Lab6: Imaging tools (Roboflow)

3099704 AI for Digital Health (2025/2)

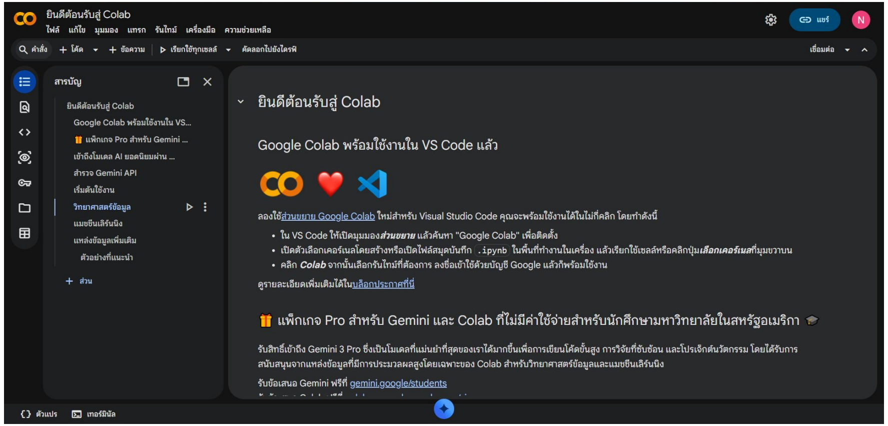
Objective

- Use the **Roboflow** to create Dataset

- Use created Dataset to train model (YOLO,UNet)

Material

- With **Google Colab**, you don't need to install any software. All you need is a Google account, and you can start using it right away. Simply visit: https://colab.research.google.com/ or select NEW NOTEBOOK to start a new file.



ยินดีต้อนรับสู่ Colab

Google Colab พร้อมใช้งานใน VS Code แล้ว

ลองใช้ส่วนขยาย Google Colab ใหม่สำหรับ Visual Studio Code คุณจะพร้อมใช้งานได้ในไม่กี่คลิก โดยทำดังนี้

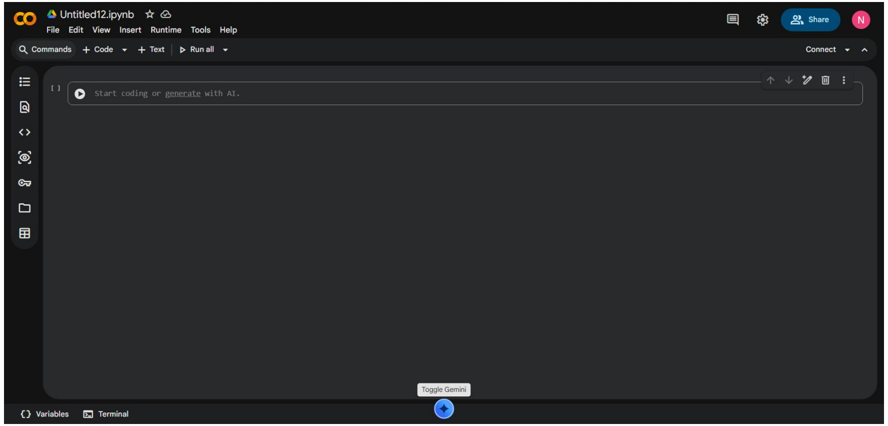
- ใน VS Code ให้เปิดมุมมอง***ส่วนขยาย*** แล้วค้นหา "Google Colab" เพื่อติดตั้ง
- เปิดตัวเลือกเคอร์เนลโดยสร้างหรือเปิดไฟล์สมุดบันทึก `.ipynb` ในพื้นที่ทำงานในเครื่อง แล้วเรียกใช้เซลล์หรือคลิกปุ่ม***เลือกเคอร์เนล***ที่มุมขวาบน
- คลิก ***Colab*** จากนั้นเลือกรันไทม์ที่ต้องการ ลงชื่อเข้าใช้ด้วยบัญชี Google แล้วก็พร้อมใช้งาน

ดูรายละเอียดเพิ่มเติมได้ในบล็อกประกาศที่นี่

🎁 แพ็กเกจ Pro สำหรับ Gemini และ Colab ที่ไม่มีค่าใช้จ่ายสำหรับนักศึกษามหาวิทยาลัยในสหรัฐอเมริกา 🎓

รับสิทธิ์เข้าถึง Gemini 3 Pro ซึ่งเป็นโมเดลที่แม่นยำที่สุดของเราได้มากขึ้นเพื่อการเขียนโค้ดขั้นสูง การวิจัยที่ซับซ้อน และโปรเจ็กต์นวัตกรรม โดยได้รับการสนับสนุนจากแหล่งข้อมูลที่มีการประมวลผลสูงโดยเฉพาะของ Colab สำหรับวิทยาศาสตร์ข้อมูลและแมชชีนเลิร์นนิง

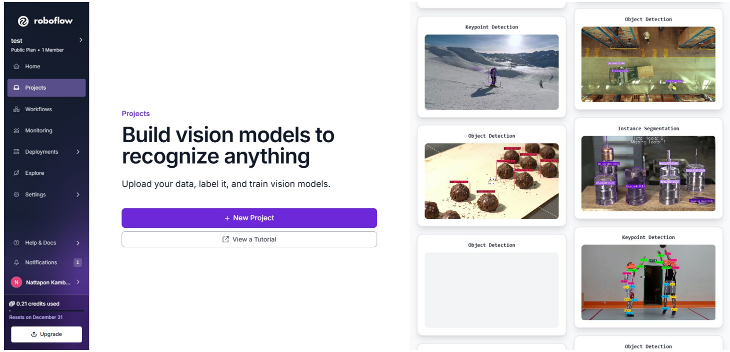
รับข้อเสนอ Gemini ฟรีที่ gemini.google/students



```
Start coding or generate with AI.
```

Roboflow

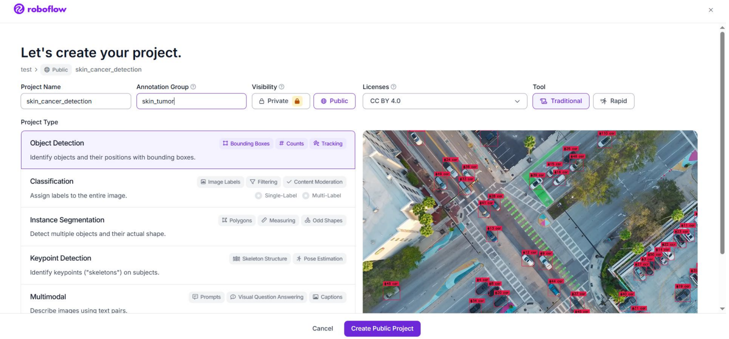
- **Roboflow** is a web-based platform that helps users easily prepare datasets. It can be accessed through a web browser at https://roboflow.com/ by signing in with a Google or GitHub account.
- Users can upload images, annotate data, apply preprocessing and data augmentation, and export datasets in formats ready for training models such as YOLO.



Projects

Build vision models to recognize anything

Upload your data, label it, and train vision models.



Let's create your project.

test > Public skin_cancer_detection

Project Name: skin_cancer_detection
Annotation Group: skin_tumor
Visibility: Private / Public
Licenses: CC BY 4.0
Tool: Traditional / Rapid

Project Type

Object Detection
Identify objects and their positions with bounding boxes.

Classification
Assign labels to the entire image.

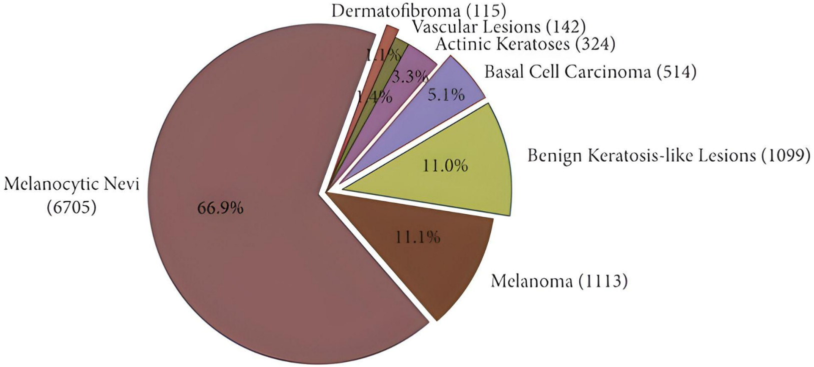
Instance Segmentation
Detect multiple objects and their actual shape.

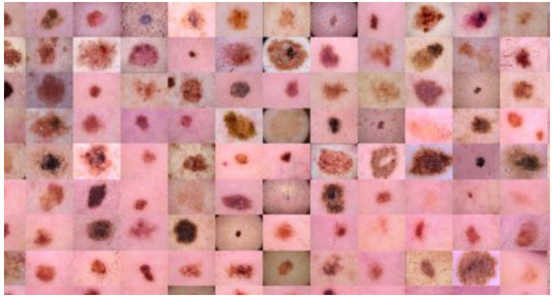
Keypoint Detection
Identify keypoints ("skeletons") on subjects.

Multimodal
Describe images using text pairs.

Dataset: Skin Cancer MNIST (HAM10000)

- The dataset consists of 10015 images with 10013 labeled objects belonging to 7 skin cancer classes.
- The data contains image in JPG format and documents in JSON format

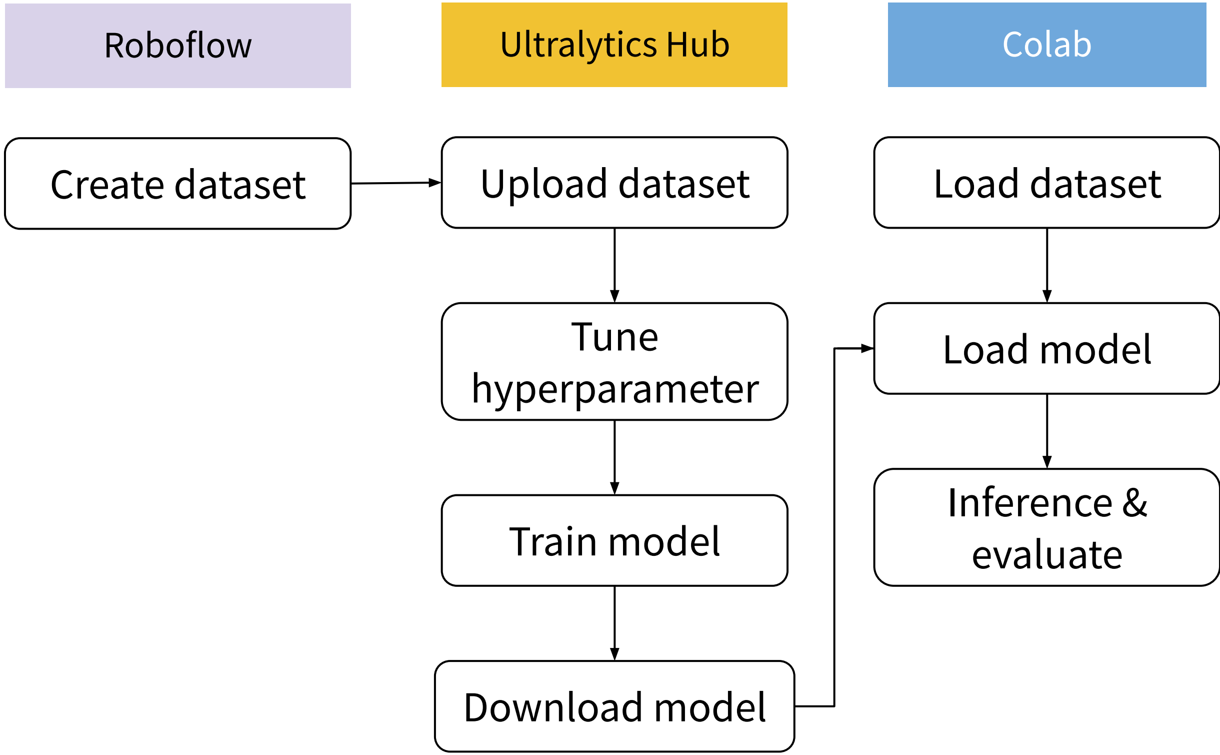




Lab6.1: Object detection dataset

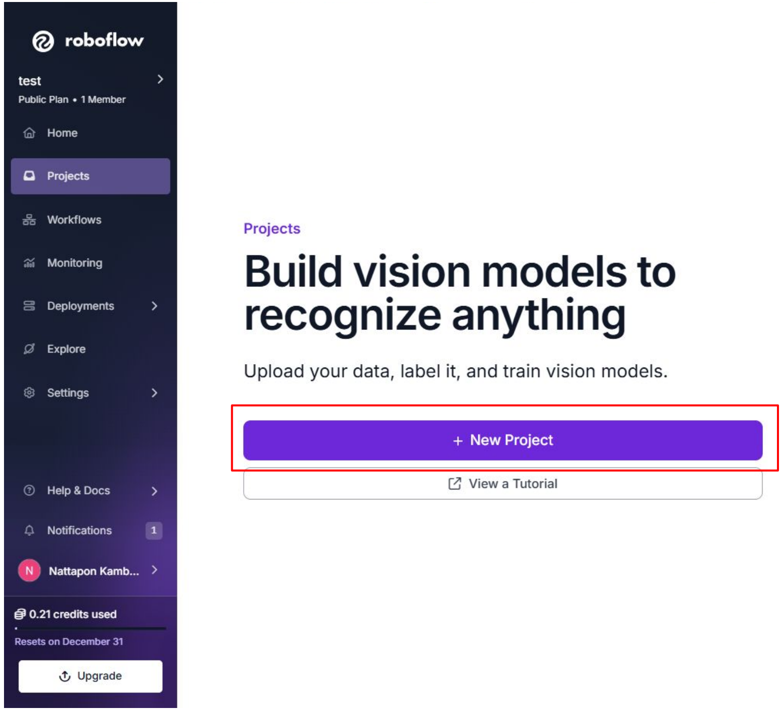
In this lab, we will repeat the experiment from **Lab 4.1 (YOLOv8n)**, but the dataset will be created using Roboflow instead.

1) Load image from github
2) Create Object detection dataset in Roboflow
3) Train YOLO model in ultralytics hub
4) evaluate YOLO in [Lab_6_1_ultralyricshub]



Lab6.1: Object detection dataset

1) Sign in **Roboflow**



roboflow

test

Public Plan • 1 Member

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- Help & Docs
- Notifications 1
- Nattapon Kamb...

0.21 credits used

Resets on December 31

Upgrade

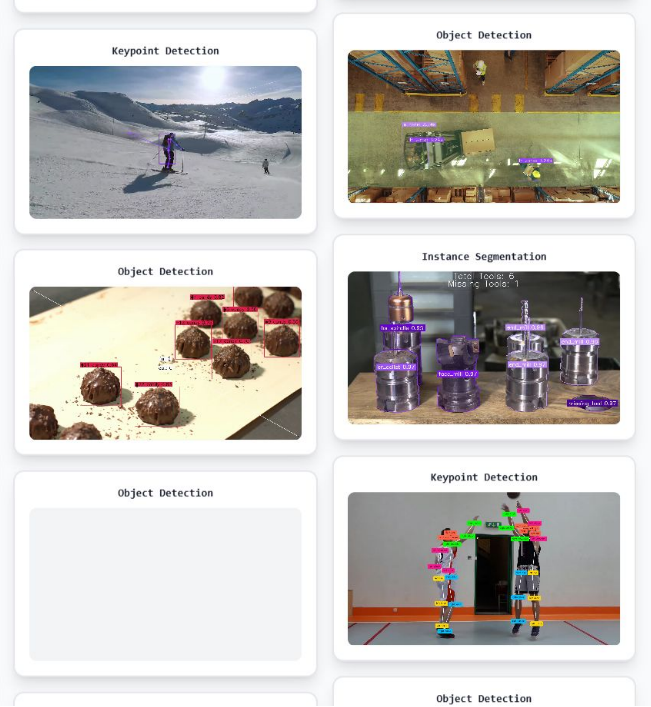
Projects

Build vision models to recognize anything

Upload your data, label it, and train vision models.

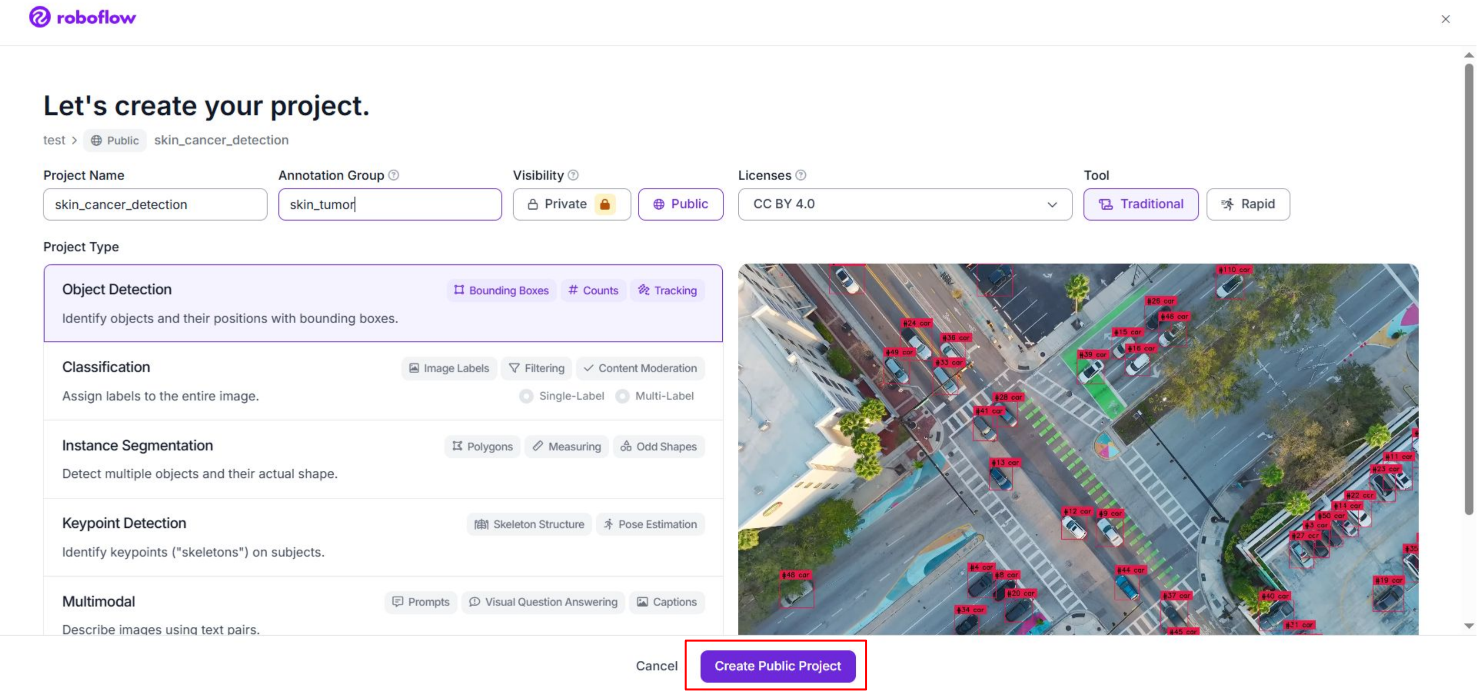
+ New Project

View a Tutorial



Lab6.1: Object detection dataset

2) Create new project **(Object Detection)**



roboflow

Let's create your project.

test > Public skin_cancer_detection

Project Name: skin_cancer_detection

Annotation Group: skin_tumor

Visibility: Private | Public

Licenses: CC BY 4.0

Tool: Traditional | Rapid

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

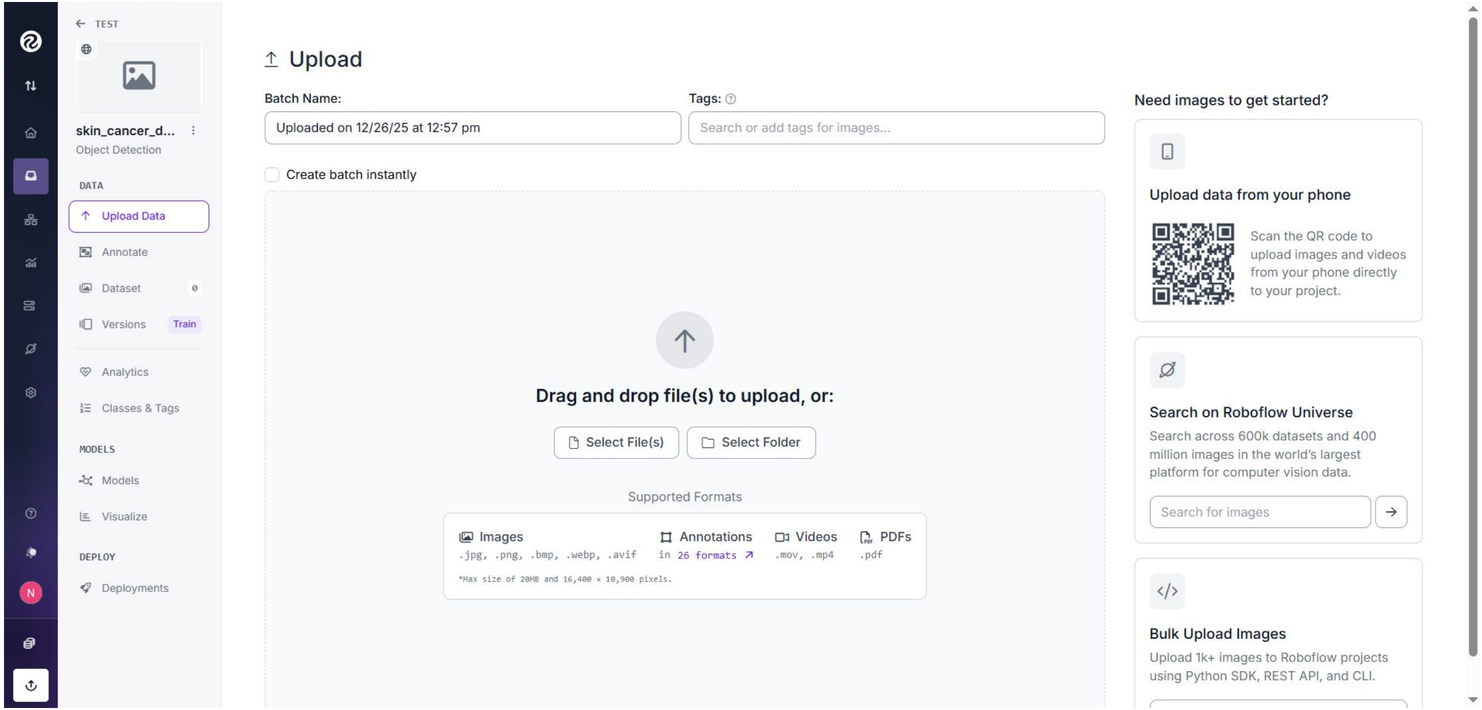
Instance Segmentation — Polygons, Measuring, Odd Shapes
Detect multiple objects and their actual shape.

Keypoint Detection — Skeleton Structure, Pose Estimation
Identify keypoints ("skeletons") on subjects.

Multimodal — Prompts, Visual Question Answering, Captions
Describe images using text pairs.

Lab6.1: Object detection dataset

3) Download the dataset from GitHub, then upload in **Roboflow**.



Upload

Batch Name: Uploaded on 12/26/25 at 12:57 pm

Tags: Search or add tags for images...

□ Create batch instantly

Drag and drop file(s) to upload, or:

Select File(s) Select Folder

Supported Formats

Images	Annotations	Videos	PDFs
.jpg, .png, .bmp, .webp, .avif	in 26 formats ↗	.mov, .mp4	.pdf

*Max size of 20MB and 16,400 × 10,900 pixels.

Need images to get started?

Upload data from your phone

Scan the QR code to upload images and videos from your phone directly to your project.

Search on Roboflow Universe

Search across 600k datasets and 400 million images in the world's largest platform for computer vision data.

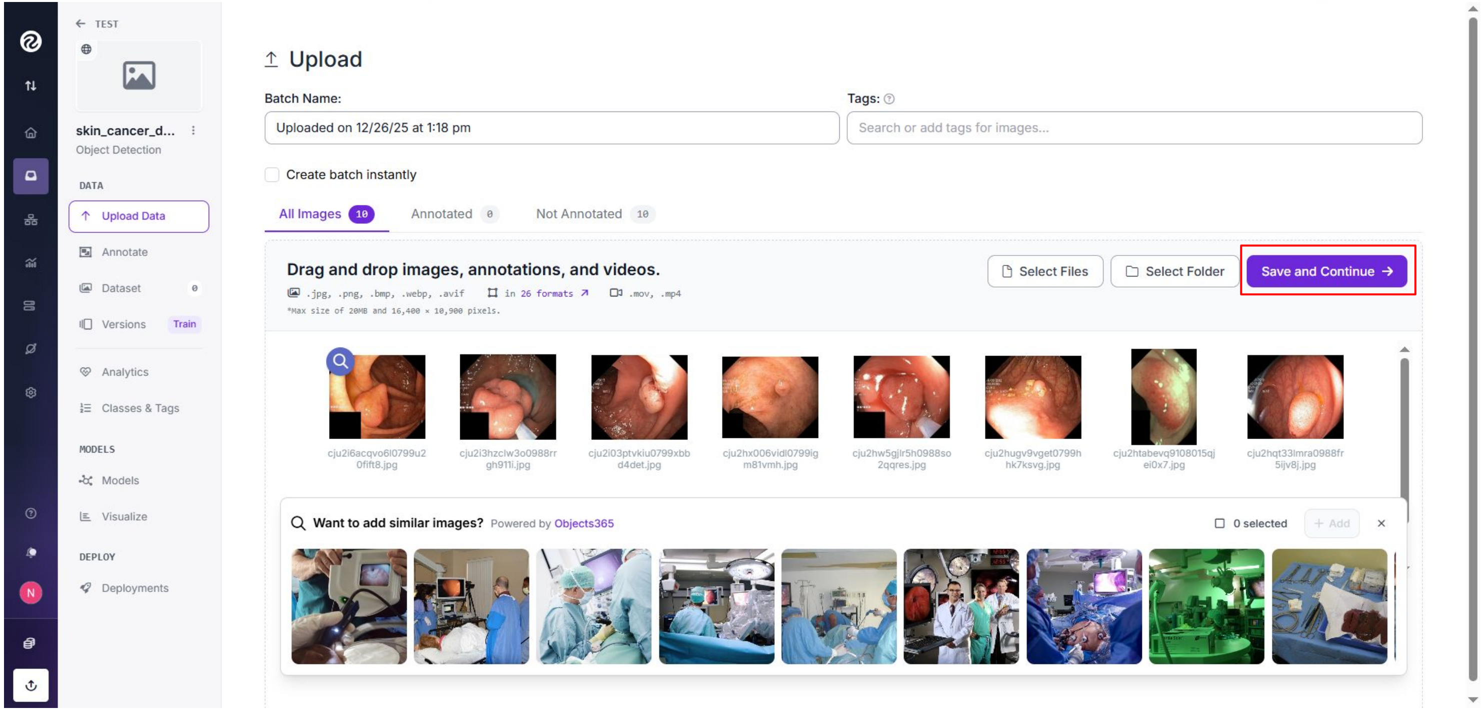
Search for images

Bulk Upload Images

Upload 1k+ images to Roboflow projects using Python SDK, REST API, and CLI.

Lab6.1: Object detection dataset

3) Download the dataset from GitHub, then upload in **Roboflow**.



Upload

Batch Name: Uploaded on 12/26/25 at 1:18 pm

Tags: Search or add tags for images...

□ Create batch instantly

Drag and drop images, annotations, and videos.

.jpg, .png, .bmp, .webp, .avif in 26 formats ↗ .mov, .mp4

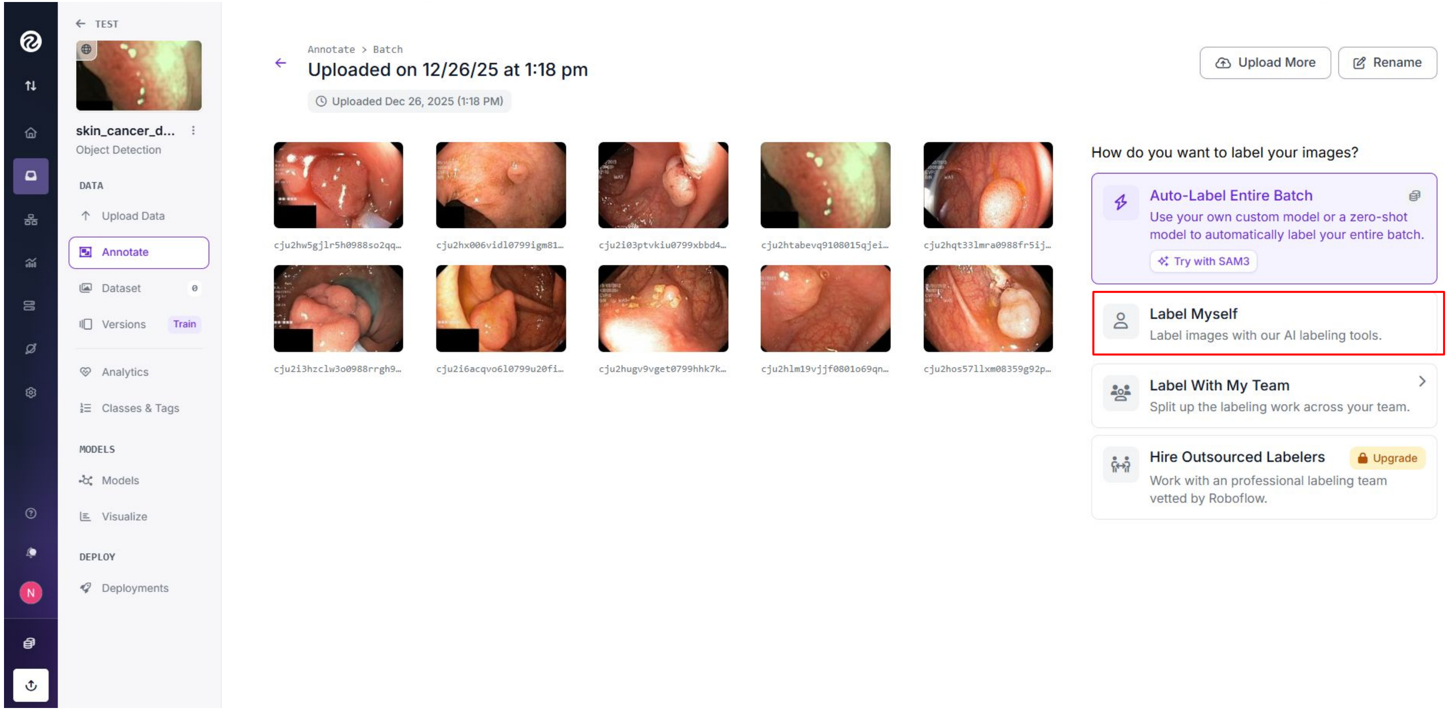
*Max size of 20MB and 16,400 × 10,900 pixels.

cju2i6acqvo6l0799u20fift8.jpg
cju2i3hzclw3o0988rrgh911i.jpg
cju2i03ptvkiu0799xbbd4det.jpg
cju2hx006vidl0799igm81vmh.jpg
cju2hw5gjlr5h0988so2qqres.jpg
cju2hugv9vget0799hhk7ksvg.jpg
cju2htabevq9108015qjei0x7.jpg
cju2hqt33lmra0988fr5ijv8j.jpg

Want to add similar images? Powered by Objects365

Lab6.1: Object detection dataset

4) Check “**Label Myself**”



Annotate > Batch

Uploaded on 12/26/25 at 1:18 pm

Uploaded Dec 26, 2025 (1:18 PM)

How do you want to label your images?

Auto-Label Entire Batch
Use your own custom model or a zero-shot model to automatically label your entire batch.
Try with SAM3

Label Myself
Label images with our AI labeling tools.

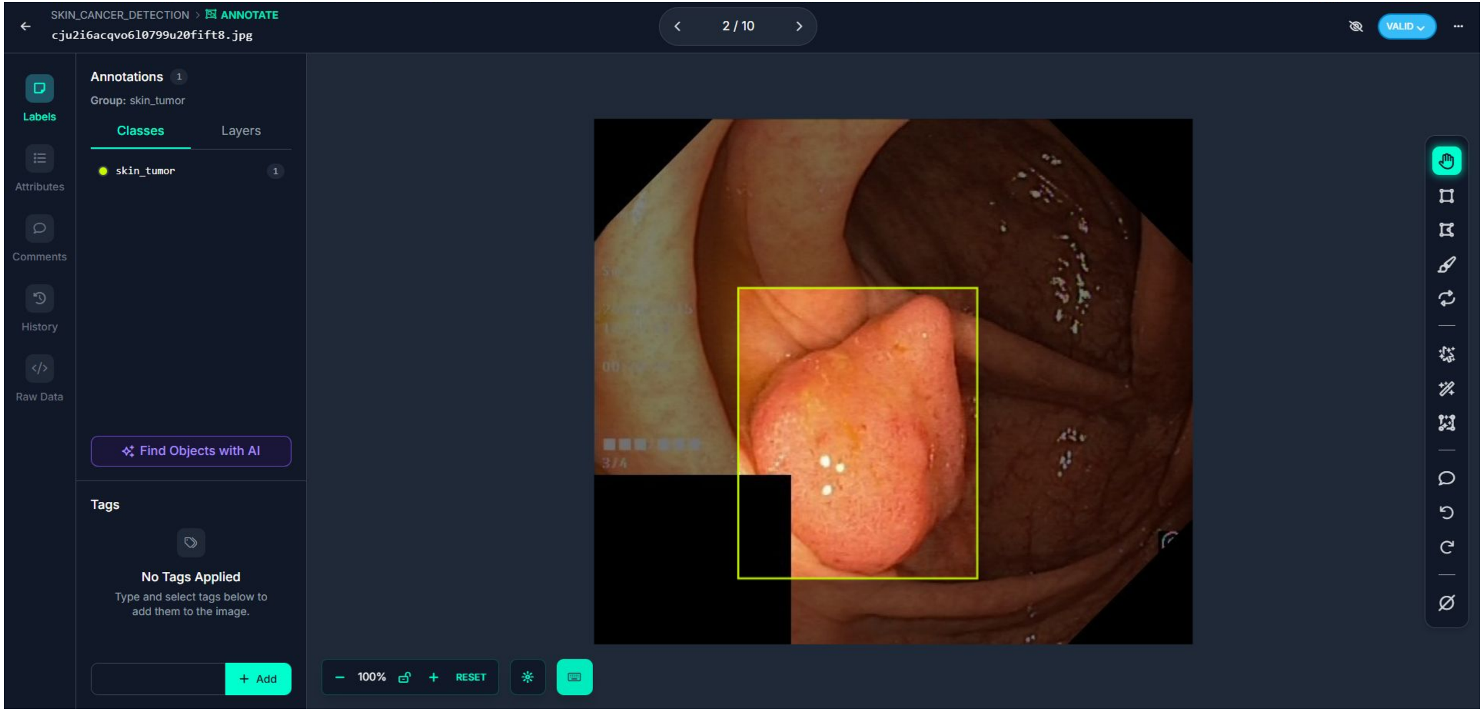
Label With My Team
Split up the labeling work across your team.

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

TEST
skin_cancer_d...
Object Detection
DATA
Upload Data
Annotate
Dataset 0
Versions Train
Analytics
Classes & Tags
MODELS
Models
Visualize
DEPLOY
Deployments
N
Upload More
Rename
cju2hw5gjlr5h0988so2qq...
cju2hx006vidl0799igm81...
cju2i03ptvkiu0799xbbd4...
cju2htabevq9108015qjei...
cju2hqt33lmra0988fr5ij...
cju2i3hzclw3o0988rrgh9...
cju2i6acqvo6l0799u20fi...
cju2hugv9vget0799hhk7k...
cju2hlm19vjjf0801o69qn...
cju2hos57llxm08359g92p...

Lab6.1: Object detection dataset

5) Label polyp



SKIN_CANCER_DETECTION > ANNOTATE

cju2i6acqvo6l0799u20fift8.jpg

2 / 10

Annotations 1

Group: skin_tumor

skin_tumor 1

Tags

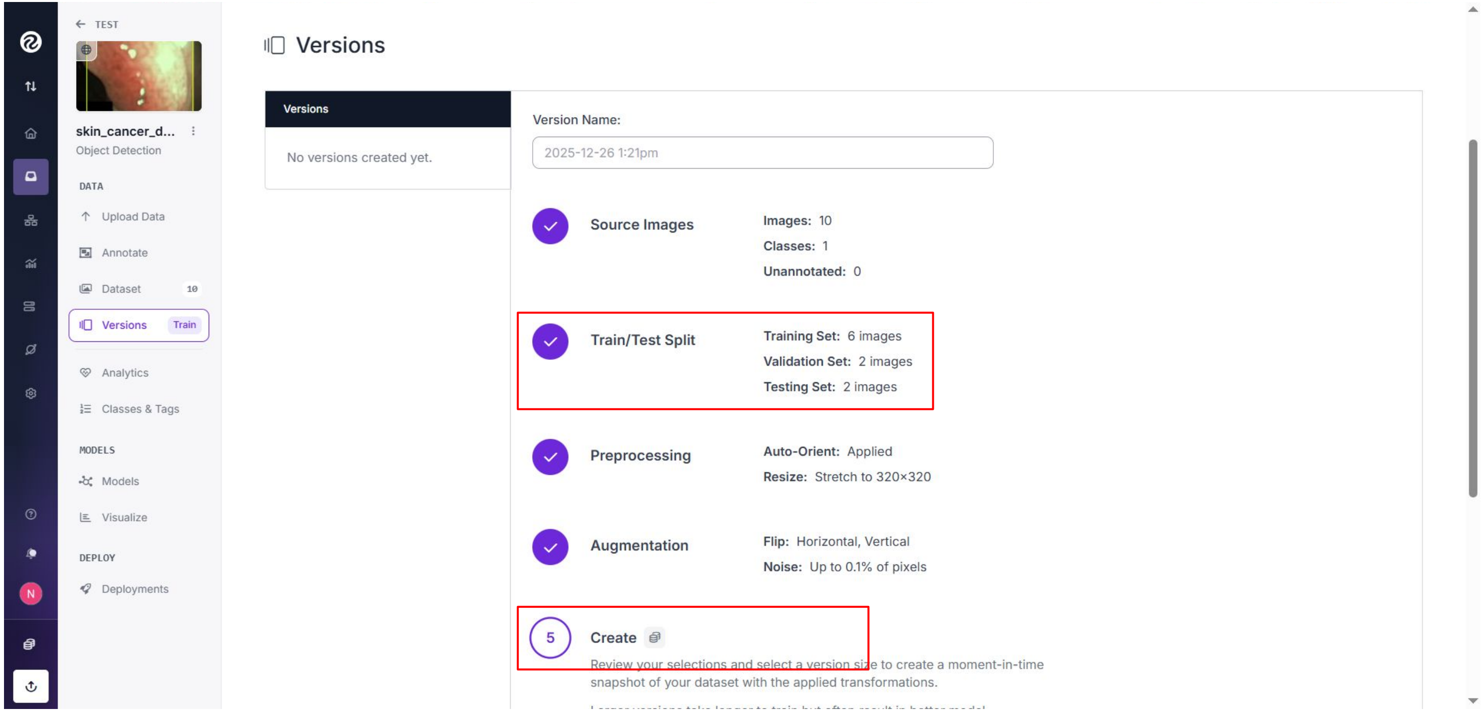
No Tags Applied

Type and select tags below to add them to the image.

100%

Lab6.1: Object detection dataset

6) Split Train:60%, Validation:20%, Test:20%



Versions

Versions

No versions created yet.

Version Name: 2025-12-26 1:21pm

Source Images
Images: 10
Classes: 1
Unannotated: 0

Train/Test Split
Training Set: 6 images
Validation Set: 2 images
Testing Set: 2 images

Preprocessing
Auto-Orient: Applied
Resize: Stretch to 320×320

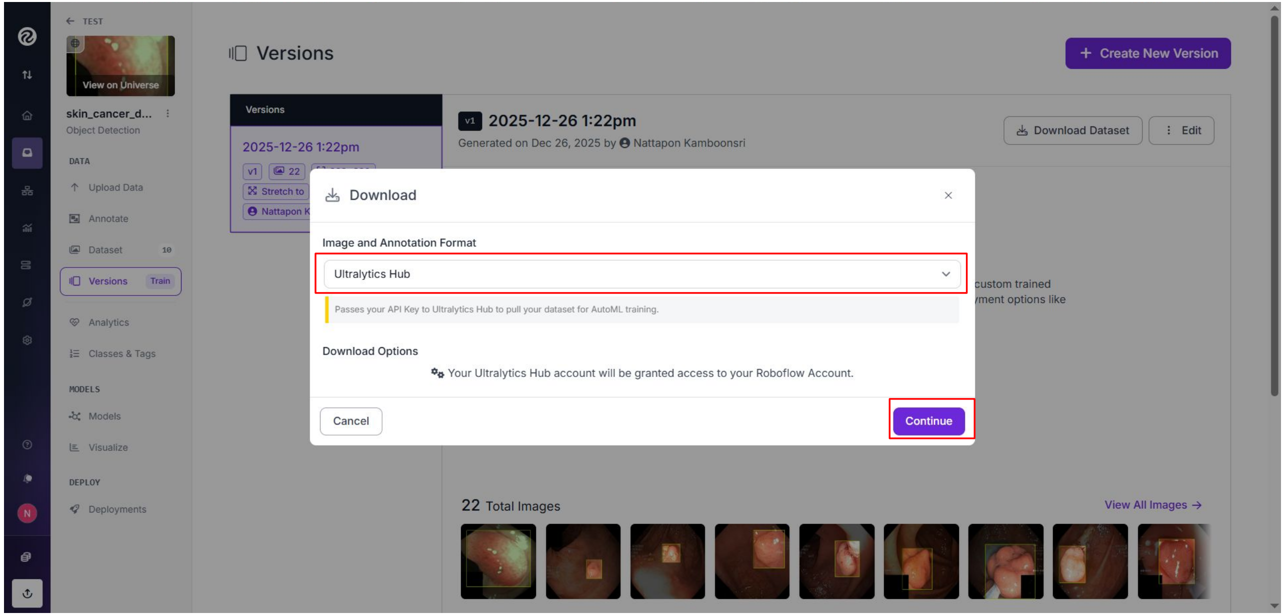
Augmentation
Flip: Horizontal, Vertical
Noise: Up to 0.1% of pixels

5 Create

Review your selections and select a version size to create a moment-in-time snapshot of your dataset with the applied transformations.

Lab6.1: Object detection dataset

7) Download the dataset in two formats: (1) Ultralytics HUB format for training the model, and (2) YOLOv8 format for evaluation using a Google Colab notebook.



Versions

v1 2025-12-26 1:22pm

Generated on Dec 26, 2025 by Nattapon Kamboonsri

Download

Image and Annotation Format: Ultralytics Hub

Passes your API Key to Ultralytics Hub to pull your dataset for AutoML training.

Download Options

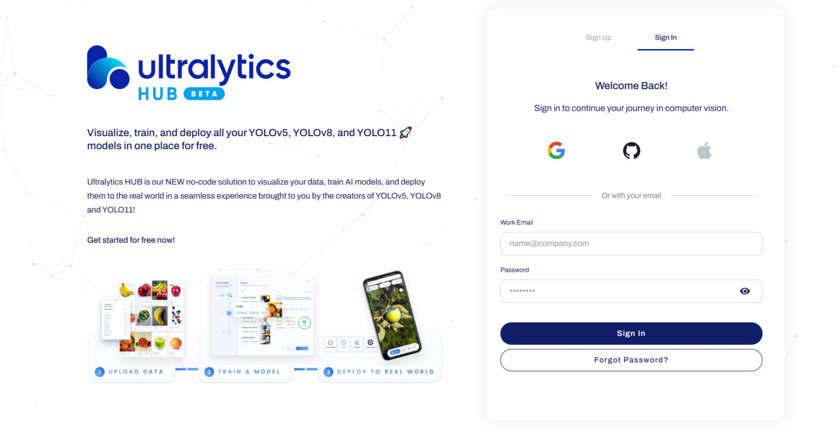
Your Ultralytics Hub account will be granted access to your Roboflow Account.

22 Total Images

Lab6.1: Object detection dataset

8) Train YOLOv8n in Ultralytics Hub

9) Load model to run in Lab_6_1_Detection (in **colab**)



Visualize, train, and deploy all your YOLOv5, YOLOv8, and YOLO11 🚀 models in one place for free.

Ultralytics HUB is our NEW no-code solution to visualize your data, train AI models, and deploy them to the real world in a seamless experience brought to you by the creators of YOLOv5, YOLOv8 and YOLO11!

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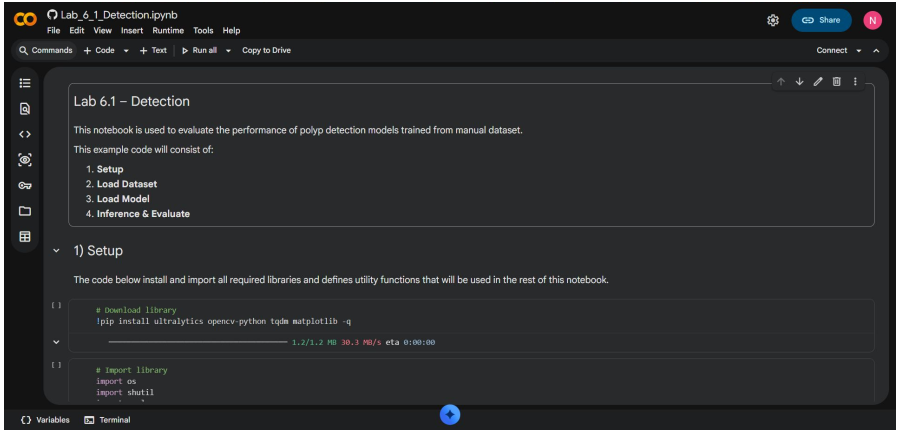
Sign in to continue your journey in computer vision.

Or with your email

Work Email: name@company.com

Password: ••••••••



Lab 6.1 – Detection

This notebook is used to evaluate the performance of polyp detection models trained from manual dataset.

This example code will consist of:

1. **Setup**
2. **Load Dataset**
3. **Load Model**
4. **Inference & Evaluate**

1) Setup

The code below install and import all required libraries and defines utility functions that will be used in the rest of this notebook.

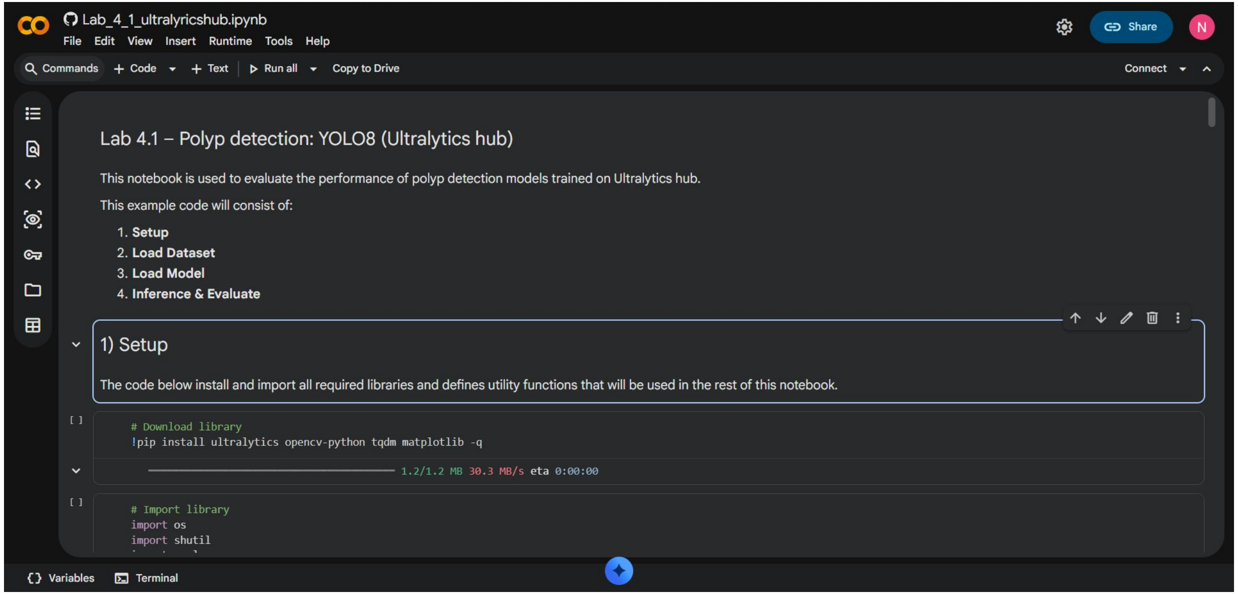
```
# Download library
!pip install ultralytics opencv-python tqdm matplotlib -q
```

```
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 1.2/1.2 MB 30.3 MB/s eta 0:00:00
```

```
# Import library
import os
import shutil
```

Lab6.1: Object detection dataset

5) Open Lab_4_1_ultralyricshub (in **colab**)



Lab_4_1_ultralyricshub.ipynb
File Edit View Insert Runtime Tools Help
Share
N
Commands + Code + Text Run all Copy to Drive
Connect
Variables Terminal

Lab 4.1 – Polyp detection: YOLO8 (Ultralytics hub)

This notebook is used to evaluate the performance of polyp detection models trained on Ultralytics hub.

This example code will consist of:

1. **Setup**
2. **Load Dataset**
3. **Load Model**
4. **Inference & Evaluate**

1) Setup

The code below install and import all required libraries and defines utility functions that will be used in the rest of this notebook.

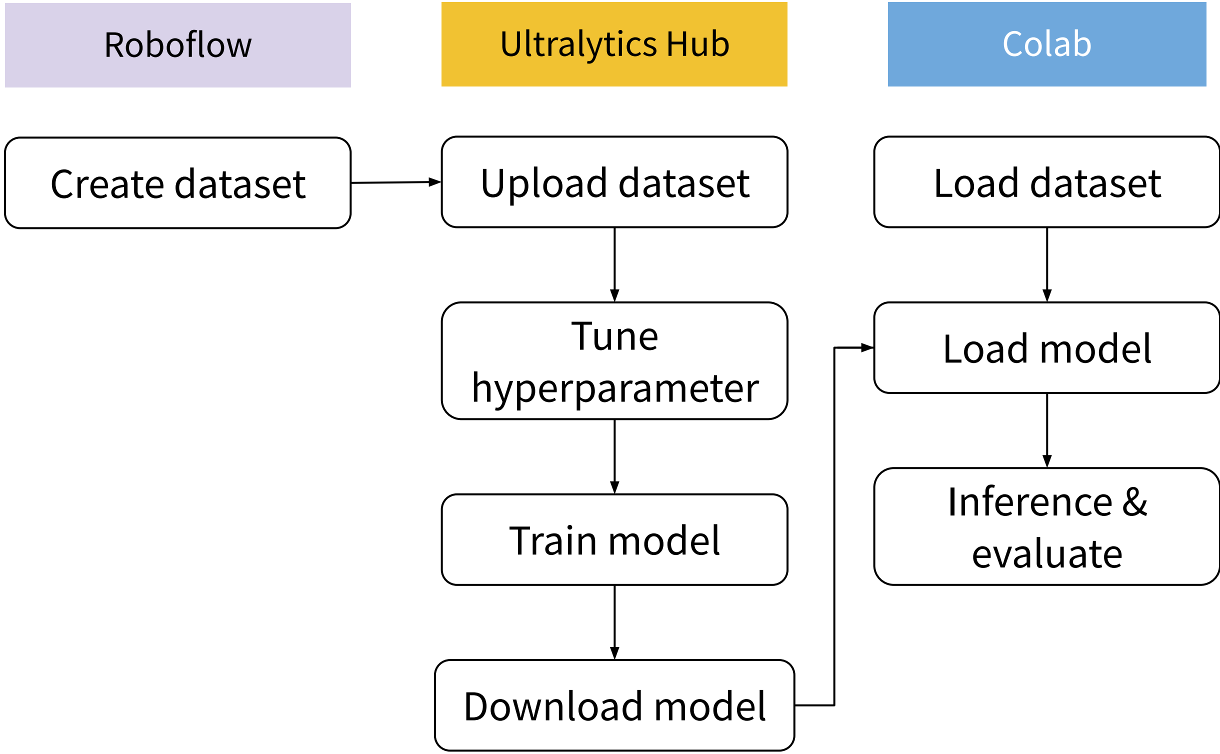
```
# Download library
!pip install ultralytics opencv-python tqdm matplotlib -q
    ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 1.2/1.2 MB 30.3 MB/s eta 0:00:00
```

```
# Import library
import os
import shutil
```

Lab6.1: Object detection dataset

In this lab, we will repeat the experiment from **Lab 4.1 (YOLOv8n)**, but the dataset will be created using Roboflow instead.

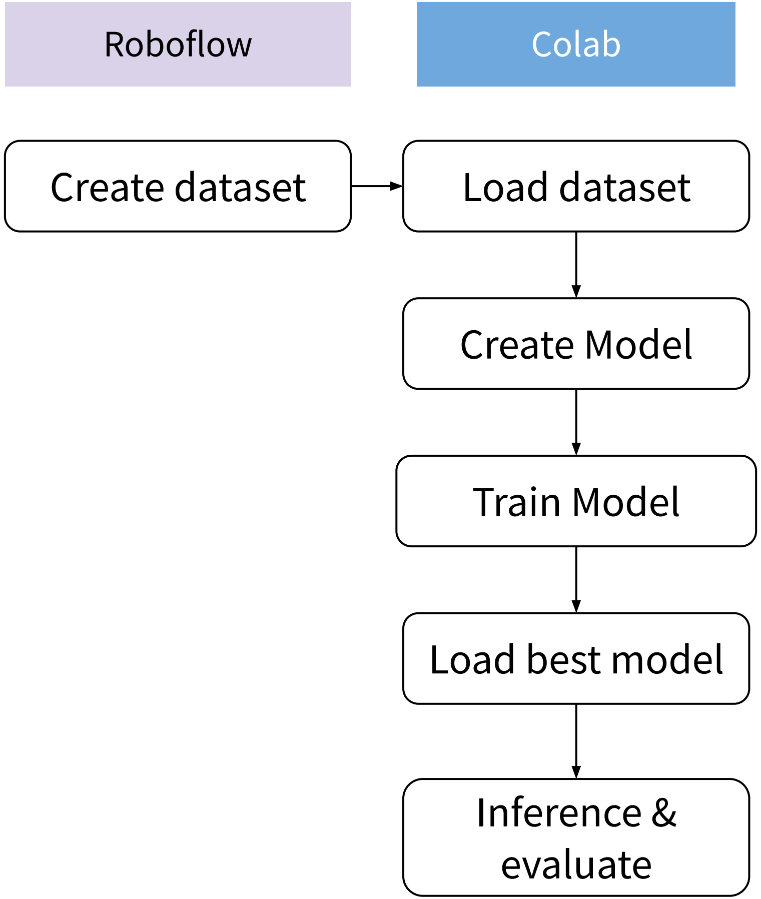
1) Load image from github
2) Create Object detection dataset in Roboflow
3) Train YOLO model in ultralytics hub
4) evaluate YOLO in [Lab_6_1_ultralyricshub]



Lab6.2: Segmentation dataset

In this lab, we will repeat the experiment from **Lab 5.1 (2DUNet)**, but the dataset will be created using Roboflow instead.

1) Load image from GitHub
2) Create segmentation dataset in Roboflow
3) Download the dataset in segment formats
4) Upload the dataset to the Lab_6_2_Segmentation, then train and evaluate the model.


Roboflow
Colab
Create dataset
Load dataset
Create Model
Train Model
Load best model
Inference & evaluate