

Lab6: Imaging tools (Roboflow)

3099704 AI for Digital Health (2025/2)

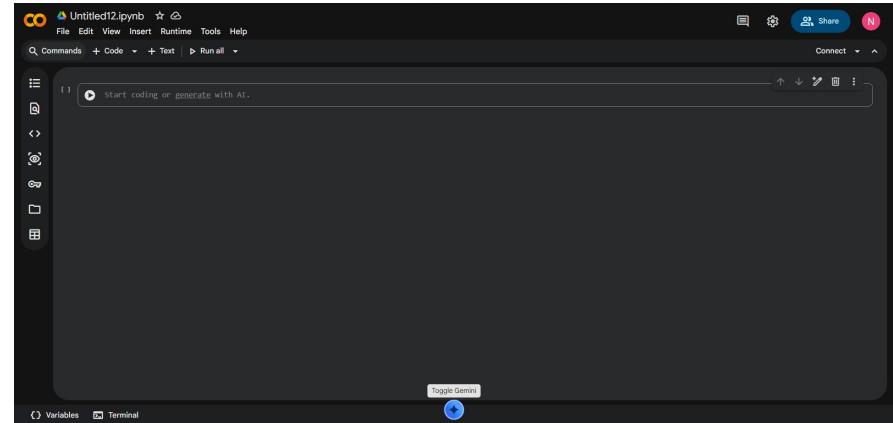
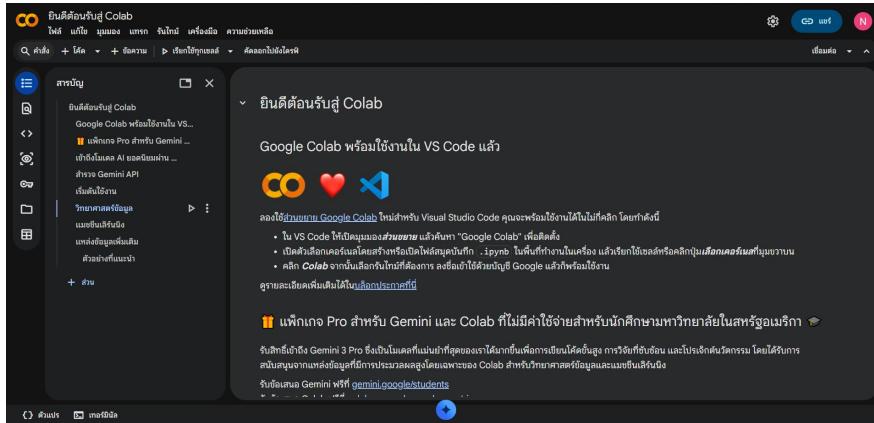
Objective

- Use the **Roboflow** to create Dataset
- Use created Dataset to train model
(YOLO,UNet)



Material

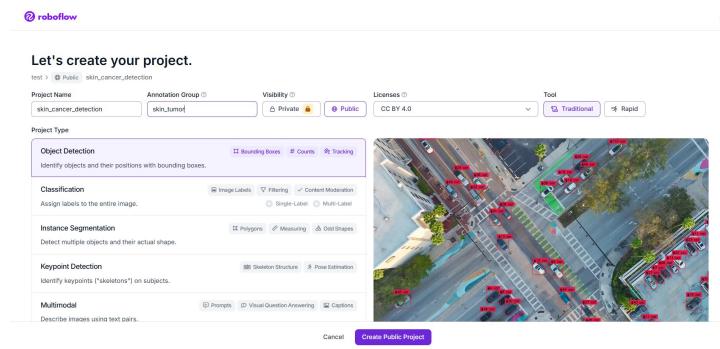
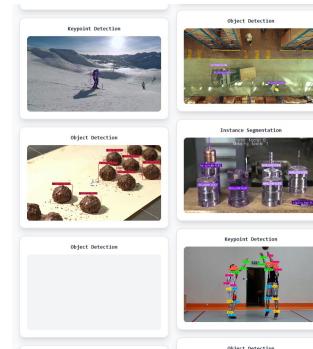
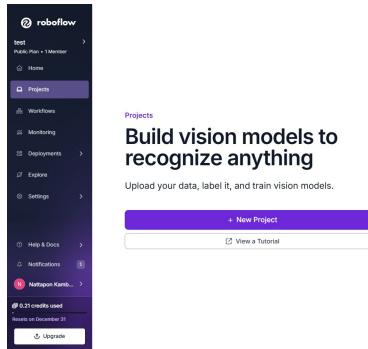
- With **Google Colab**, you don't need to install any software. All you need is a Google account, and you can start using it right away. Simply visit: <https://colab.research.google.com/> or select NEW NOTEBOOK to start a new file.



Roboflow

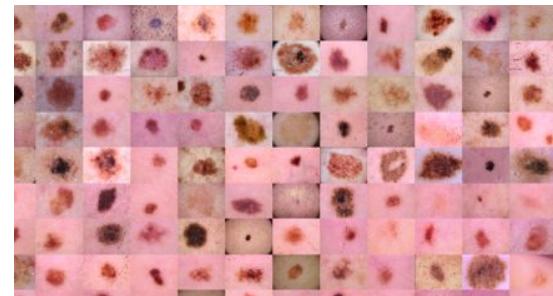
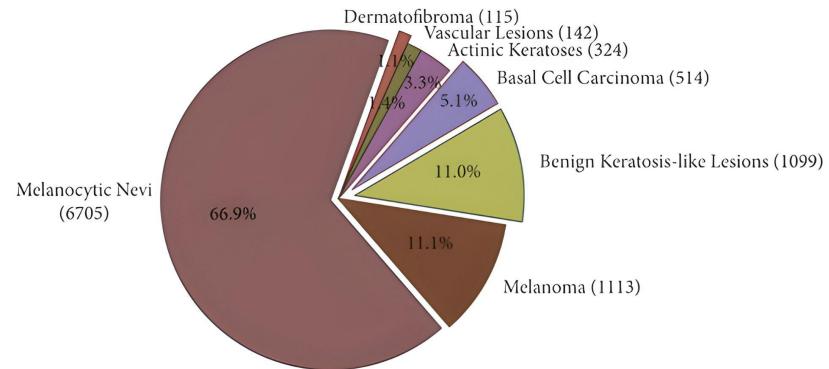


- **Roboflow** is a web-based platform that helps users easily prepare datasets. It can be accessed through a web browser at <https://roboflow.com/> by signing in with a Google or GitHub account.
- Users can upload images, annotate data, apply preprocessing and data augmentation, and export datasets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



Dataset: Skin Cancer MNIST (HAM10000)

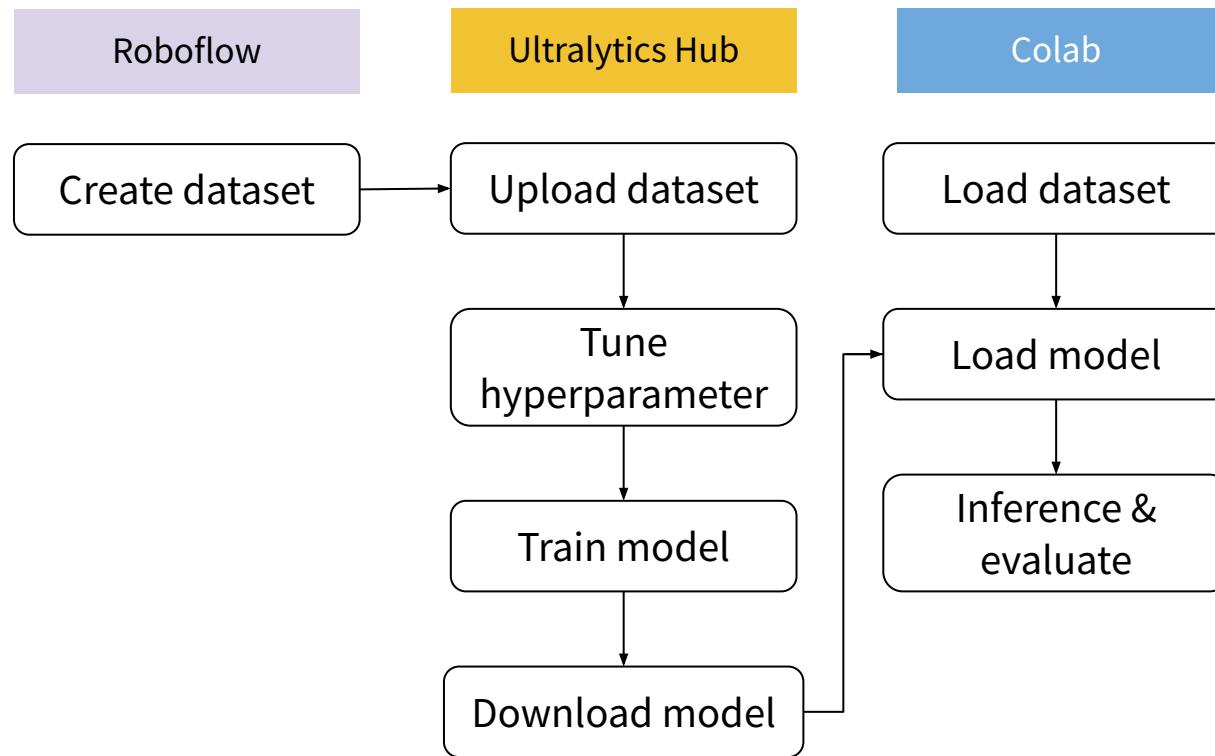
- The dataset consists of 10015 images with 10013 labeled objects belonging to 7 skin cancer classes.
- The data contains image in JPG format and documents in JSON format



Lab6.1: Object detection dataset

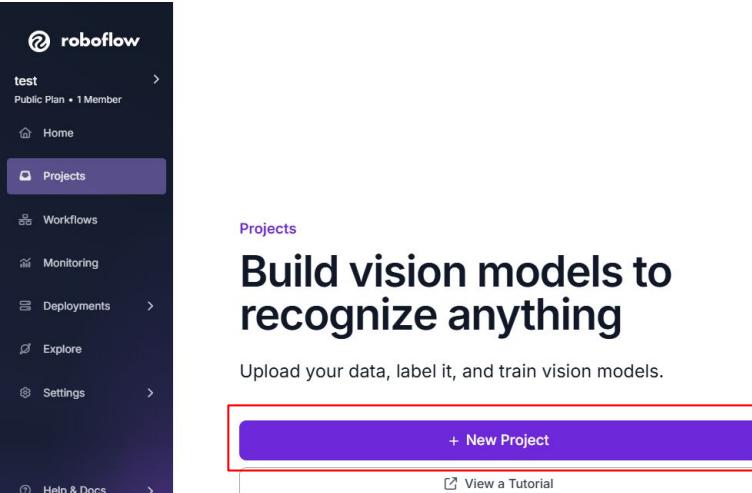
In this lab, we will repeat the experiment from **Lab 4.1 (YOLOv8n)**, but the dataset will be created using Roboflow instead.

- 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](#)

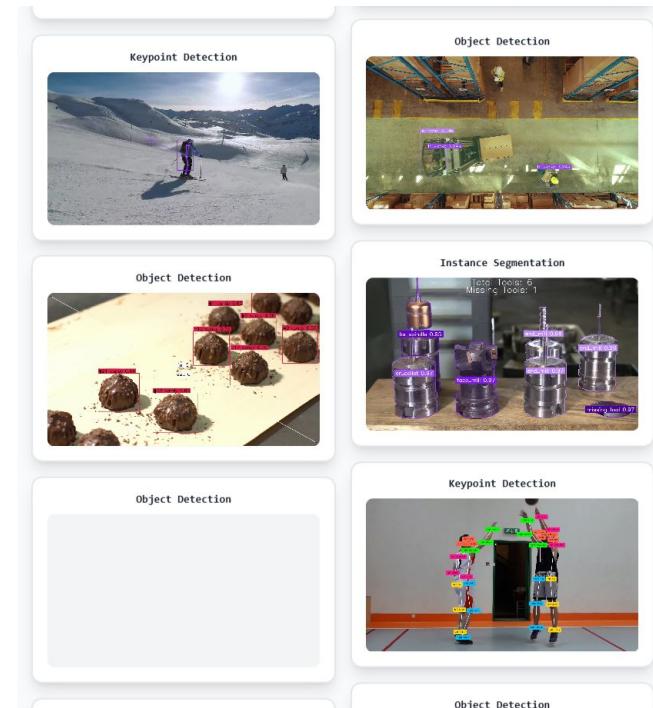


Lab6.1: Object detection dataset

1) Sign in [Roboflow](#)



The image shows the Roboflow web interface. On the left is a dark sidebar with various navigation links: Home, Projects (which is selected and highlighted in purple), Workflows, Monitoring, Deployments, Explore, Settings, Help & Docs, Notifications (with a '1' notification badge), and a user profile for Nattapon Kamb... Below the sidebar, it says '0.21 credits used' and 'Resets on December 31'. At the bottom is a 'Upgrade' button. The main area has a heading 'Build vision models to recognize anything' and a sub-instruction 'Upload your data, label it, and train vision models.' A prominent purple button labeled '+ New Project' is centered at the bottom of this section, with a red rectangular box drawn around it to indicate it as the target for step 1.



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 selected)
Licenses: CC BY 4.0
Tool: Traditional (Rapid selected)

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.

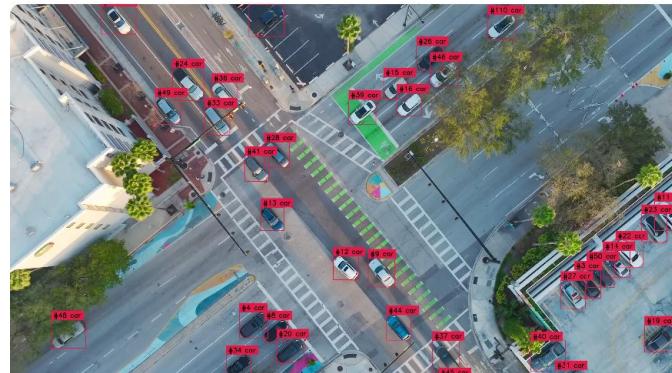
Bounding Boxes # Counts Tracking

Image Labels Filtering Content Moderation Single-Label Multi-Label

Polygons Measuring Odd Shapes

Skeleton Structure Pose Estimation

Captions



Create Public Project

Lab6.1: Object detection dataset

- 3) Download the dataset from [GitHub](#), then upload in **Roboflow**.

TEST

skin_cancer_d... Object Detection

DATA

Upload Data

Annotate

Dataset

Versions Train

Analytics

Classes & Tags

MODELS

Models

Visualize

DEPLOY

Deployments

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

*Max size of 20MB and 16,400 x 16,900 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**.

The screenshot shows the Roboflow web interface. On the left is a sidebar with navigation links: TEST, skin_cancer_d..., DATA (with Upload Data highlighted), Annotate, Dataset, Versions (Train selected), Analytics, Classes & Tags, MODELS, Models, Visualize, DEPLOY, Deployments, and a circular icon with 'N'. The main area is titled 'Upload' under 'TEST'. It shows a 'Batch Name' field containing 'skin_cancer_d...' and a timestamp 'Uploaded on 12/26/25 at 1:18 pm'. There is a 'Tags' field with a placeholder 'Search or add tags for images...'. A checkbox for 'Create batch instantly' is unchecked. Below these are buttons for 'All Images' (16), 'Annotated' (0), and 'Not Annotated' (16). A large section below is titled 'Drag and drop images, annotations, and videos.' and specifies supported formats: '.jpg, .png, .bmp, .webp, .avif' (in 26 formats) and '.mov, .mp4'. It includes 'Select Files' and 'Select Folder' buttons, and a prominent purple 'Save and Continue →' button. Below this is a grid of 16 image thumbnails, each with a file name. At the bottom is a 'Want to add similar images?' section with a preview of 8 images and a '+ Add' button.

TEST

skin_cancer_d... Object Detection

DATA

Upload Data

Annotate

Dataset

Versions Train

Analytics

Classes & Tags

MODELS

Models

Visualize

DEPLOY

Deployments

Upload

Batch Name:

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

Tags:

Create batch instantly

All Images (16) Annotated (0) Not Annotated (16)

Drag and drop images, annotations, and videos.

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

*Max size of 200B and 16,400 x 10,900 pixels.

Select Files Select Folder Save and Continue →

cju2i6acqv6i0799u20f1t8.jpg cju2i3hzcw3o0988rgh911.jpg cju2i03ptvkiu0799xbd4det.jpg cju2hx006vid0799gmm81vh.jpg cju2hw5glr5h0988so2qqres.jpg cju2hugv9vget0799hk7ksvg.jpg cju2htabevq9108015jei0x7.jpg cju2hqt33imra0988f5ijv8j.jpg

Want to add similar images? Powered by Objects365

+ Add

0 selected

Lab6.1: Object detection dataset

4) Check “Label Myself”

The screenshot shows the Roboflow interface for a dataset named "TEST". On the left, there's a sidebar with various navigation options like "Object Detection", "Upload Data", "Annotate", "Dataset", "Versions", "Train", "Analytics", "Classes & Tags", "Models", "Visualize", "Deploy", and "Deployments". The main area displays a batch of images uploaded on 12/26/25 at 1:18 pm. A red box highlights the "Label Myself" option under the heading "How do you want to label your images?", which includes a sub-section for "Label With My Team" and "Hire Outsourced Labelers".

TEST

Annotate > Batch
Uploaded on 12/26/25 at 1:18 pm
Uploaded Dec 26, 2025 (1:18 PM)

Upload More Rename

skin_cancer_d... Object Detection

DATA

Upload Data Annotate

Dataset Versions Train

Analytics

Classes & Tags

MODELS

Models Visualize

DEPLOY

Deployments

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

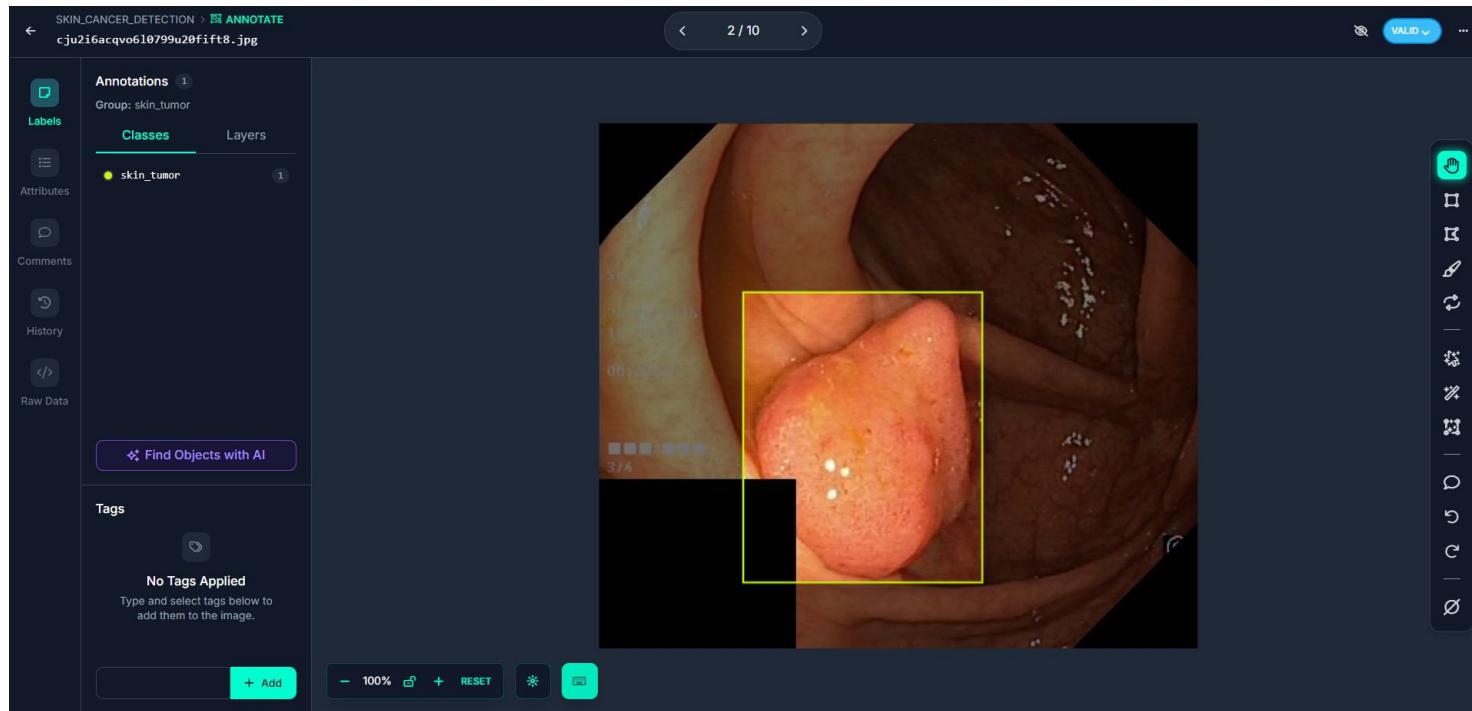
Label Myself Label images with our AI labeling tools.

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

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

Lab6.1: Object detection dataset

5) Label polyp



Lab6.1: Object detection dataset

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

The screenshot shows a user interface for managing datasets, specifically for an 'Object Detection' task. On the left, a sidebar provides navigation links for TEST, DATA, MODELS, and DEPLOY. The main area displays a preview of an image from the 'skin_cancer_d...' dataset, which is currently set to 'TEST'. A 'Versions' tab is selected, showing a list of existing versions and a form to create a new one.

Versions

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

Source Images
Images: 10
Classes: 1
Unannotated: 0

Train/Test Split (highlighted with a red box)
Training Set: 6 images
Validation Set: 2 images
Testing Set: 2 images

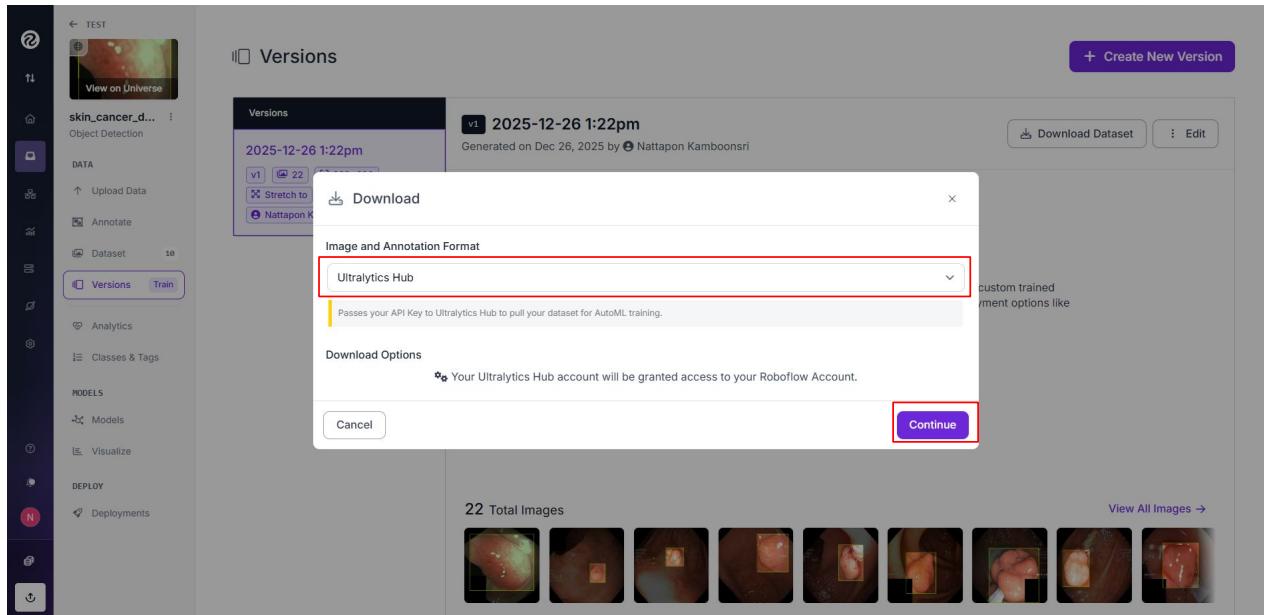
Preprocessing
Auto-Orient: Applied
Resize: Stretch to 320x320

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

Create (highlighted with a red box)
Review your selections and select a version size to create a moment-in-time snapshot of your dataset with the applied transformations.

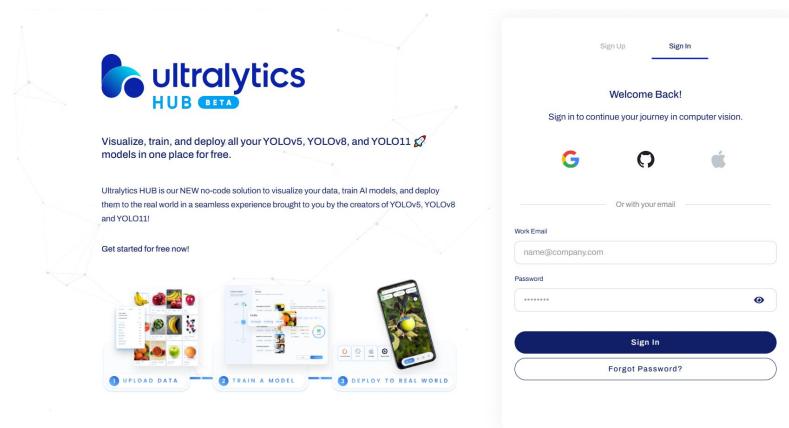
Lab6.1: Object detection dataset

- 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.

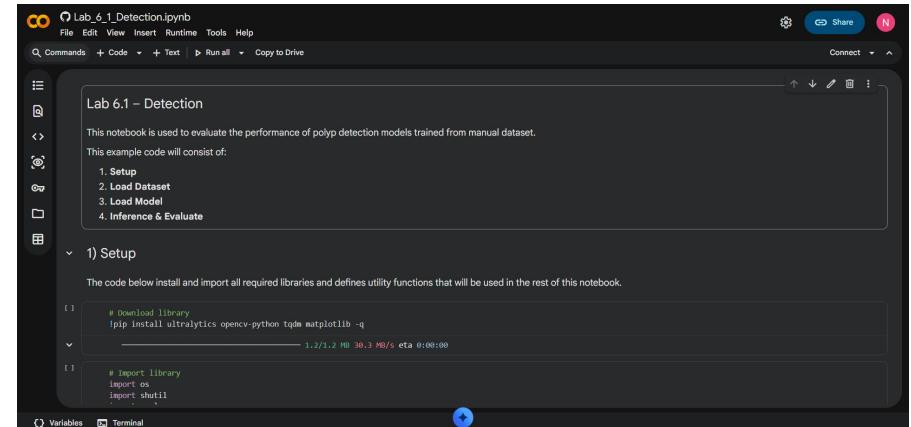


Lab6.1: Object detection dataset

- 8) Train YOLOv8n in Ultralytics Hub
- 9) Load model to run in [Lab_6_1_Detection](#) (in **colab**)



The image shows two screenshots of the Ultralytics Hub interface. On the left is the homepage, featuring the Ultralytics logo, a 'HUB BETA' badge, and a brief description: 'Visualize, train, and deploy all your YOLOv5, YOLOv8, and YOLOv11 models in one place for free.' It includes sections for 'Upload Data', 'Train a Model', and 'Deploy to Real World'. On the right is the sign-in screen, which has 'Sign Up' and 'Sign In' buttons at the top. Below is a 'Welcome Back!' message and a 'Sign in to continue your journey in computer vision.' section. It features social login buttons for Google, GitHub, and Apple, and fields for 'Work Email' and 'Password'.



The image shows a Google Colaboratory (Colab) notebook titled 'Lab_6_1_Detection.ipynb'. The title bar includes 'File Edit View Insert Runtime Tools Help', 'Commands + Code + Text Run all Copy to Drive', and a 'Share' button. The main area contains the following text and code:

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
```

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

At the bottom, there are 'Variables' and 'Terminal' tabs.

Lab6.1: Object detection dataset

5) Open [Lab_4_1_ultralyricshub](#) (in **colab**)

The screenshot shows a Google Colab interface with the following details:

- Title:** Lab_4_1_ultralyricshub.ipynb
- Toolbar:** File, Edit, View, Insert, Runtime, Tools, Help.
- Search Bar:** Commands, + Code, + Text, Run all, Copy to Drive.
- Share Button:** Share, Connect.
- Notebook Content:**
 - Section:** Lab 4.1 – Polyp detection: YOLO8 (Ultralytics hub)
 - Description:** This notebook is used to evaluate the performance of polyp detection models trained on Ultralytics hub.
 - Text:** This example code will consist of:
 1. Setup
 2. Load Dataset
 3. Load Model
 4. Inference & Evaluate
 - Section:** 1) Setup (highlighted with a blue border)
 - Description:** The code below install and import all required libraries and defines utility functions that will be used in the rest of this notebook.
 - Code:**

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

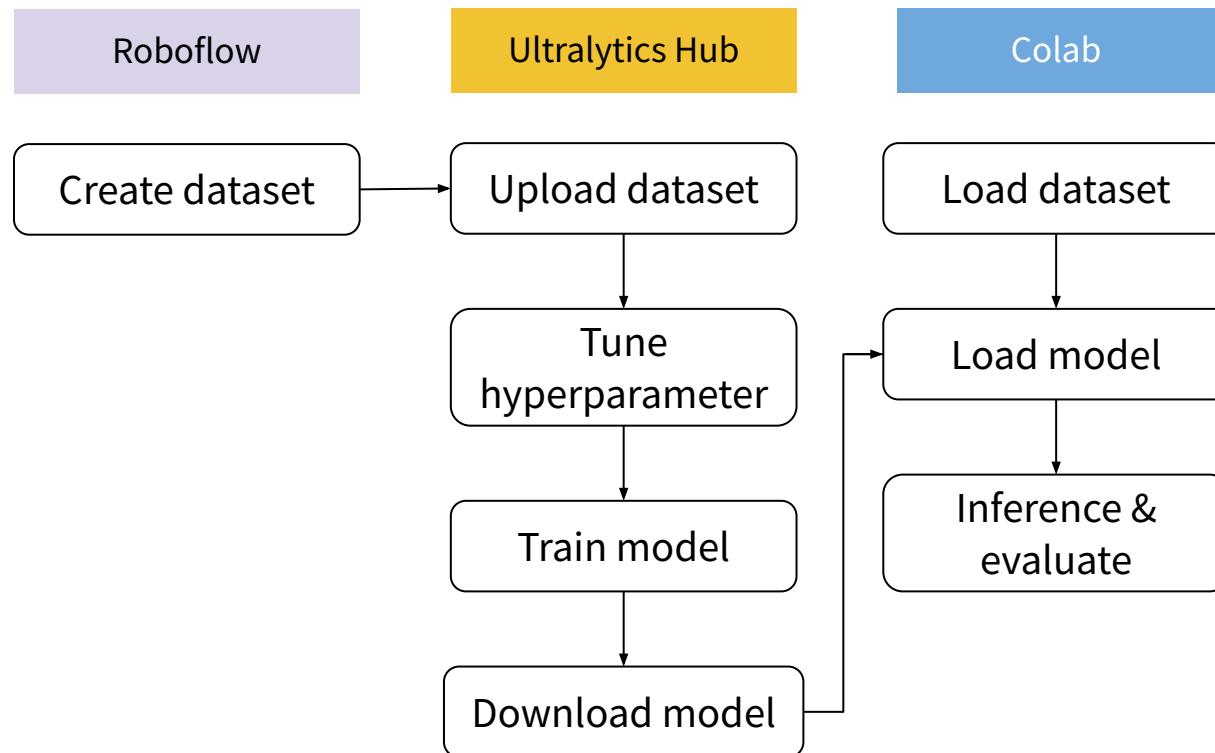
Output: 1.2/1.2 MB 30.3 MB/s eta 0:00:00

```
# 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

Roboflow

Colab

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.

