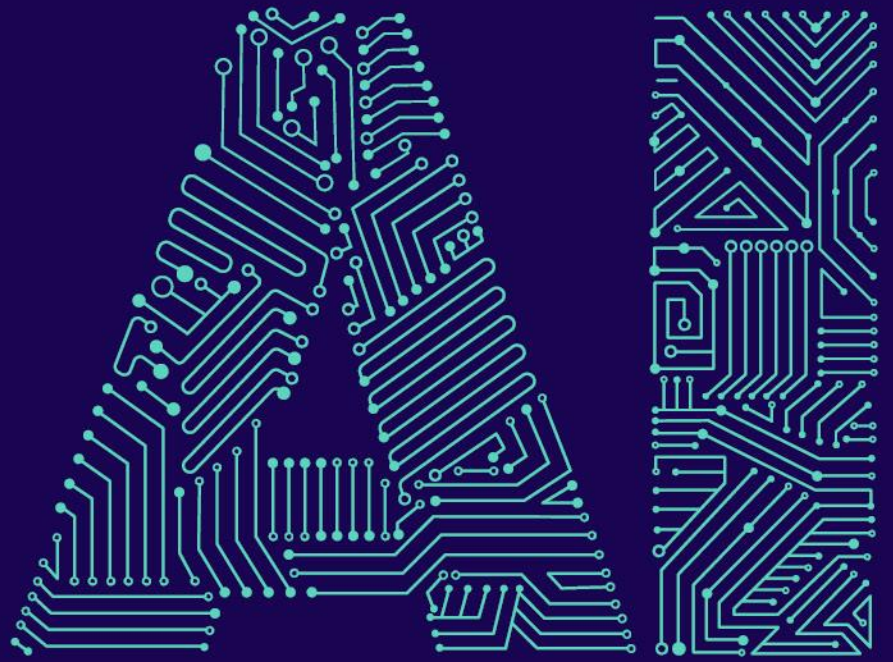
cnvrg.io

OCR + Text Detection Workshop

AI Blueprints



Agenda

- What are you going to get out of this workshop?
- cnvrg.io Overview
- cnvrg.io AI Blueprints
- What is OCR/Text Detection?
- OCR Inference Example
- Using YOLO for Text Detection
- Preparing your Dataset for Yolov5 Model
- Bonus: Train your Dataset with cnvrg.io Blueprints

What are you going to get out of this workshop?

Knowledge

- Introduction to the cnvrg.io platform and AI Blueprints
- Understand the different types of OCR and Text Detection
- Overview of Yolov5 and Labelling

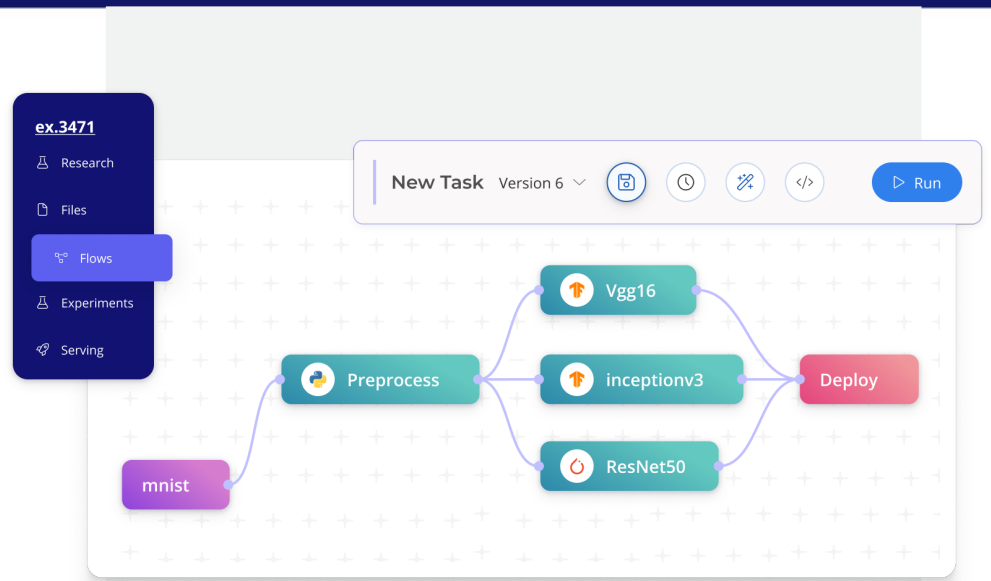
Practical Experience

- Prepare your dataset using a labelling tool
- Use cnvrg.io Blueprints to convert images to machine readable text
- Deploy and monitor your model using cnvrg.io

cnvrg.io Overview

Built by data scientists for developers of AI applications

- A platform to automate the continuous **training and deployment** of AI and ML models.
- Manages the **entire lifecycle**: data preprocessing, experimentation, training, testing, versioning, deployment, monitoring, and automatic retraining.
- Enables developers to train and deploy on **any infrastructure at scale**
- cnvrg.io **Metacloud** is the cnvrg.io platform offered as a **managed service**



Benefits

- Up to 10x increase in productivity
- Up to 5x faster model training
- Up to 50% increase in compute utilization

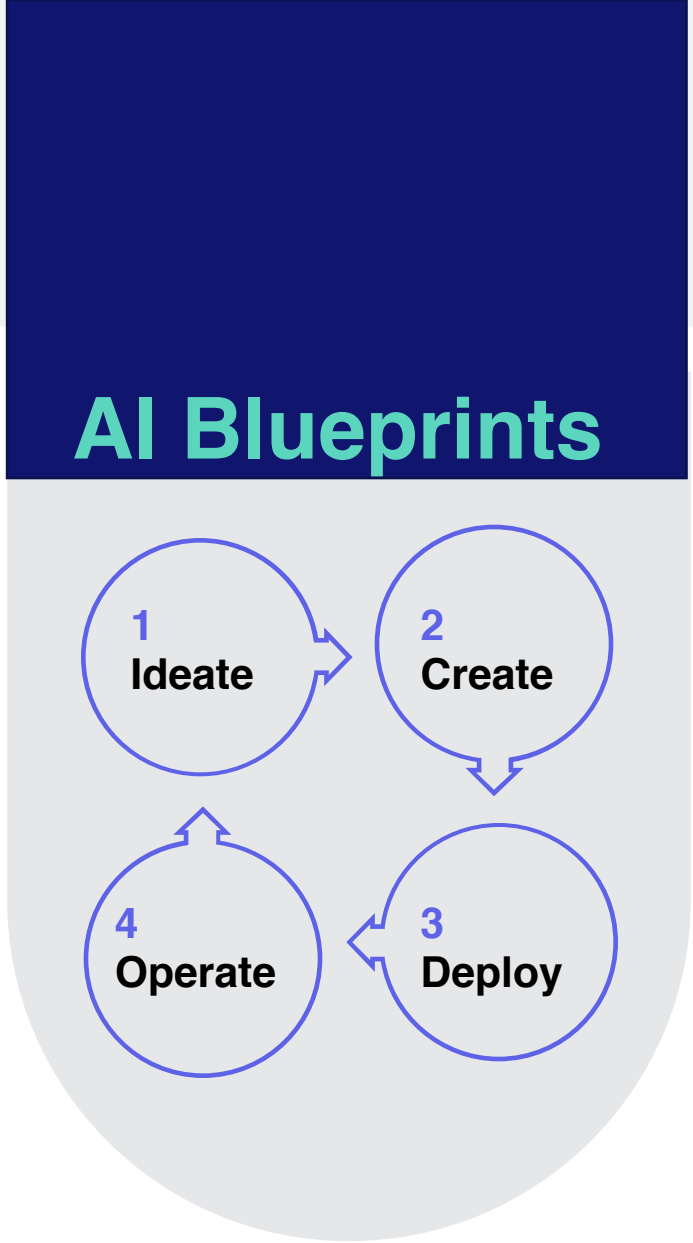
cnvrg.io

AI Blueprints

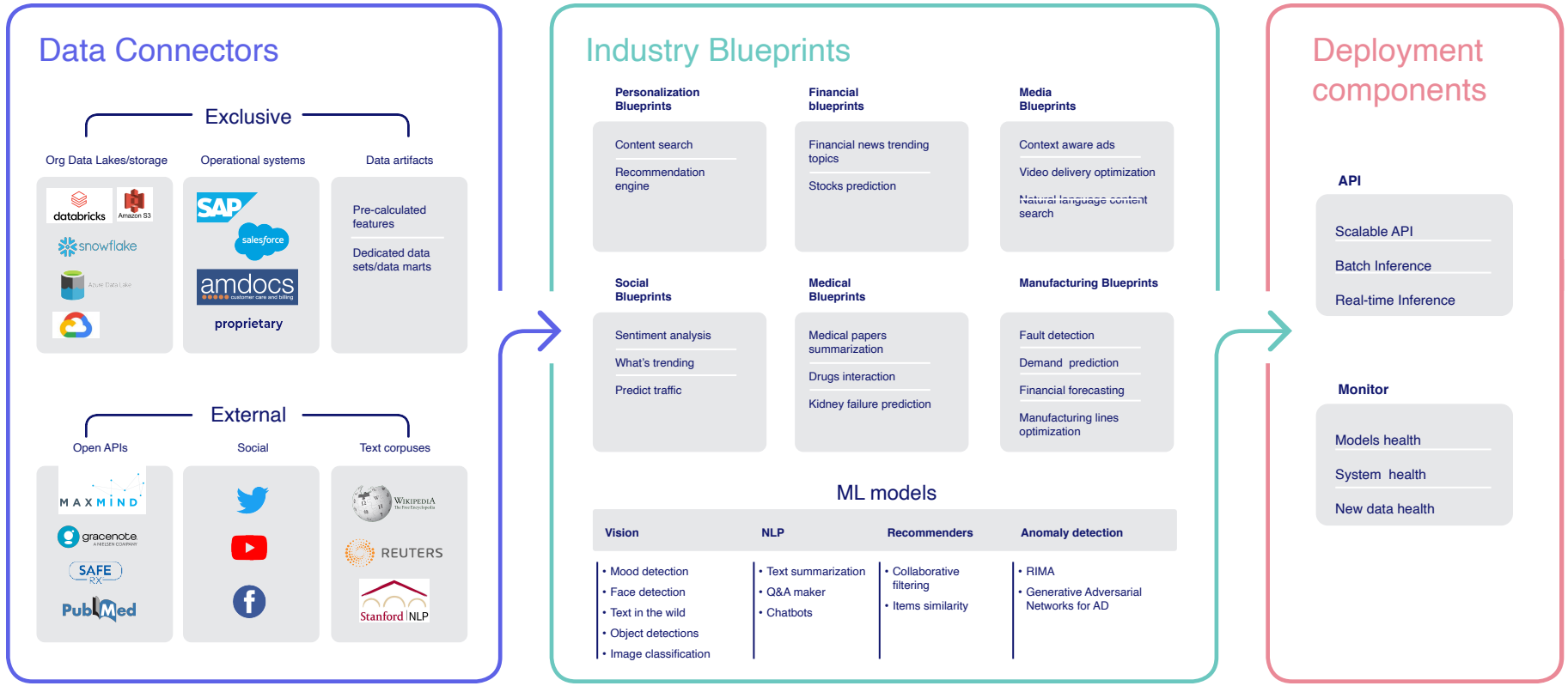
cnvrg.io AI Blueprints

are ready to use, low-code and open-source ML pipelines.

Built by data scientists, for everyone.



Rich Marketplace of Blueprints and Components



AI Blueprints

From ideation to production in a few clicks

Inference blueprints

Pull updated data from a variety of data sources and run it through a pre-trained model for immediate predictions

data > processing > inference

Training blueprints

Fine tune a model or train it on your own exclusive data and deploy it on your selected infrastructure

data > train > deploy

Blueprints components

Get access to a rich library of ready components and create your own story !

Scene detection

Text in the wild

Q&A maker

The Basic Process

Data

Identifying the data from operational systems or organizational data lake

Preparing the data (cleansing, missing values…)

Model

Training and fitting the best model to the data

Experimenting with several types of models and selecting the best one

Deployment

Deploying the model so it can receive new data and make predictions

Real-time
Batch

So what is **OCR?**

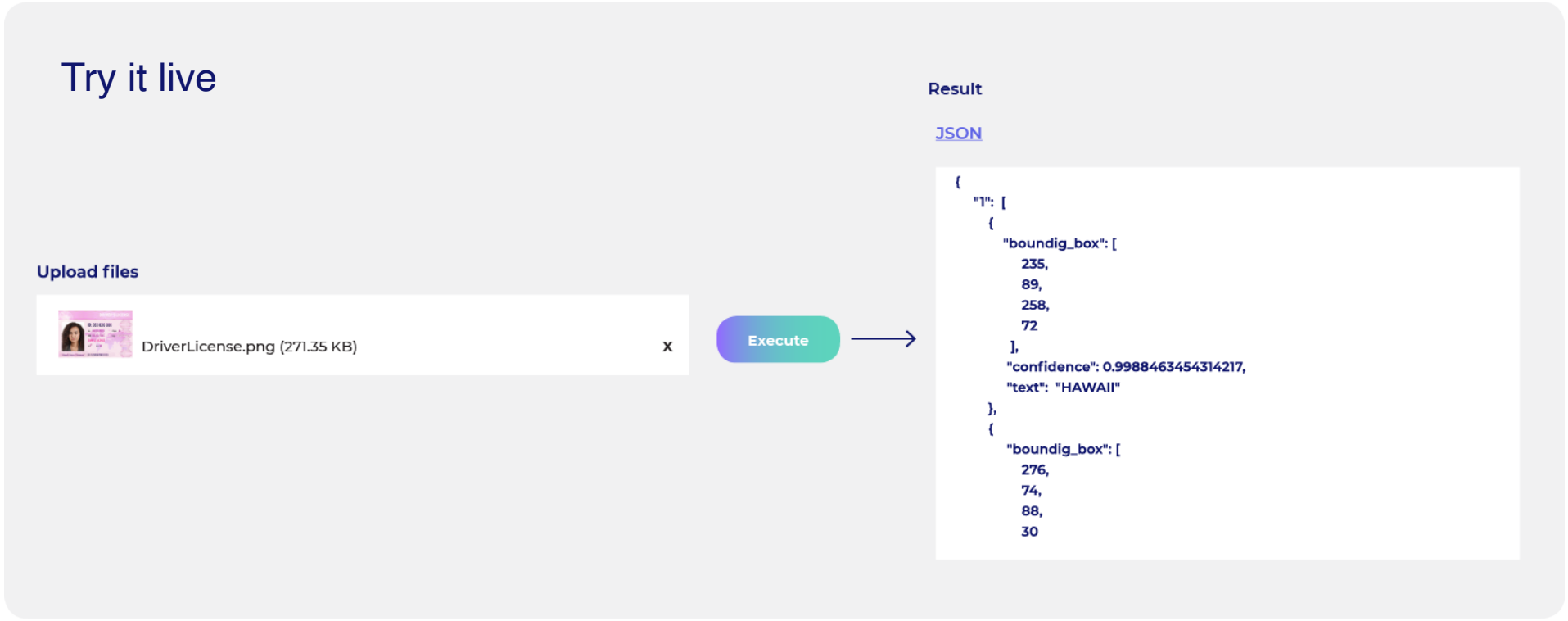
OCR - Optical Character Recognition

- Used to read text from images to extract information
- Examples: Street Signs, License Plate Numbers, Drug Labels, Receipts
- Types of OCR:
  1. Text Detection
  2. Text Recognition

Text Detection

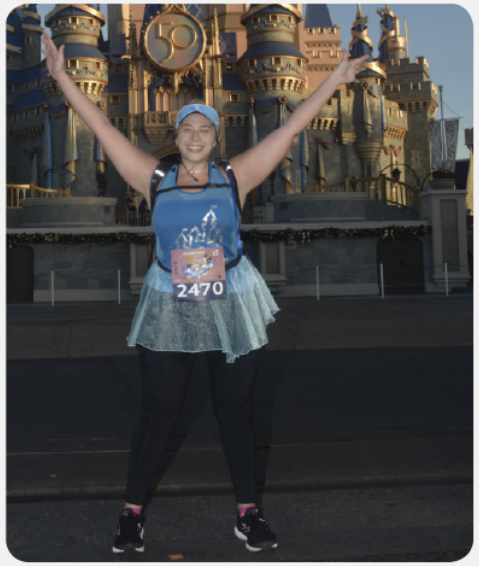
- **Region-Based detectors -**
  - Finds the regions which have the objects (bounding box) and the class
  - 2 step process
  - Examples: Faster R-CNN and R-FCN
- **Single Shot detectors -**
  - Predict the bounding box and the class at the same time
  - Faster processing time
  - Examples: SSD and YOLO

Text Detection: Inference



Text Detection: Inference

Input



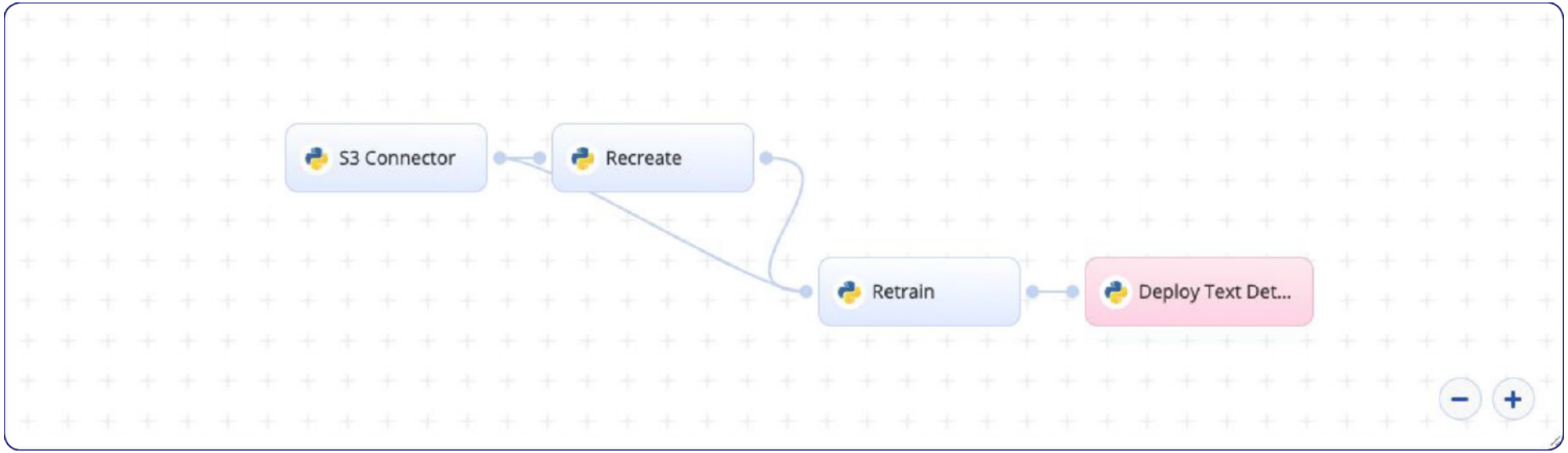
Output

center_x
center_y
Width
Height


```
{
  "prediction":{
    "1":[
      {
        "bounding_box":[
          166,
          222,
          83,
          36
        ],
        "confidence":0.9999963045120239,
        "text":"2470"
      }
    ]
  }
}
```

Text Detection: Training

Blueprint Deep dive



YOLO "You Only Look Once"

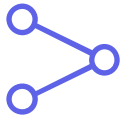
Nano

YOLOv5n

4 MB_{FP16}

6.3 ms_{V100}

28.4 mAP_{COCO}



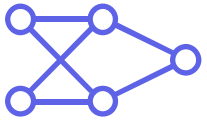
Small

YOLOv5s

14 MB_{FP16}

6.4 ms_{V100}

37.2 mAP_{COCO}



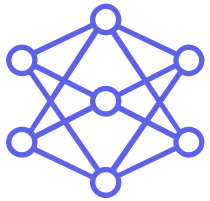
Medium

YOLOv5m

41 MB_{FP16}

8.2 ms_{V100}

45.2 mAP_{COCO}



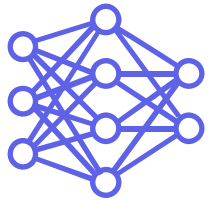
Large

YOLOv5l

89 MB_{FP16}

10.1 ms_{V100}

48.8 mAP_{COCO}



XLarge

YOLOv5x

166 MB_{FP16}

12.1 ms_{V100}

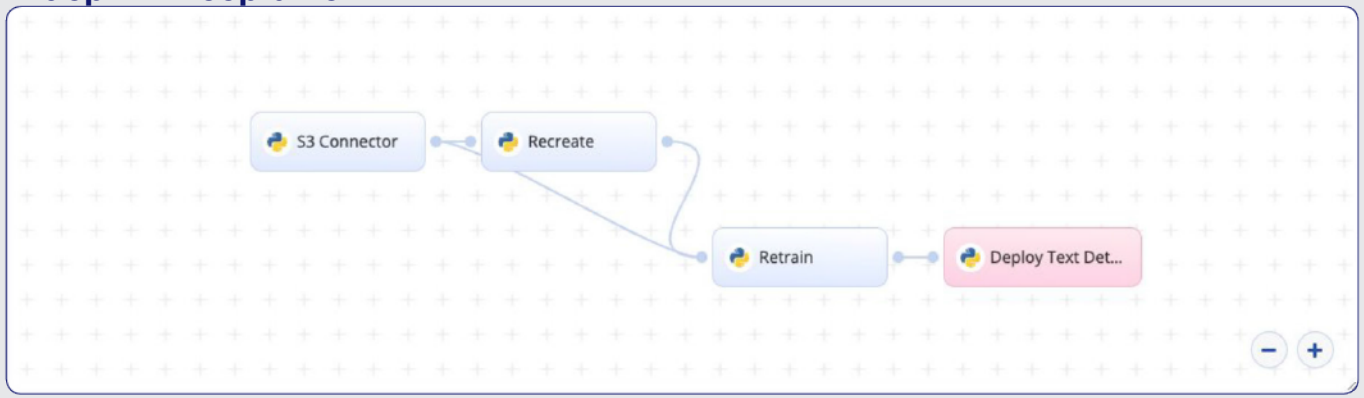
50.7 mAP_{COCO}

Data Format for Yolov5 (Input)

Outputs

```
| - images
    | - train
        | - img13.jpg
        | - img24.jpg
        | ..
    | - val
        | - img73.jpg
        | - img30.jpg
        | ..
    | - test
        | - img2.jpg
        | - img50.jpg
        | ..
| - labels
    | - train
        | - img13.txt
        | - img24.txt
        | ..
    | - val
        | - img73.txt
        | - img30.txt
        | ..
    | - test
        | - img2.txt
        | - img50.txt
        | ..
```

Blueprint Deep dive



Before we start building, any questions on OCR and Text Detection?

So What Are We Building?

Let’s build!

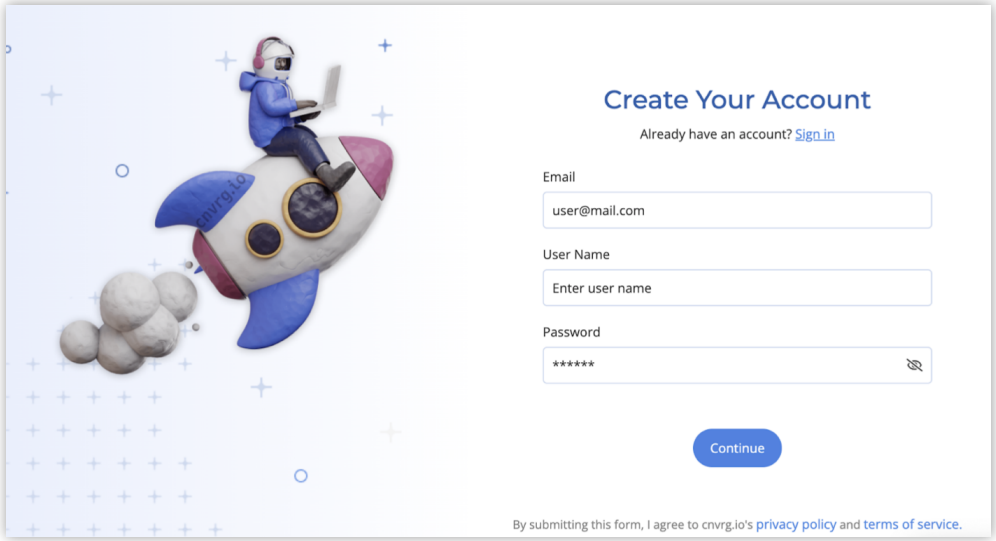
Summary

What we have seen:

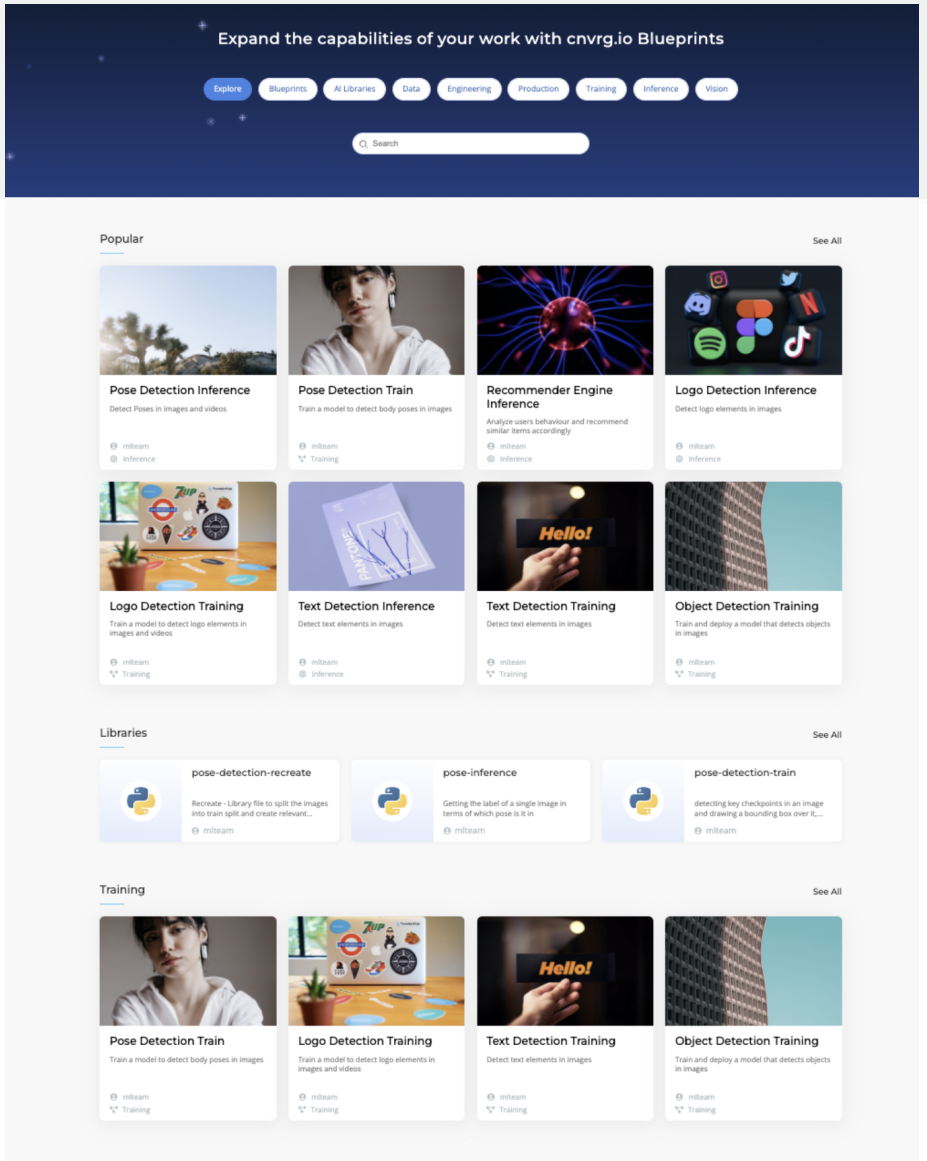
- Imported and used our own data
- Created and trained a text detection system
- Deployed the system for inference on Cnvrg
- Used the created Inference to give predictions

Next

[You are welcome to sign-up to Metacloud and recreate what you tried here as well as other blueprints]



https://metacloud.cloud.cnvrg.io/sign-up



Thank you

cnvrg.io