑ Upload Data  
Annotate  
Dataset 63  
Versions Train  
Analytics  
Classes & Tags

MODELS  
Models  
Visualize

DEPLOY  
Deployments

image\_20250901-12032... image\_20250901-12033... image\_20250901-12051...  
image\_20250901-12051... image\_20250901-12033... image\_20250901-12034...  
image\_20250901-12102... image\_20250901-12035... image\_20250901-12035...  
image\_20250901-12032... image\_20250901-12041... image\_20250901-12033...  
image\_20250901-12050... image\_20250901-12101... image\_20250901-12020...

How do you want to label your images?

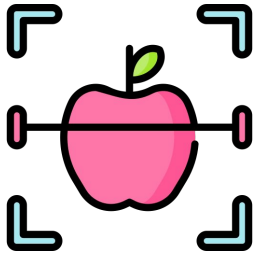
**Label Myself**  
Label images with our AI labeling tools.

**Label With My Team**  
Split up the labeling work across your team.

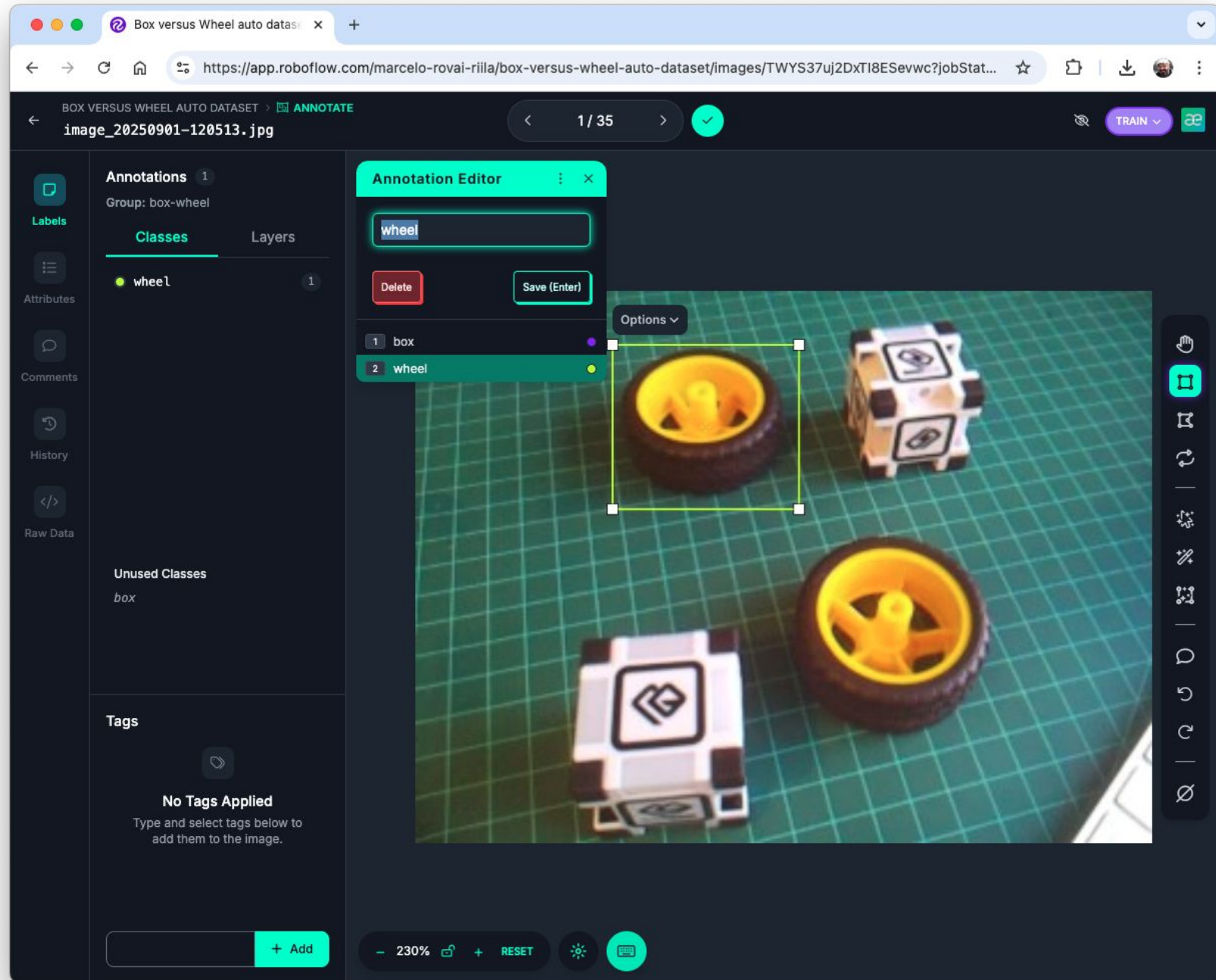
**Auto-Label Entire Batch**  
Use your own custom model or a zero-shot model to automatically label your entire batch.

**Hire Outsourced Labelers** Upgrade  
Work with an professional labeling team vetted by Roboflow.

# Labeling

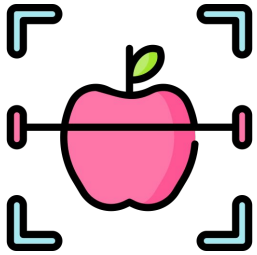


(Manual Labeling)

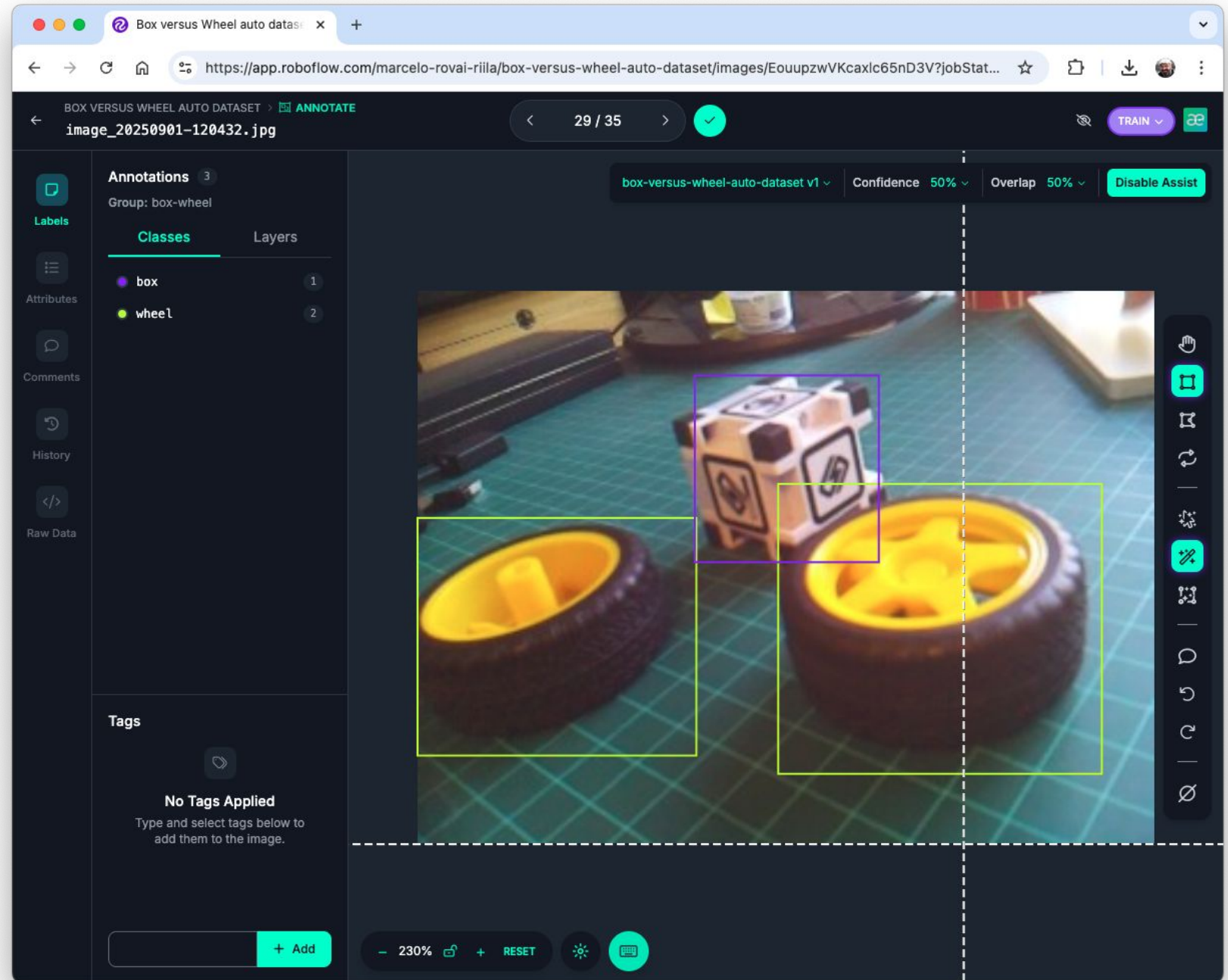




# Labeling

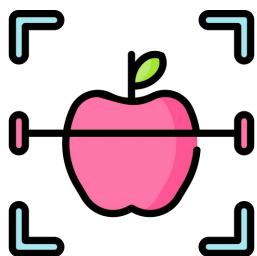


(Label Assist)

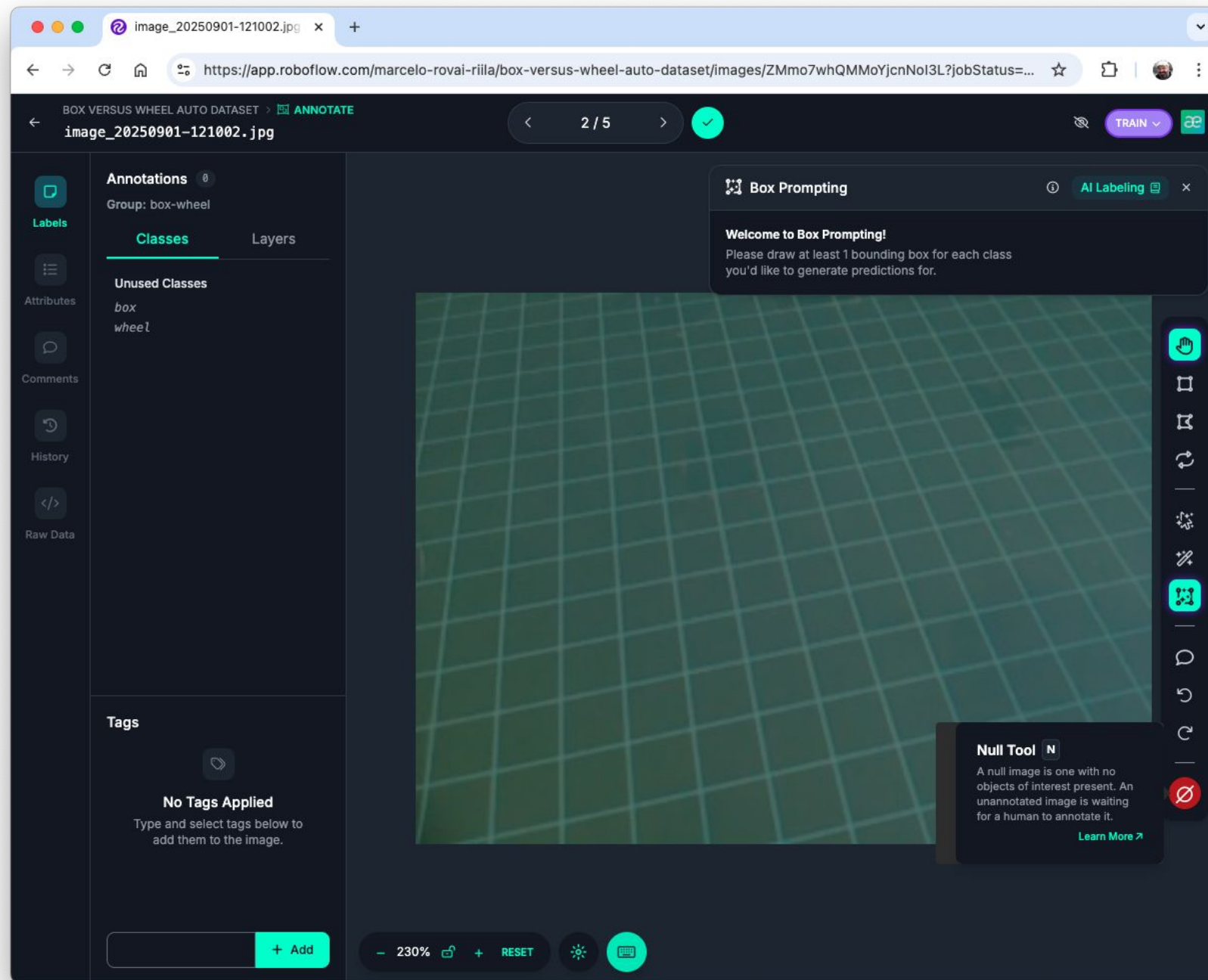




# Labeling



(Null Tool)



# Pre-Processing



Preprocessing > Add resize

Partial convergence padding

https://app.roboflow.com/marcelo-rovai-riila/box-versus-wheel-auto-dataset/generate/preprocessing/resize/add

MARCELO ROVAI

Box versus ...  
Object Detection

DATA

- Upload Data
- Annotate
- Dataset 98
- Versions** Train

Analytics

Classes & Tags

MODELS

- Models
- Visualize

DEPLOY

- Deployments

Versions

Source Images Images: 98

Resize

Downsize images for smaller file sizes and faster training.

Stretch to

320 x 320

original

resized

Selecting Resize Settings

Considerations for choosing the optimal computer vision resize settings to improve model performance.

via Roboflow Blog

Go Back

Apply

2024-04-11 12:41pm

5 Create

# Pre-Processing



Box versus Wheel auto dataset

Partial convergence padding

https://app.roboflow.com/marcelo-rovai-riila/box-versus-wheel-auto-dataset/8

MARCELO ROVAI

View on Universe

Box versus ...  
Object Detection

DATA

Upload Data

Annotate

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Deployments

## Versions

+ New Version

Versions

2025-09-01 2:56pm

v8 248 320x320

Stretch to Notes

Marcelo Rovai

2025-09-01 2:18pm

v7 248 Notes

Marcelo Rovai

Roboflow Instant 1 [Eval]

v6 258

Marcelo Rovai

2024-09-03 10:15pm

v5 153 320x320

Stretch to

Marcelo Rovai

2024-04-19 9:02am

v4 126 640x640

Stretch to

Marcelo Rovai

248 Total Images

View All Images →

Dataset Split

TRAIN SET 91%  
225 Images

VALID SET 5%  
13 Images

TEST SET 4%  
10 Images

Preprocessing

Auto-Orient: Applied  
Resize: Stretch to 320x320

Augmentations

Outputs per training example: 3  
Flip: Vertical  
Crop: 0% Minimum Zoom, 20% Maximum Zoom  
Rotation: Between -15° and +15°  
Brightness: Between -20% and +20%

Notes

Marcelo Rovai  
Resize (stretch) 320x320. Images from Rasp and USB Cameras





## Annotated Dataset

Export Version x Partial convergence padding x +

https://app.roboflow.com/marcelo-rovai-riila/box-versus-wheel-auto-dataset/8/export

MARCELO ROVAI

View on Universe

Box versus ...  
Object Detection

DATA

Upload Data

Annotate

Dataset 98

Versions Train

Analytics

Classes & Tags

MODELS

Models

Visualize

DEPLOY

Deployments

Versions

v8 2025-09-01 2:56pm

Generated on Sep 1, 2025 by Marcelo Rovai

Download Dataset Edit

+ New Version

Download

Image and Annotation Format

YOLOv11

TXT annotations and YAML config used with YOLOv11.

Download Options

☒ Download zip to computer  
Downloads all images, annotations, and classes.

☐ Show download code  
Custom train this dataset using the provided code snippet in a notebook.

Cancel Continue

248 Total Images

View All Images →

2024-04-19 9:02am

v4 126 640x640

Stretch to

Marcelo Rovai

Dataset Split

TRAIN SET 91%

VALID SET 5%

TEST SET 4%

# Questions?



Prof. Marcelo J. Rovai

[rovai@unifei.edu.br](mailto:rovai@unifei.edu.br)



**UNIFEI**