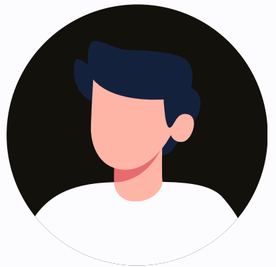
MLOps

Roboflow

Empowers developers to build their own computer vision applications, no matter their skillset or experience. It streamlines the process between labeling your data and training your model.

15 January, 2025

THE TEAM



KUSHAAL

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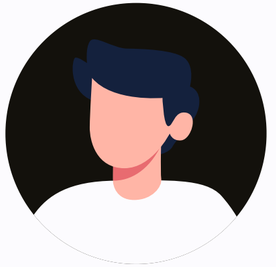

SHIVAKUMAR

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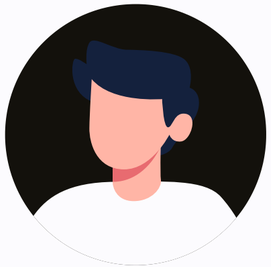

TANISHQ

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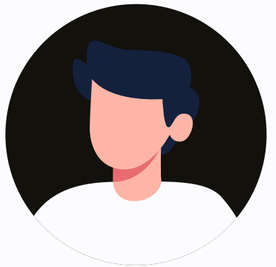

RAVIKIRAN

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Introduction

- Roboflow empowers developers to create custom computer vision applications, regardless of their skill level or experience. It simplifies the process of transitioning from data labeling to model training, making computer vision accessible to all.

- Having developed its own applications, Roboflow's team experienced the challenges of training and deploying computer vision models firsthand. They encountered inefficiencies such as excessive coding for data formatting, difficulties in collaboration, and the time-consuming nature of benchmarking machine learning tools.

- Launched in January 2020, Roboflow was created with the belief that every developer should have access to computer vision as part of their toolkit.

- Roboflow is backed by a network of industry-leading investors with experience in scaling transformative technologies and developer tools. Supporters include the co-founders of Segment, Firebase, Stripe, PayPal, and others.

trusted by

Roboflow is built for security, with enterprise grade infrastructure and compliance always in mind. Compliant with SOC2 Type 2 requirements. Data is encrypted in transit and at rest, with SSL transport receiving a grade A+ rating from Qualys.

awards won

Why Roboflow?

Dataset Management

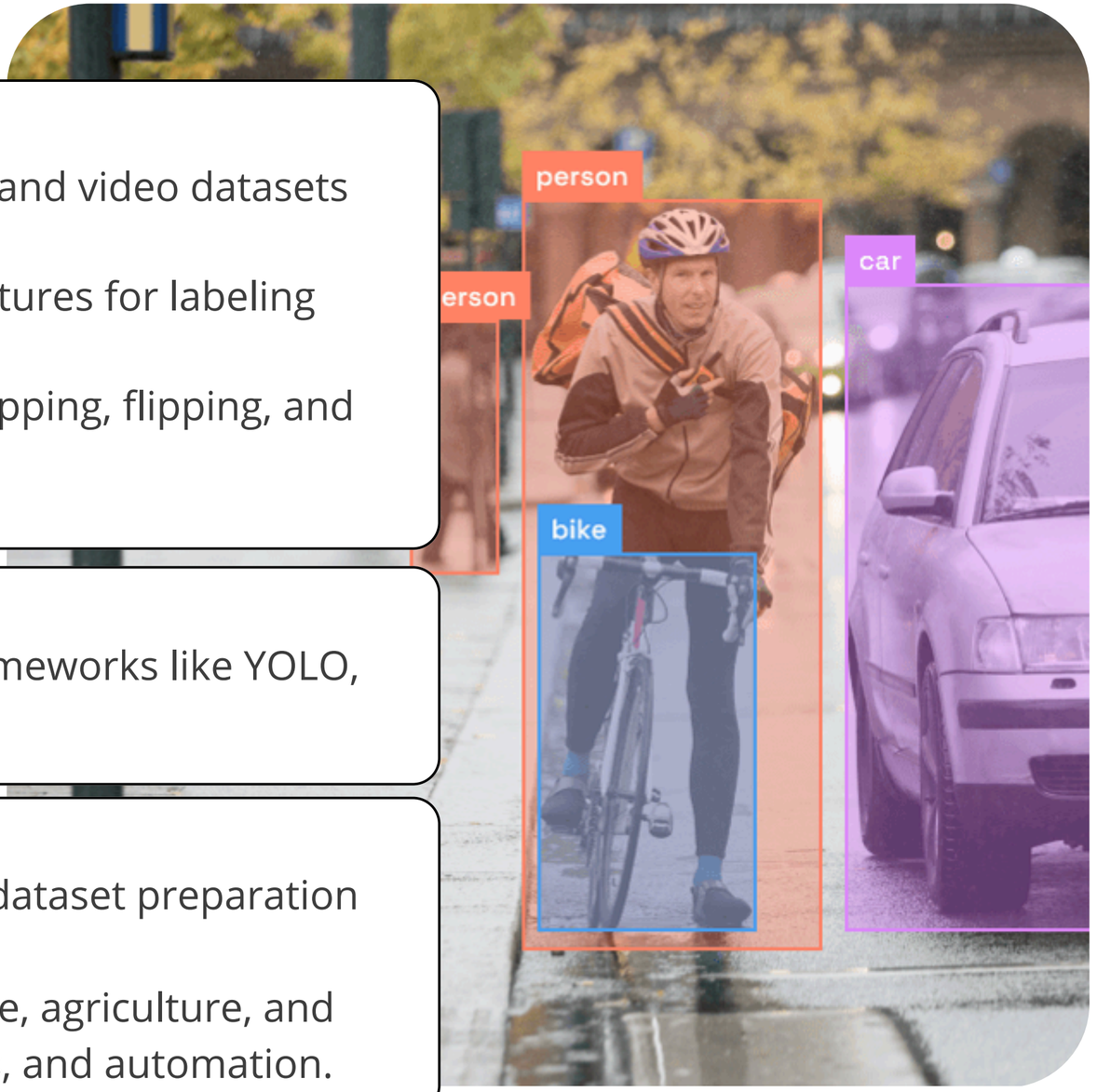
- Simplifies importing, organizing, and preparing image and video datasets for machine learning tasks.
- Annotation Tools: Provides easy-to-use annotation features for labeling objects, segmenting regions, or classifying images.
- Data Augmentation: Offers various techniques like cropping, flipping, and brightness adjustment to enhance dataset diversity.

Framework Compatibility

- Supports integration with popular computer vision frameworks like YOLO, TensorFlow, and PyTorch.

End-to-End Workflow

- Streamlines the entire computer vision pipeline, from dataset preparation to model deployment.
- Versatile Applications: Used in industries like healthcare, agriculture, and retail for tasks such as object detection, defect analysis, and automation.



Benefits of Roboflow

Improved Model Performance

Roboflow Train simplifies complex machine learning pipelines, removing the guesswork and fine-tuning that can lead to subtle performance issues.

Streamlined Deployment

There are all kinds of deployment destinations available to the users, including hosted web inference and on-device deployment, like NVIDIA Jetsons, OAK devices, or even a web browser.

One-Click Train

Kick off a train with a single click . In this way, Roboflow Train enables users to abstract away the complexities of the training process, and in just a few hours, your model will be ready for deployment.

Lower Cost

With Roboflow Train, we don’t have to hire an expensive team of machine learning experts - you can use computer vision with the engineering resources you already have

Pricing

Public Plan

For open source

Free

No credit card needed

Switch to Public Plan

$30 value in credits / month

15 credits / month

Data and Models are **public**.

Access to the Roboflow platform:

- **$2** per additional credit
- **5** User Seats
- Public Data and Models
- Model Training and Deployment
- Community Support

Basic Plan

For small teams

$49 ~~$65~~

per month, billed annually

Upgrade to Basic Plan

$90 value in credits / month

360 credits **loaded upfront**

Data and Models are **private**.

Everything in Public Plan, plus:

- **$3** per additional credit
- **5** User Seats
- Pay As You Go Training and Storage
- Commercial Model License
- Model Evaluation
- Community Support

Growth Plan

For startups

$299 ~~$399~~

per month, billed annually

Upgrade to Growth Plan

$600 value in credits / month

1,800 credits **loaded upfront**

Data and Models are **private**.

Everything in Basic Plan, plus:

- **$4** per additional credit
- **20** User Seats
- Role-Based Access Control
- Professional Labeling Services
- Premium GPU Access
- Priority Chat and Email Support, Onboarding with Specialists

Enterprise Plan

For organizations

Custom Pricing

Billed annually

Contact Sales

Custom credits

Custom credits

Data and Models are **private**.

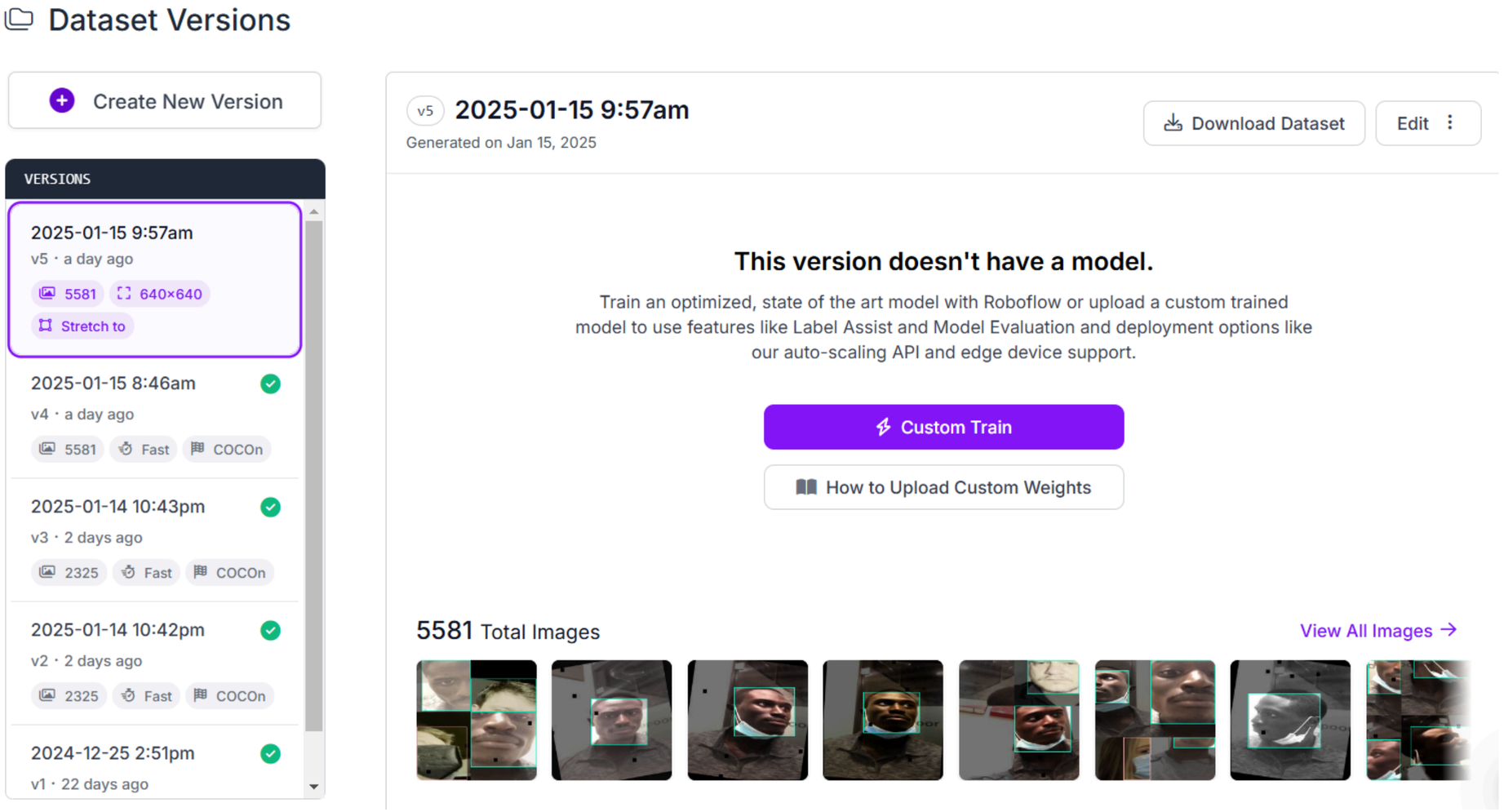
Everything in Growth Plan, plus:

- **Custom user limits** with Single Sign-On (SSO)
- Model Monitoring
- Device Management
- Hardware Procurement
- Offline Deployments
- SSO + Scoped API Keys
- Priority Access to Premium GPUs
- HIPAA Compliance + BAA Execution
- Dedicated Field Engineering Support

Different features of Roboflow

- **Dataset Management:** Roboflow simplifies managing, organizing, and versioning datasets for machine learning projects, including automatic label validation and dataset augmentation.
- **Preprocessing and Augmentation:** Offers a suite of preprocessing options like resizing, cropping, and flipping, as well as augmentation techniques like random rotations, color adjustments, and more to improve model robustness.
- **Model Training and Deployment:** Allows users to train models directly using integrated tools and deploy them via API endpoints for real-time inference.
- **Collaboration Tools**: Supports team collaboration with dataset sharing, version control, and project organization for streamlined workflows.
- **Integrations:** Integrates with popular machine learning frameworks and tools like TensorFlow, PyTorch, and OpenCV, enabling seamless workflows.
- **Deployment Tools:** Deploy models to production with API endpoints for real-time inference.

Data Versioning



Custom Weight Deployement

MODEL NAME	UPDATED	METRICS		TYPE	DATASET VERSION	LICENSE	
Mask 4 ID: mask-l3xmq/4	1/15/25, 2:27 PM	mAP Precision Recall	98.7% 98.2% 96.6%	YOLOv11 Object Detection (Fast)	2025-01-15 8:46am	AGPL-3.0	Deploy
Mask 3 ID: mask-l3xmq/3	1/15/25, 9:35 AM	mAP Precision Recall	90.7% 92.3% 86.5%	Roboflow 3.0 Object Detection (Fast)	2025-01-14 10:43pm	AGPL-3.0	Deploy
Mask 2 ID: mask-l3xmq/2	1/15/25, 1:09 AM	mAP Precision Recall	94.2% 94.2% 91.8%	Roboflow 3.0 Object Detection (Fast)	2025-01-14 10:42pm	AGPL-3.0	Deploy
Mask 1 ID: mask-l3xmq/1	12/25/24, 4:07 PM	mAP Precision Recall	93.6% 95.2% 87.7%	yolov8s Model Upload	2024-12-25 2:51pm	AGPL-3.0	Deploy

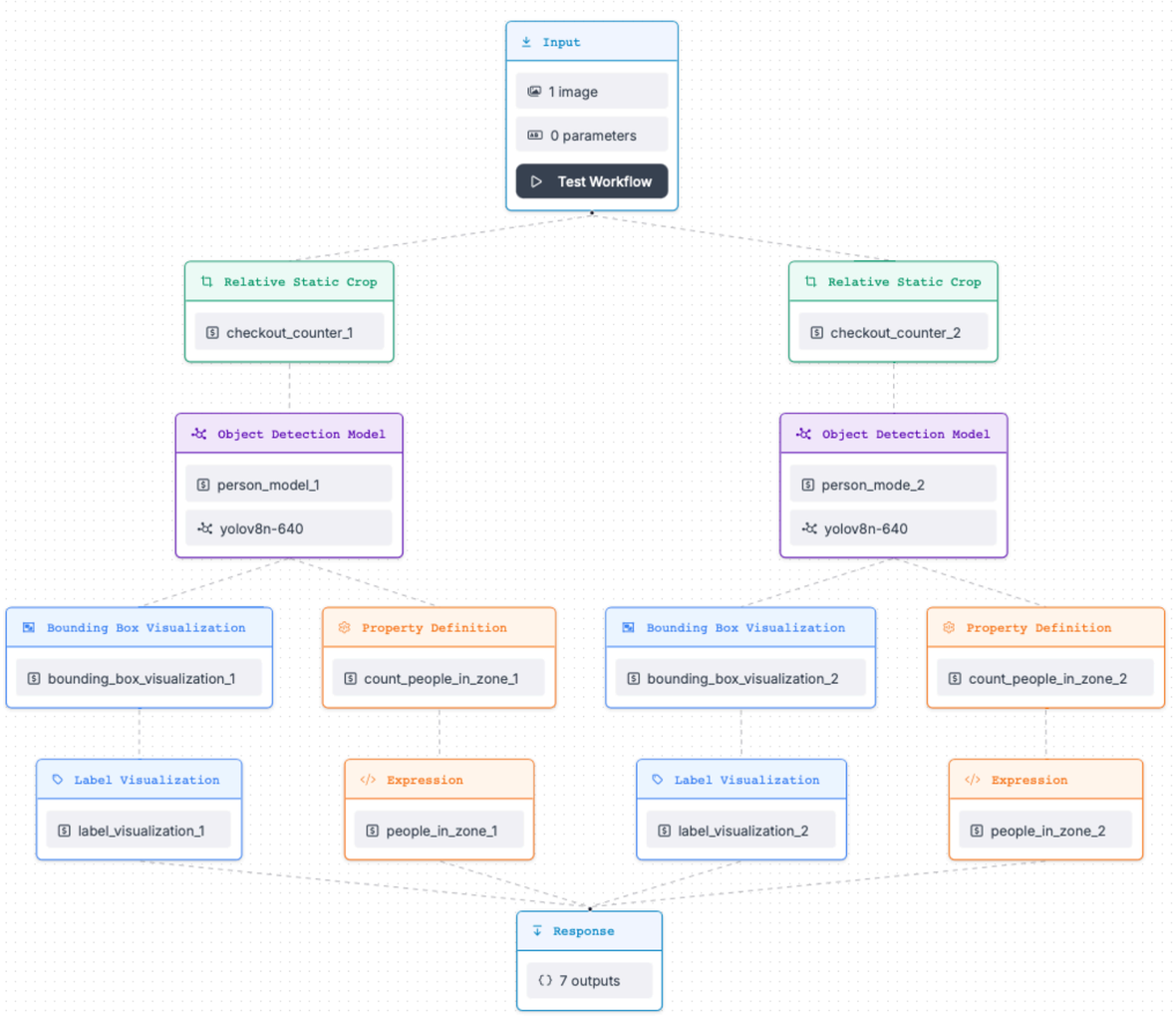
Active Learning

- Active Learning is a process of iterative improvement of model by retraining models on dataset that grows over time. This process includes data collection (usually with smart selection of datapoints that model would most benefit from), labeling, model re-training, evaluation and deployment - to close the circle and start new iteration.

- **Random sampling**: Images are collected at random.
- **Close-to-threshold:** Collect data close to a given threshold.
- **Detection count-based (Detection models only)**: Collect data with a specific number of detections returned by a detection model.
- **Class-based (Classification models only):** Collect data with a specific class returned by a classification model.

Each strategy can be configured with limits: list of values limiting how many images can be collected each minute, hour or day.

Workflows


Input
1 image
0 parameters
Test Workflow
Relative Static Crop
checkout_counter_1
Relative Static Crop
checkout_counter_2
Object Detection Model
person_model_1
yolov8n-640
Object Detection Model
person_mode_2
yolov8n-640
Bounding Box Visualization
bounding_box_visualization_1
Property Definition
count_people_in_zone_1
Bounding Box Visualization
bounding_box_visualization_2
Property Definition
count_people_in_zone_2
Label Visualization
label_visualization_1
Expression
people_in_zone_1
Label Visualization
label_visualization_2
Expression
people_in_zone_2
Response
7 outputs

Containerization

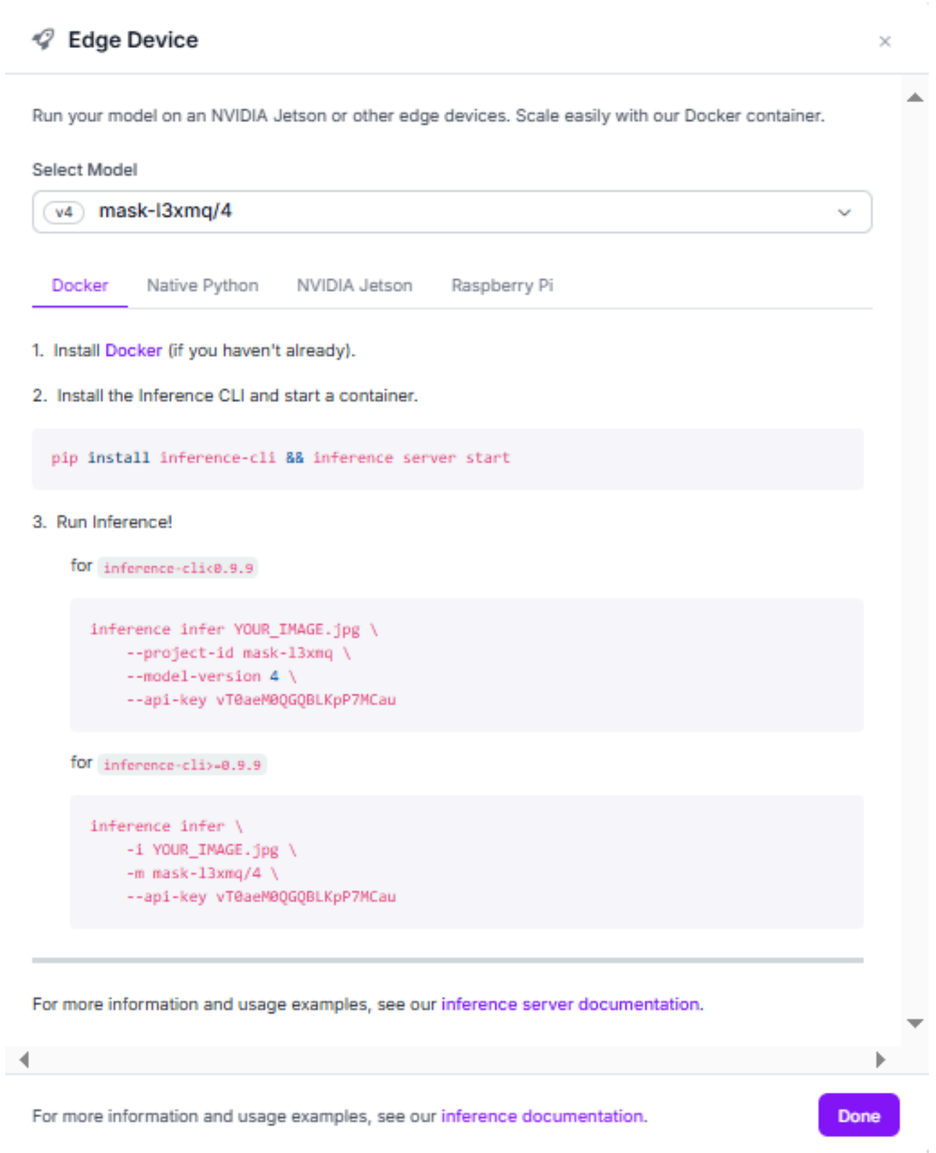
```yaml
# Run the roboflow Inference Service as a Docker compose service"
services:
  roboflow-inference-service:
    image: roboflow/inference-server:cpu
    ports:
      - "9001:9001"

# Optionally, add any other containers or services you need here,
# illustrated via this example below;
# so you can "compose" multiple services with the roboflow inference
# service  as needed by your application

  another-container-service:
    image:  curlimages/curl:8.00.1
    entrypoint:
      - /bin/ash
      - -c
      - |
        while true; do
        curl -s -X GET http://roboflow-inference-service:9001
        sleep 5;
        done

    depends_on:
      - roboflow-inference-service
```

Run the Roboflow inference server alongside other docker containers to build your multi-container application via Docker Compose.



Conclusion

Roboflow empowers developers and teams to streamline the entire computer vision workflow, from dataset preparation to model deployment. By providing intuitive tools for data management, augmentation, and integration with popular frameworks, it reduces development time and enhances model performance. Whether you're building prototypes or scaling production systems, Roboflow is a valuable partner in achieving your computer vision goals. With its collaborative features and robust capabilities, it's not just a tool but a catalyst for innovation in the AI and machine learning space.

Thank You