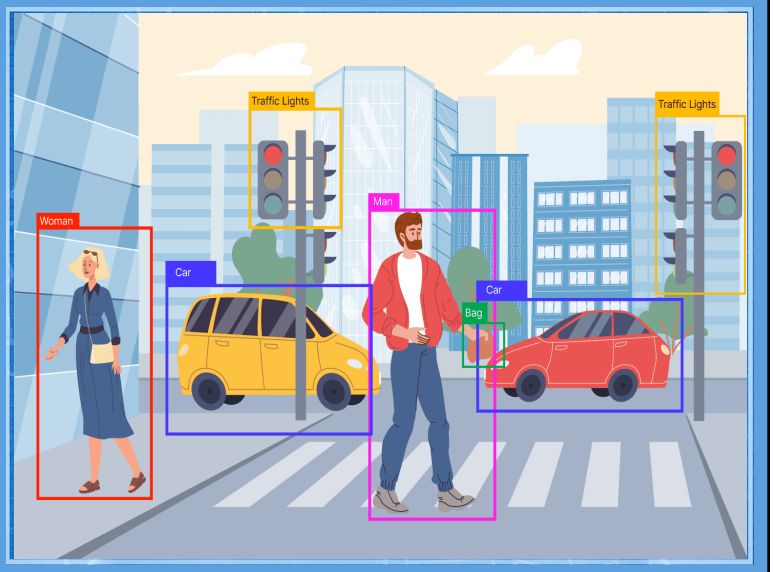
OCI Vision per trovare e tracciare oggetti in immagini e video

OCI Vision to Find and Track Objects in Images and Videos



Brendan Tierney

1

Brendan Tierney

- Working with Oracle DB
  - since version 5 (Yes, I'm Old)
- Data Warehousing
- Data Science
- Machine Learning
- Data Engineering
- AI
- Developer
- Author - 6 Books
- Data Science Book - Best Selling

Oracle ACE Director

2

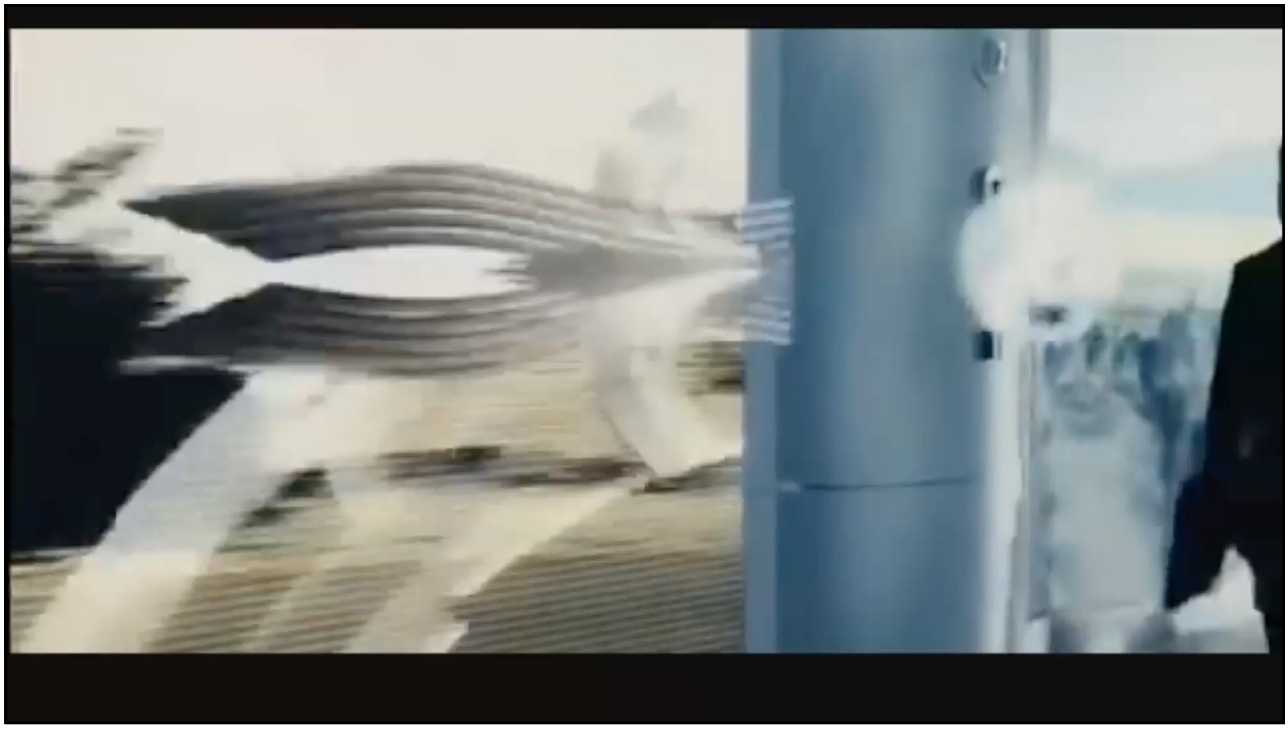
Paperback, E-book, Audio Book

English
Korean
Japanese
Chinese
Russian
Turkish
Croatian
Finnish
Spanish
Arabic

10 Languages

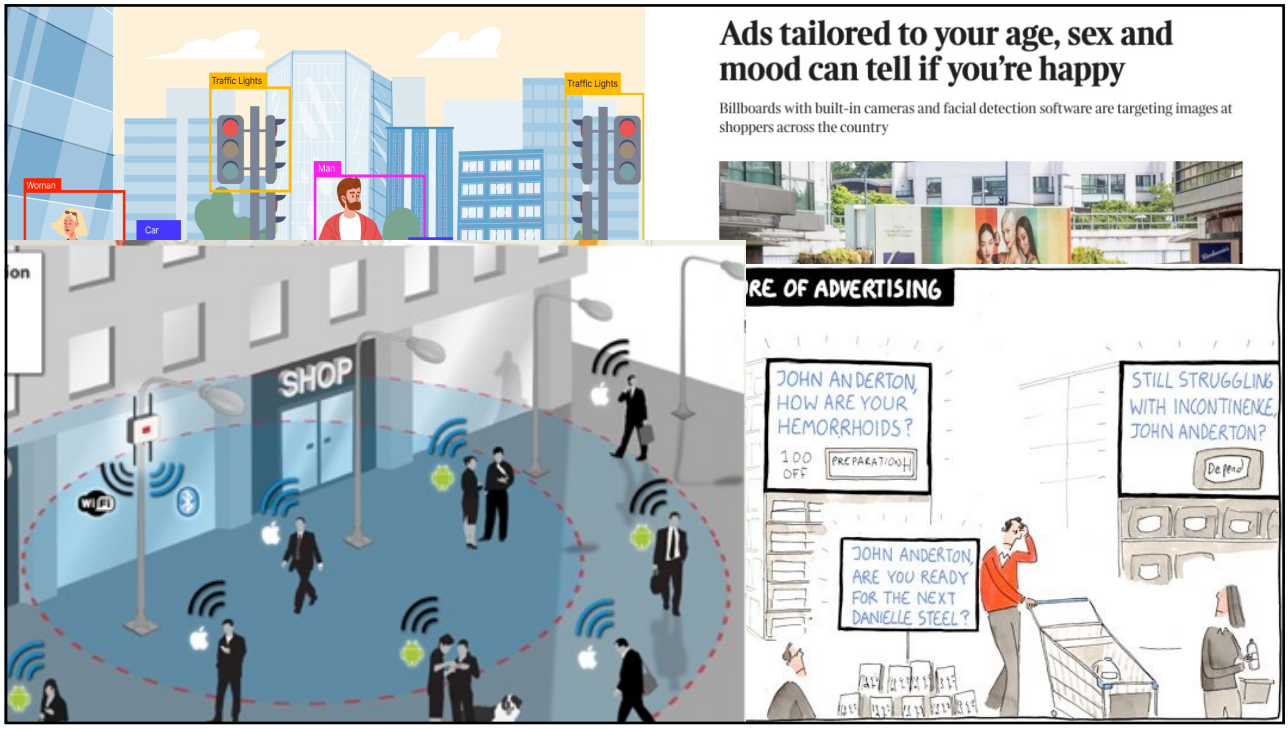
3

4



5

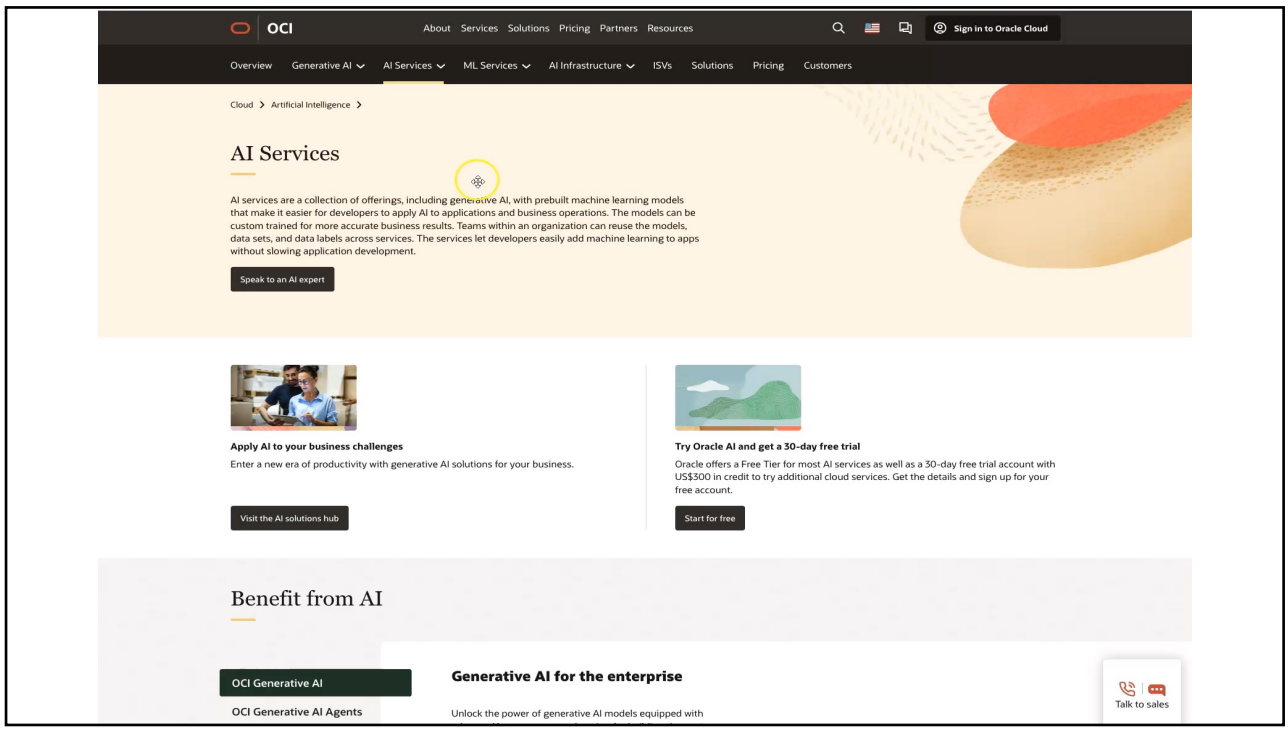
6


Traffic Lights
Traffic Lights
Woman
Man
Car
Ads tailored to your age, sex and mood can tell if you're happy
Billboards with built-in cameras and facial detection software are targeting images at shoppers across the country
SHOP
RE OF ADVERTISING
JOHN ANDERTON, HOW ARE YOUR HEMORRHOIDS?
100 OFF
PREPARATION H
STILL STRUGGLING WITH INCONTINENCE, JOHN ANDERTON?
Depend
JOHN ANDERTON, ARE YOU READY FOR THE NEXT DANIELLE STEEL?

7


HOW?
ORACLE AI
Take a look..

8


OCI
About Services Solutions Pricing Partners Resources
Sign in to Oracle Cloud
Overview Generative AI AI Services ML Services AI Infrastructure ISVs Solutions Pricing Customers
Cloud > Artificial Intelligence >
AI Services
AI services are a collection of offerings, including generative AI, with prebuilt machine learning models that make it easier for developers to apply AI to applications and business operations. The models can be custom trained for more accurate business results. Teams within an organization can reuse the models, data sets, and data labels across services. The services let developers easily add machine learning to apps without slowing application development.
Speak to an AI expert
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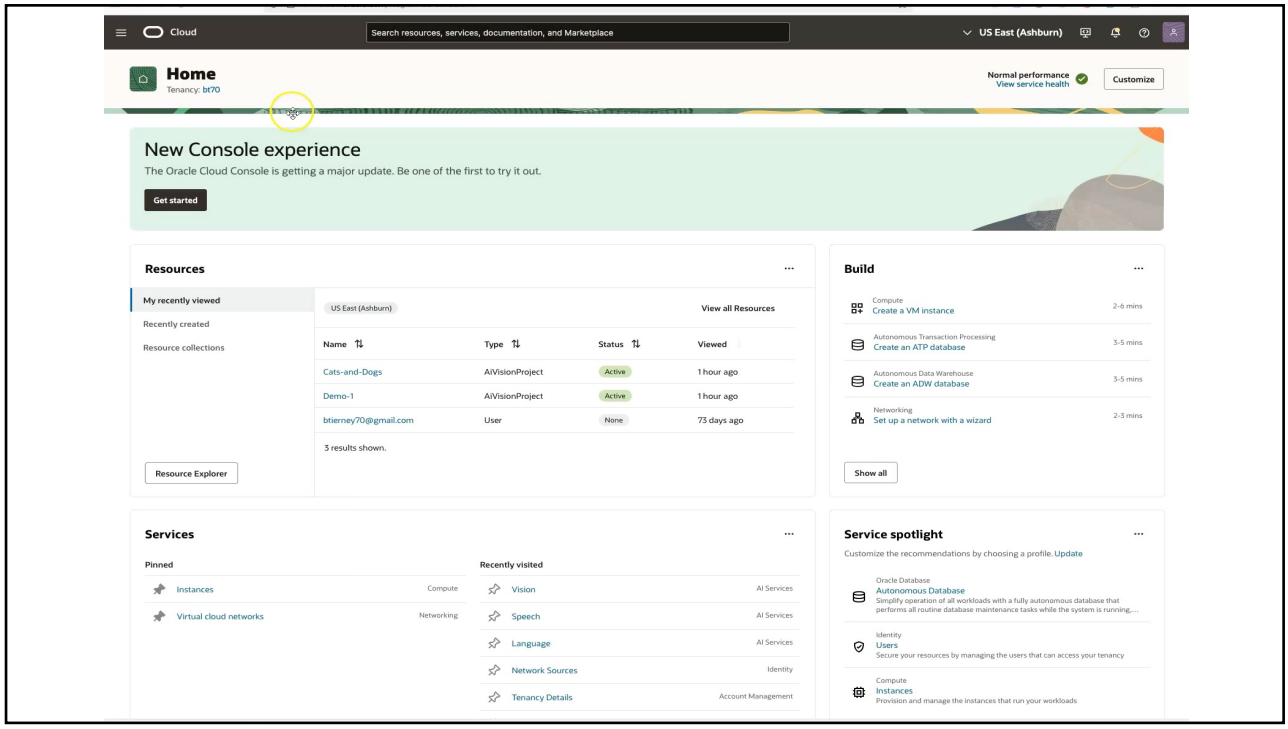
Start for free
Benefit from AI
OCI Generative AI
OCI Generative AI Agents
Generative AI for the enterprise
Unlock the power of generative AI models equipped with
Talk to sales

9


Cloud
Search resources, services, documentation, and Marketplace
US East (Ashburn)
Home
Tenancy: bt70
Normal performance
View service health
Customize
New Console experience
The Oracle Cloud Console is getting a major update. Be one of the first to try it out.
Get started
Resources
My recently viewed
Recently created
Resource collections
US East (Ashburn)
View all Resources
Name
Type
Status
Viewed
Cats-and-Dogs
AiVisionProject
Active
1 hour ago
Demo-1
AiVisionProject
Active
1 hour ago
btierney70@gmail.com
User
None
73 days ago
3 results shown.
Resource Explorer
Build
Compute
Create a VM instance
2-6 mins
Autonomous Transaction Processing
Create an ATP database
3-5 mins
Autonomous Data Warehouse
Create an ADW database
3-5 mins
Networking
Set up a network with a wizard
2-3 mins
Show all
Services
Pinned
Instances
Compute
Virtual cloud networks
Networking
Recently visited
Vision
AI Services
Speech
AI Services
Language
AI Services
Network Sources
Identity
Tenancy Details
Account Management
Service spotlight
Customize the recommendations by choosing a profile. Update
Oracle Database
Autonomous Database
Simplify operation of all workloads with a fully autonomous database that performs all routine database maintenance tasks while the system is running,...
Identity
Users
Secure your resources by managing the users that can access your tenancy
Compute
Instances
Provision and manage the instances that run your workloads

10


WOW!


BORING

11

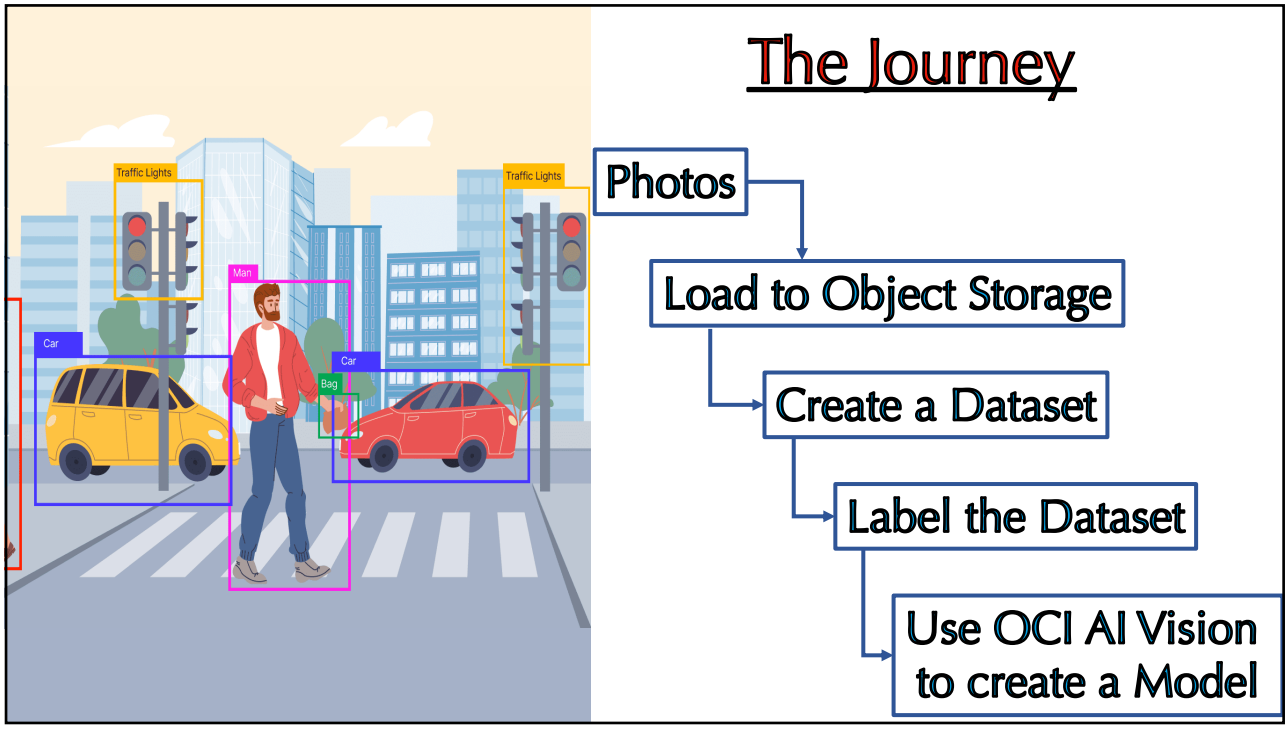

DINKY TOYS
139
DINKY TOYS
VANWALL RACING CAR
35
Vanwall


Claro
Mobil
ORACLE
RedBull
HONDA

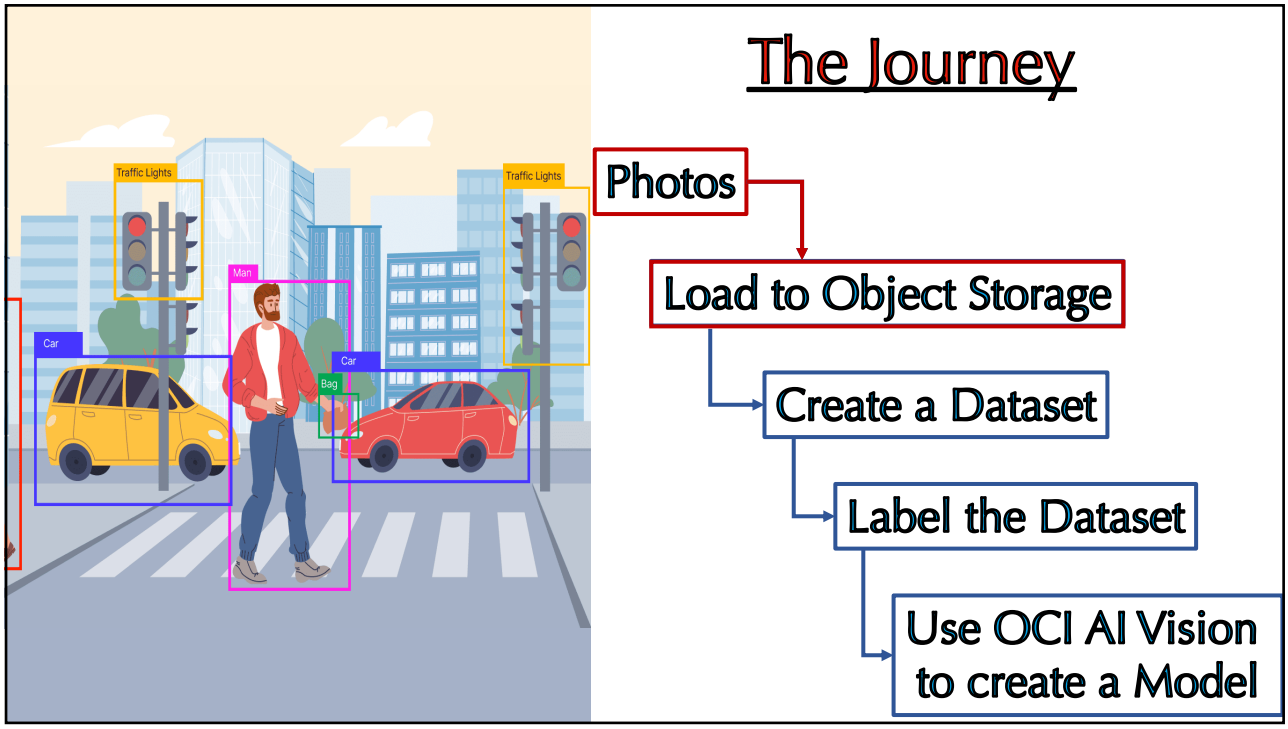
12

13

14


The Journey
Photos
Load to Object Storage
Create a Dataset
Label the Dataset
Use OCI AI Vision to create a Model
Traffic Lights
Traffic Lights
Man
Car
Car
Bag

15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Traffic Lights
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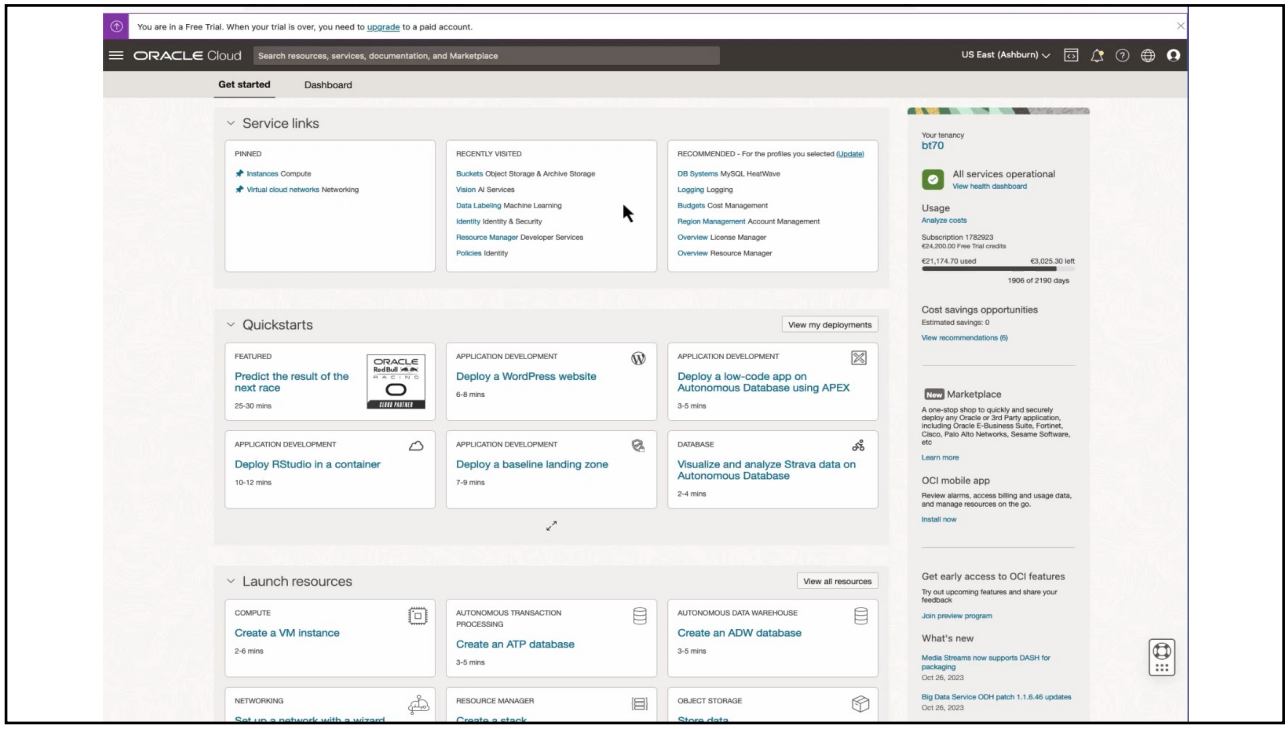
Car
Bag

16


You are in a Free Trial. When your trial is over, you need to upgrade to a paid account.
ORACLE Cloud
Search resources, services, documentation, and Marketplace
US East (Ashburn)
Get started
Dashboard
Service links
PINNED
Instances Compute
Virtual cloud networks Networking
RECENTLY VISITED
Buckets Object Storage & Archive Storage
Vision AI Services
Data Labeling Machine Learning
Identity Identity & Security
Resource Manager Developer Services
Policies Identity
RECOMMENDED - For the profiles you selected (Update)
DB Systems MySQL HeatWave
Logging Logging
Budgets Cost Management
Region Management Account Management
Overview License Manager
Overview Resource Manager
Quickstarts
View my deployments
FEATURED
Predict the result of the next race
25-30 mins
APPLICATION DEVELOPMENT
Deploy a WordPress website
6-8 mins
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2-4 mins
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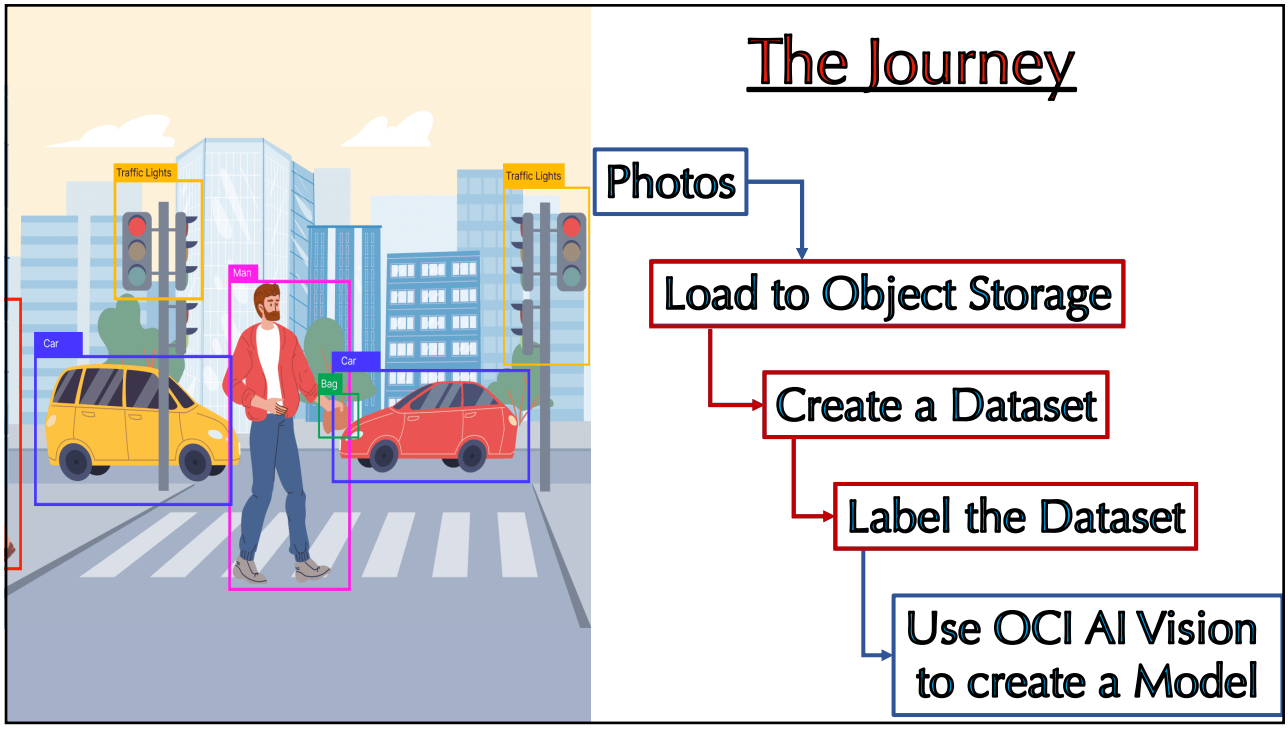
AUTONOMOUS DATA WAREHOUSE
Create an ADW database
3-5 mins
NETWORKING
RESOURCE MANAGER
OBJECT STORAGE
Your tenancy
bt70
All services operational
View health dashboard
Usage
Analyze costs
Cost savings opportunities
Estimated savings: 0
View recommendations (6)
New Marketplace
OCI mobile app
Install now
Get early access to OCI features
Join preview program
What's new

17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Photos
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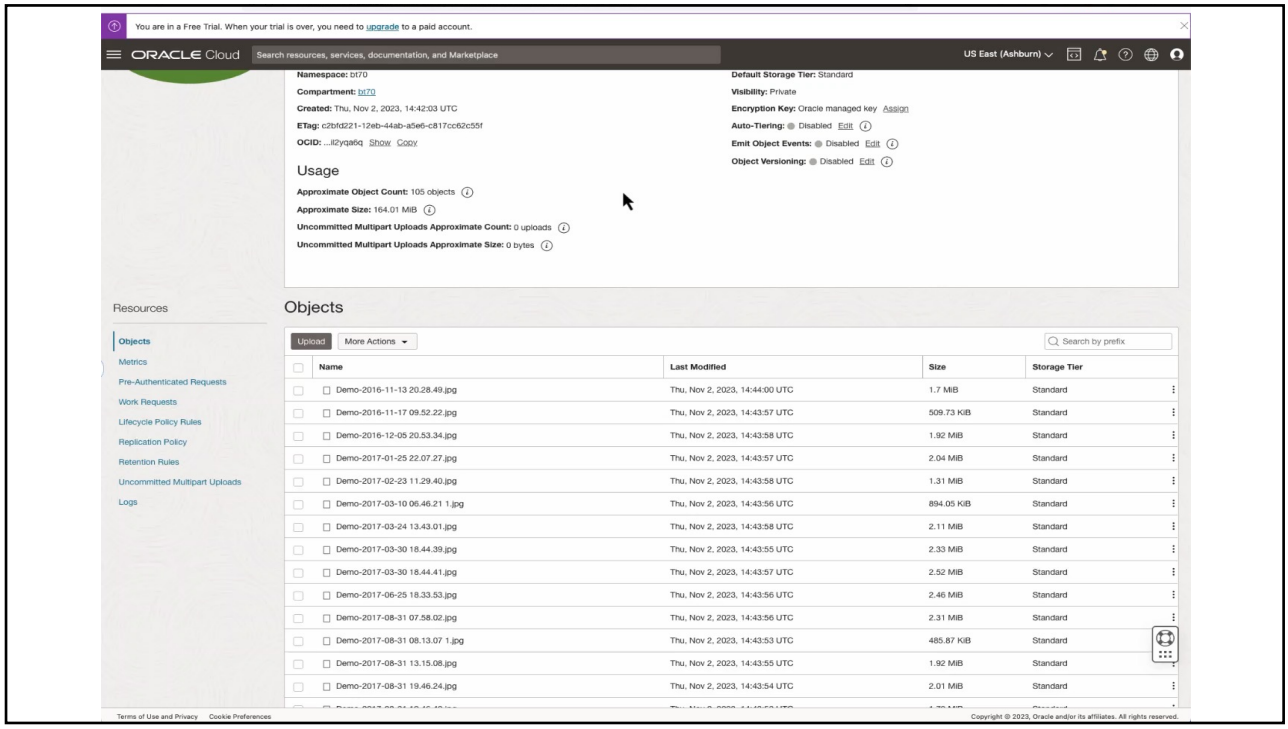
Traffic Lights
Traffic Lights
Man
Car
Car
Bag

18


You are in a Free Trial. When your trial is over, you need to upgrade to a paid account.
ORACLE Cloud
Search resources, services, documentation, and Marketplace
US East (Ashburn)
Namespace: bf70
Compartment: bf70
Created: Thu, Nov 2, 2023, 14:42:03 UTC
ETag: c2bfd221-12eb-44ab-a5e6-c817cc62c55f
OCID: ...il2yqa6q Show Copy
Default Storage Tier: Standard
Visibility: Private
Encryption Key: Oracle managed key Assign
Auto-Tiering: Disabled Edit
Emit Object Events: Disabled Edit
Object Versioning: Disabled Edit
Usage
Approximate Object Count: 105 objects
Approximate Size: 164.01 MiB
Uncommitted Multipart Uploads Approximate Count: 0 uploads
Uncommitted Multipart Uploads Approximate Size: 0 bytes
Resources
Objects
Metrics
Pre-Authenticated Requests
Work Requests
Lifecycle Policy Rules
Replication Policy
Retention Rules
Uncommitted Multipart Uploads
Logs
Objects
Upload
More Actions
Search by prefix
Name
Last Modified
Size
Storage Tier
Demo-2016-11-13 20.28.49.jpg Thu, Nov 2, 2023, 14:44:00 UTC 1.7 MiB Standard
Demo-2016-11-17 09.52.22.jpg Thu, Nov 2, 2023, 14:43:57 UTC 509.73 KiB Standard
Demo-2016-12-05 20.53.34.jpg Thu, Nov 2, 2023, 14:43:58 UTC 1.92 MiB Standard
Demo-2017-01-25 22.07.27.jpg Thu, Nov 2, 2023, 14:43:57 UTC 2.04 MiB Standard
Demo-2017-02-23 11.29.40.jpg Thu, Nov 2, 2023, 14:43:58 UTC 1.31 MiB Standard
Demo-2017-03-10 06.46.21 1.jpg Thu, Nov 2, 2023, 14:43:56 UTC 894.05 KiB Standard
Demo-2017-03-24 13.43.01.jpg Thu, Nov 2, 2023, 14:43:58 UTC 2.11 MiB Standard
Demo-2017-03-30 18.44.39.jpg Thu, Nov 2, 2023, 14:43:55 UTC 2.33 MiB Standard
Demo-2017-03-30 18.44.41.jpg Thu, Nov 2, 2023, 14:43:57 UTC 2.52 MiB Standard
Demo-2017-06-25 18.33.53.jpg Thu, Nov 2, 2023, 14:43:56 UTC 2.46 MiB Standard
Demo-2017-08-31 07.58.02.jpg Thu, Nov 2, 2023, 14:43:56 UTC 2.31 MiB Standard
Demo-2017-08-31 08.13.07 1.jpg Thu, Nov 2, 2023, 14:43:53 UTC 485.87 KiB Standard
Demo-2017-08-31 13.15.08.jpg Thu, Nov 2, 2023, 14:43:55 UTC 1.92 MiB Standard
Demo-2017-08-31 19.46.24.jpg Thu, Nov 2, 2023, 14:43:54 UTC 2.01 MiB Standard
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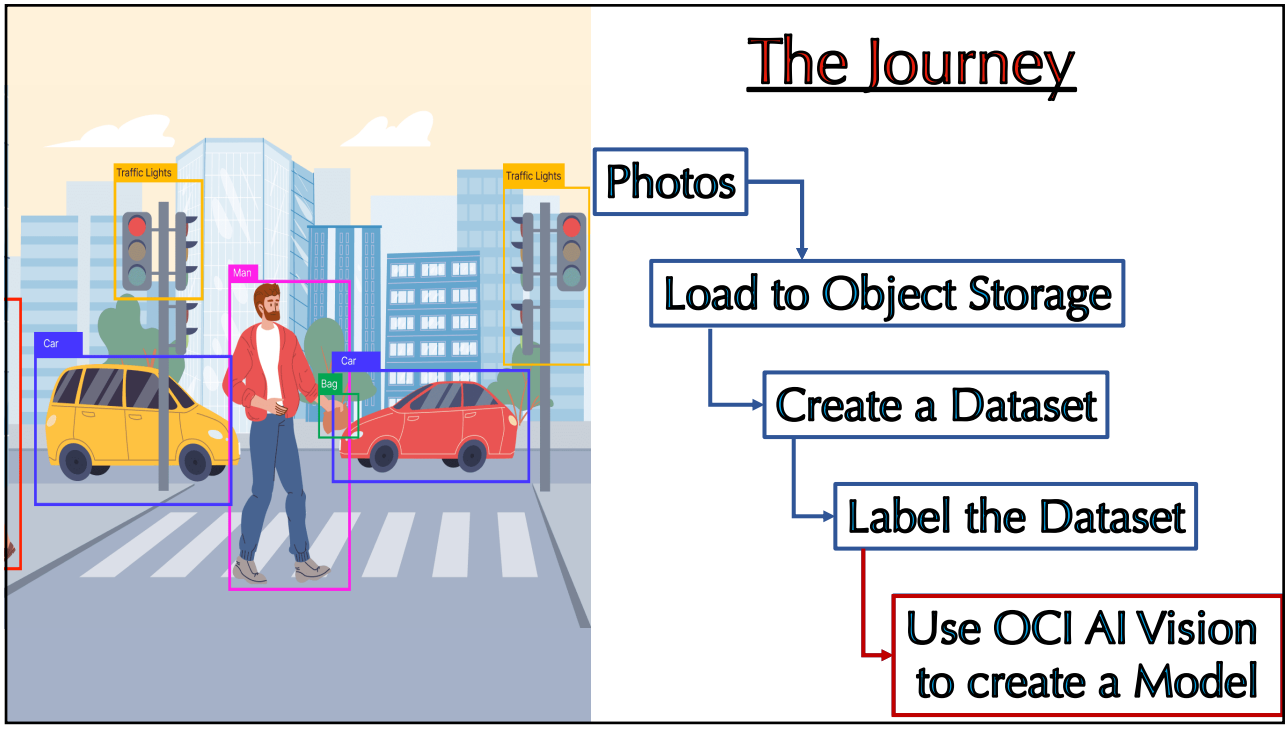
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Traffic Lights
Traffic Lights
Man
Car
Car
Bag
Photos
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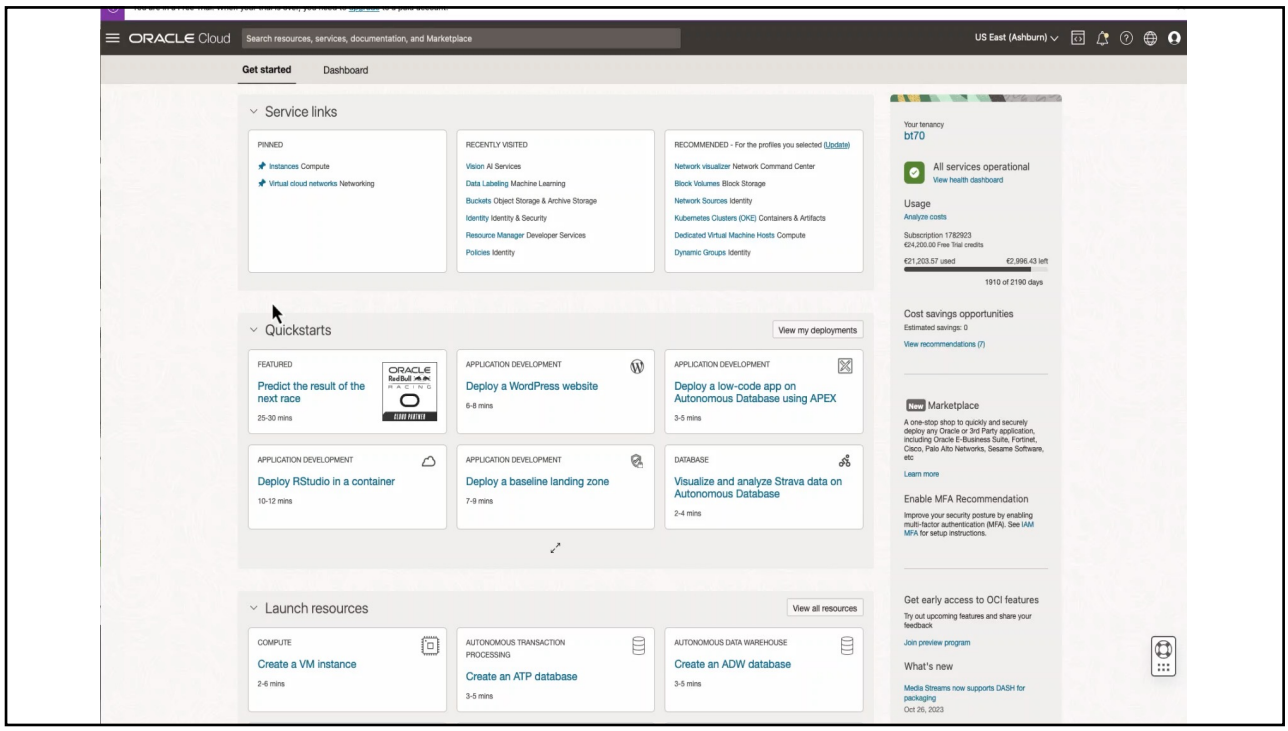
Label the Dataset
Use OCI AI Vision to create a Model

20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Network visualizer Network Command Center
Block Volumes Block Storage
Network Sources Identity
Kubernetes Clusters (OKE) Containers & Artifacts
Dedicated Virtual Machine Hosts Compute
Dynamic Groups Identity
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Enable MFA Recommendation
Get early access to OCI features
Join preview program
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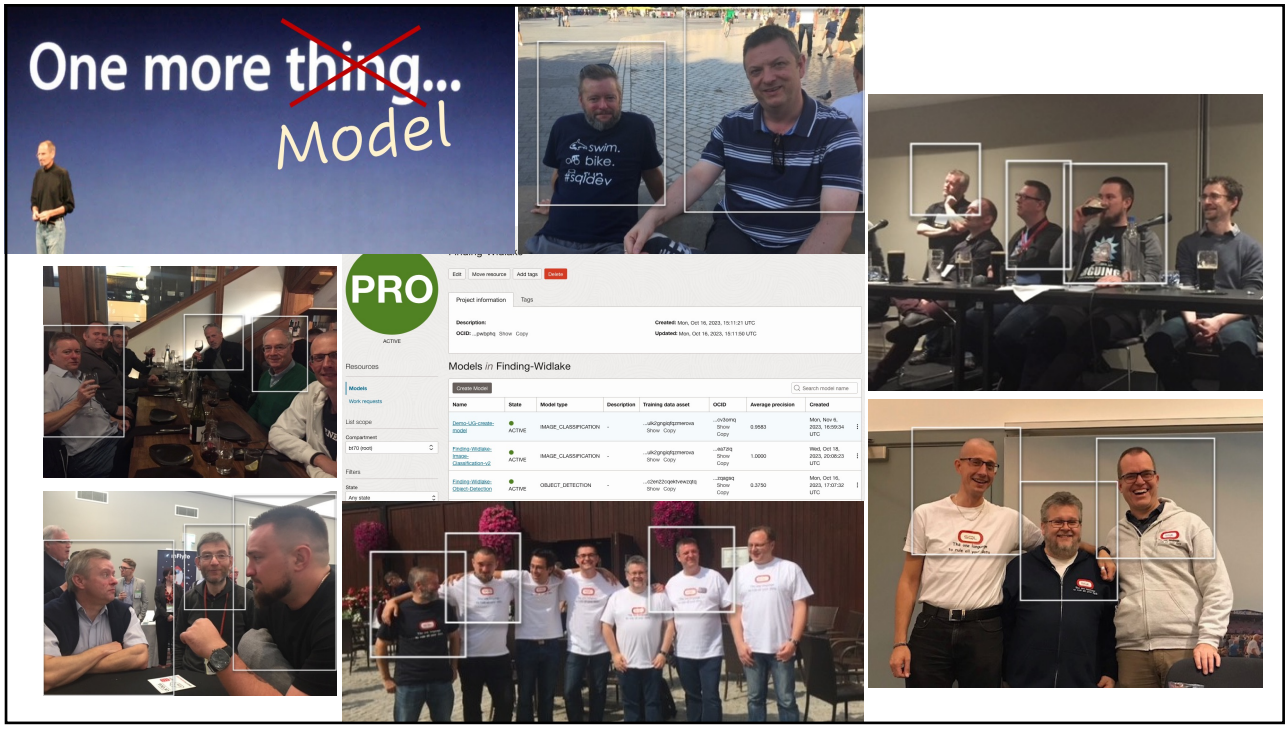
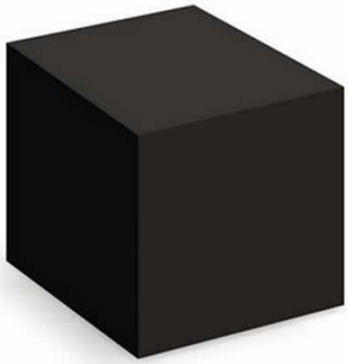
21


One more thing...
Model
swim.
bike.
#sqldev
PRO
ACTIVE
Models in Finding-Widlake

22

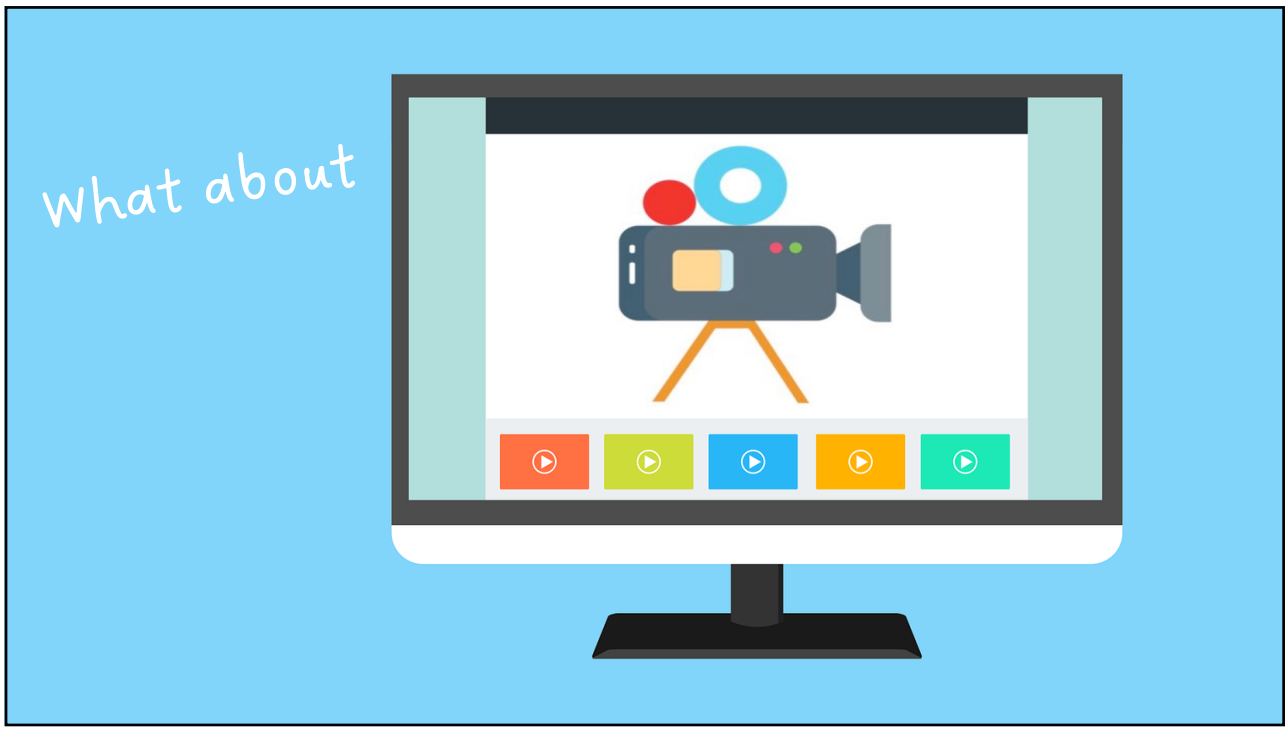



The Good Enough Shop
THE PERFECT SHOP
OPEN
Opening soon!
Maybe
Closed

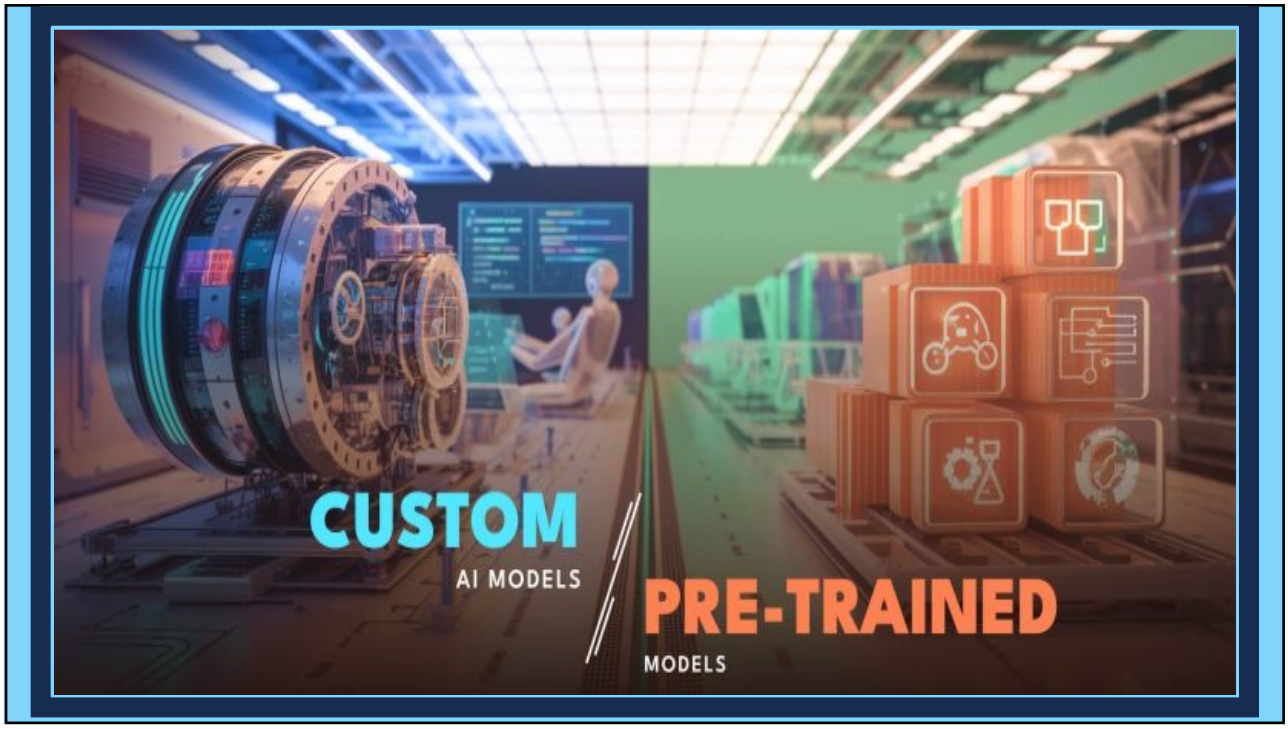

12
11
10
9
8
7
6

23

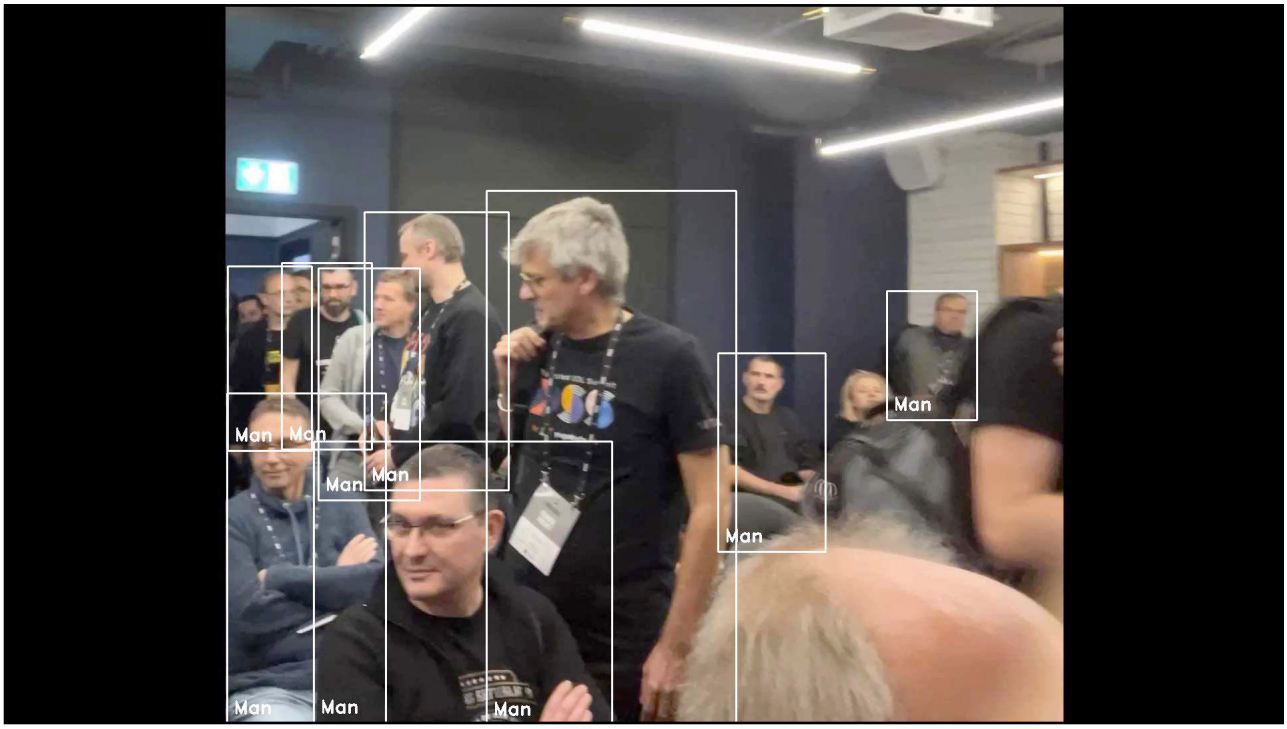
24



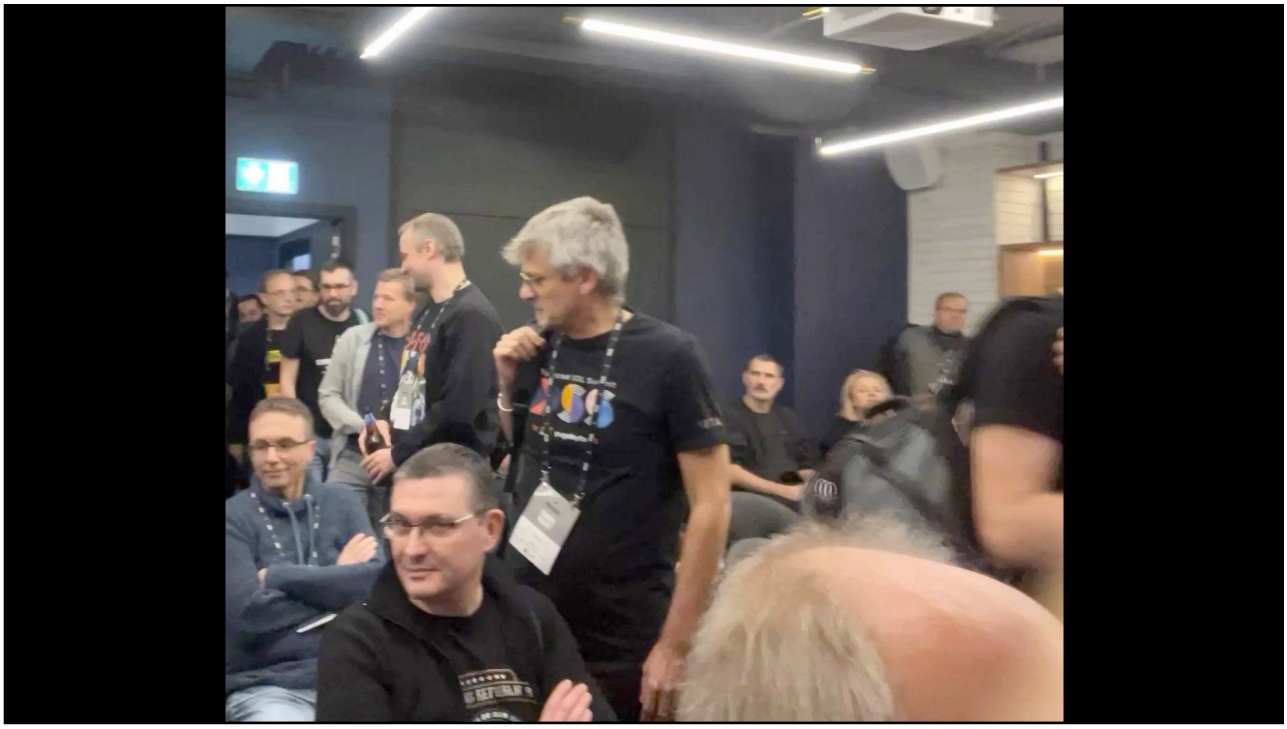
25



26



27



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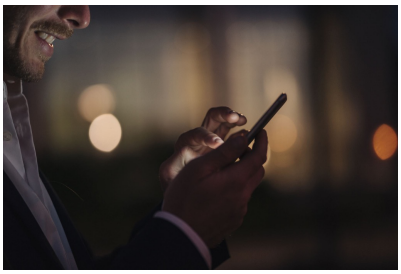
29

Any connected camera



30

REAL-TIME

Challenges / Compromises

Video has 25 – 30 frames per second

Processing time consuming

FPS

Reduce frame rate

Reduce image size

Reapply results to many frames?

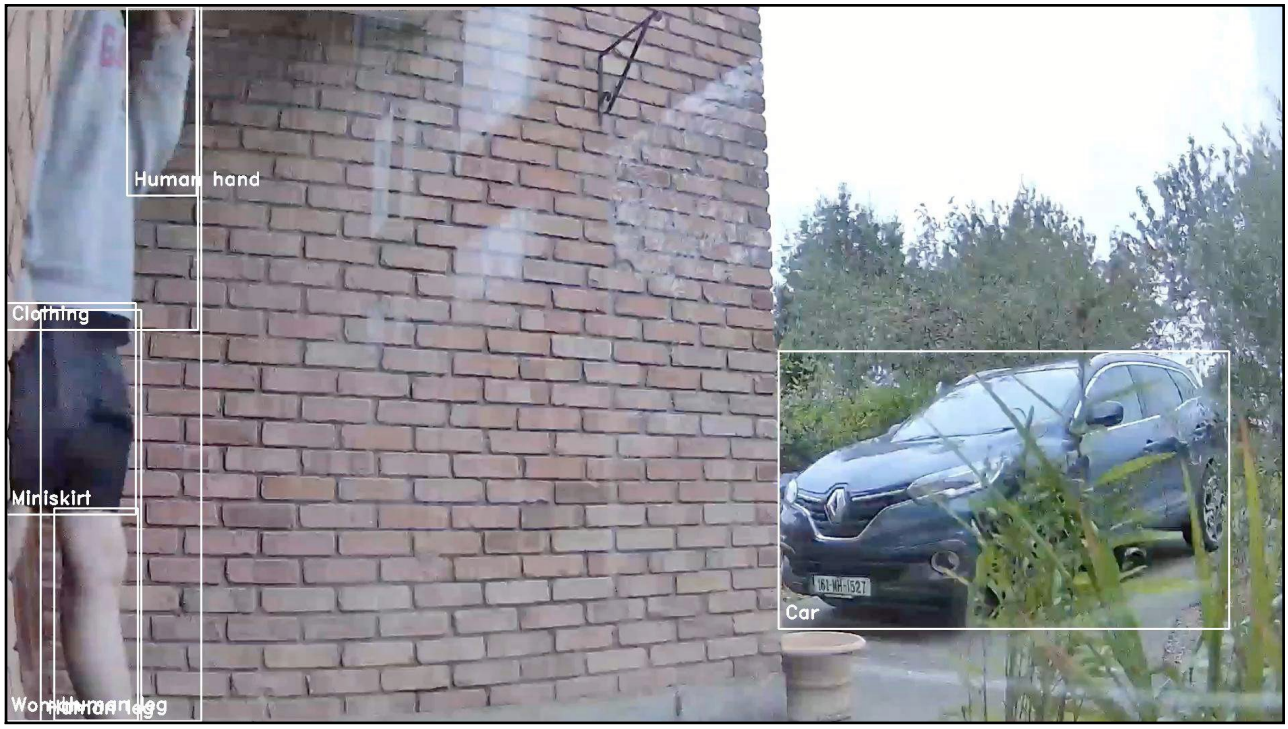
Parallel Processing

Filtering based on Object Detected

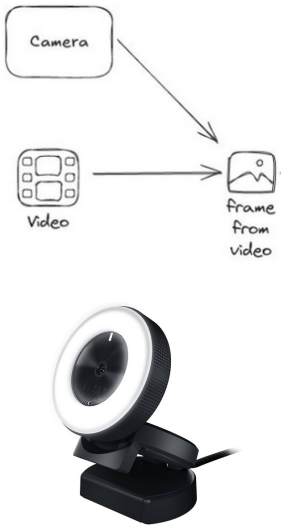
Filtering based on Probability score

Be care which Data Centre you use [Ashburn vs Frankfurt]

31

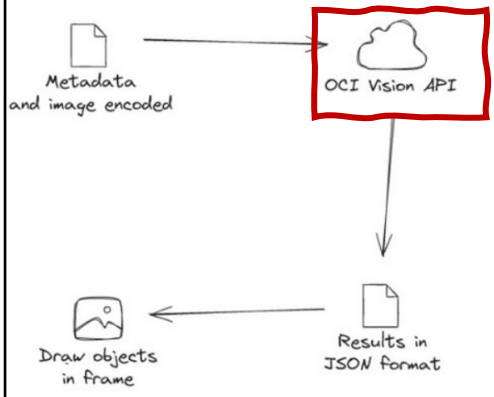


32




```
from cv2 import VideoCapture, imshow, waitKey, destroyAllWindows
import matplotlib.pyplot

# Create video capture object
print("Connecting to webcam")
capture = VideoCapture(1) # 0 for built-in camera

# Check that a camera connection has been established
if not capture.isOpened():
    print("Error establishing connection")
else:
    print("Connected to webcam")

while capture.isOpened():
    # Read an image frame
    ret, frame = capture.read()
    print("Reading frame")

    # If an image frame has been grabbed, display it
    print("..Preparing to display image")
    if ret:
        imshow('Displaying image frames from a webcam', frame)
    else:
        print("......Cannot display image")

    print("...Image displayed?")

    if waitKey(1) in[27, ord('q'), ord('Q')]:
        break


    break

# Release the video capture and close the display window
capture.release()
destroyAllWindows()
```

33




```
##########################################################################################################
# OCI Visions to analyze image
##########################################################################################################
def analyse_image_objectD(img):
    random_number = random.randint(0, 500000)

    #### Initialise the OCI AI Vision Client ####
    config = oci.config.from_file()
    ai_service_vision_client = AIServiceVisionClient(config=config)

    #### My Compartment ID ####
    COMPARTMENT_ID = "ocid1.tenancy.oc1..aaaaaaaaop3yssfqnytz5uhc353cmel22duc4xn2lnxdr4f4azmi2fq
    # Vision Service endpoint - I'm in Ashburn data centre
    ENDPOINT = "https://vision.aiservice.us-ashburn-1.oci.oraclecloud.com"

    ### Models ###
    #OCI Vision general purpose mode
    MODEL_ID = ""
    ####################

    #Call model, passing image -> get response
    analyze_image_response = ai_service_vision_client.analyze_image(
        analyze_image_details=oci.ai_vision.models.AnalyzeImageDetails(
            features=[
                oci.ai_vision.models.ImageClassificationFeature(
                    feature_type="OBJECT_DETECTION",
                    max_results=13,
                    model_id=MODEL_ID
                )],
            image=img,
            compartment_id=COMPARTMENT_ID),
        opc_request_id="vision-ai-test-nacho-{}".format(random_number))

    # list of responses
    jdata = json.loads(str(analyze_image_response.data))
     objects = jdata['image_objects'] # list() type

    return objects
```

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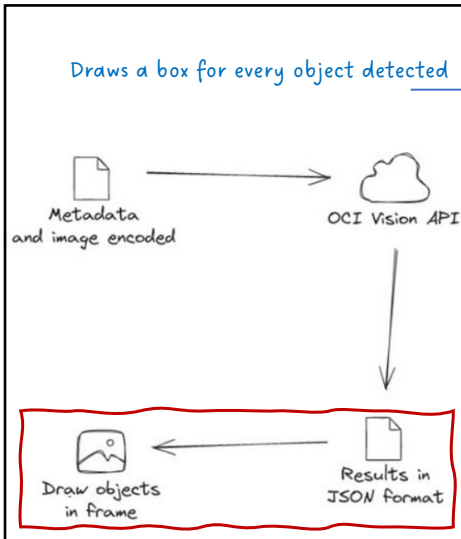


```
##################################################################################################
# Draws the box around objects  / recognize their types  / send notifications
##################################################################################################
def draw_object_info(image_objects, img):
    if image_objects:
        for image_object in image_objects:
            if image_object["confidence"]>0.25:
                width = img.shape[1]
                height = img.shape[0]
                vertices = image_object["bounding_polygon"]["normalized_vertices"]
                vertex_x = vertices[0]['x'] * width
                vertex_y = vertices[0]['y'] * height
                box_width = (vertices[2]['x'] - vertices[0]['x']) * width
                box_height = (vertices[2]['y'] - vertices[0]['y']) * height
                start_point = (int(vertex_x), int(vertex_y + box_height))
                end_point = (int(vertex_x + box_width), int(vertex_y))
                color = (255, 255, 255)
                thickness = 2
                font_scale = 0.9   #1.25
                font_thickness = 2   # 3
                which_font = cv2.FONT_HERSHEY_DUPLEX
                cv2.rectangle(img, start_point, end_point, color, thickness)
                cv2.putText(img, image_object["name"], (int(vertex_x + 10), int(vertex_y + box_heigh

    return img

##################################################################################################
# OCI Label individual Frames #####
##################################################################################################
def label_images(vFrame):
    #### Read in files and prepare them ####
    img_file = source_dir+vFrame
    im = cv2.imread(img_file, cv2.IMREAD_ANYCOLOR)

    with open(img_file, "rb") as image_file:
        encoded_string = base64.b64encode(image_file.read())

    image_data = base64.b64decode(encoded_string)
    image = Image.open(io.BytesIO(image_data))

    #### prepare image for transfer ####
    image_details = InlineImageDetails()
    image_details.data = encoded_string.decode('utf-8')
    ####################

    #### Use Model to label objects in image ####
    objects = analyse_image_objectD(image_details)
    draw_result = draw_object_info(objects, im)
    ####################
    return draw_result, objects
```

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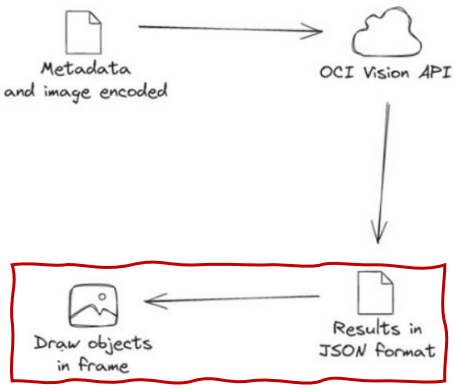


```
##################################################################################################
# Draws the box around objects  / recognize their types  / send notifications
##################################################################################################
def draw_object_info(image_objects, img):
    obj_list = ['Man', 'Woman', 'Person', 'Child' ]
    if image_objects:
        for image_object in image_objects:
            if image_object["confidence"]>0.4:
                width = img.shape[1]
                height = img.shape[0]
                vertices = image_object["bounding_polygon"]["normalized_vertices"]
                vertex_x = vertices[0]['x'] * width
                vertex_y = vertices[0]['y'] * height
                box_width = (vertices[2]['x'] - vertices[0]['x']) * width
                box_height = (vertices[2]['y'] - vertices[0]['y']) * height
                start_point = (int(vertex_x), int(vertex_y + box_height))
                end_point = (int(vertex_x + box_width), int(vertex_y))
                color = (255, 255, 255)
                thickness = 2
                font_scale = 0.9   #1.25
                font_thickness = 2   # 3
                which_font = cv2.FONT_HERSHEY_DUPLEX
                cv2.rectangle(img, start_point, end_point, color, thickness)
                cv2.putText(img, image_object["name"], (int(vertex_x + 10), int(vertex_y + box_height - 15)), wh
font_thickness, 2)

    return img

##################################################################################################
# OCI Label individual Frames #####
##################################################################################################
def label_images(vFrame):
    start_time = time.time()

    #### Read in files and prepare them ####
    img_file = source_dir+vFrame
    im = cv2.imread(img_file, cv2.IMREAD_ANYCOLOR)

    with open(img_file, "rb") as image_file:
        encoded_string = base64.b64encode(image_file.read())

    image_data = base64.b64decode(encoded_string)
    image = Image.open(io.BytesIO(image_data))

    #### prepare image for transfer ####
    image_details = InlineImageDetails()
    image_details.data = encoded_string.decode('utf-8')
    ####################
```

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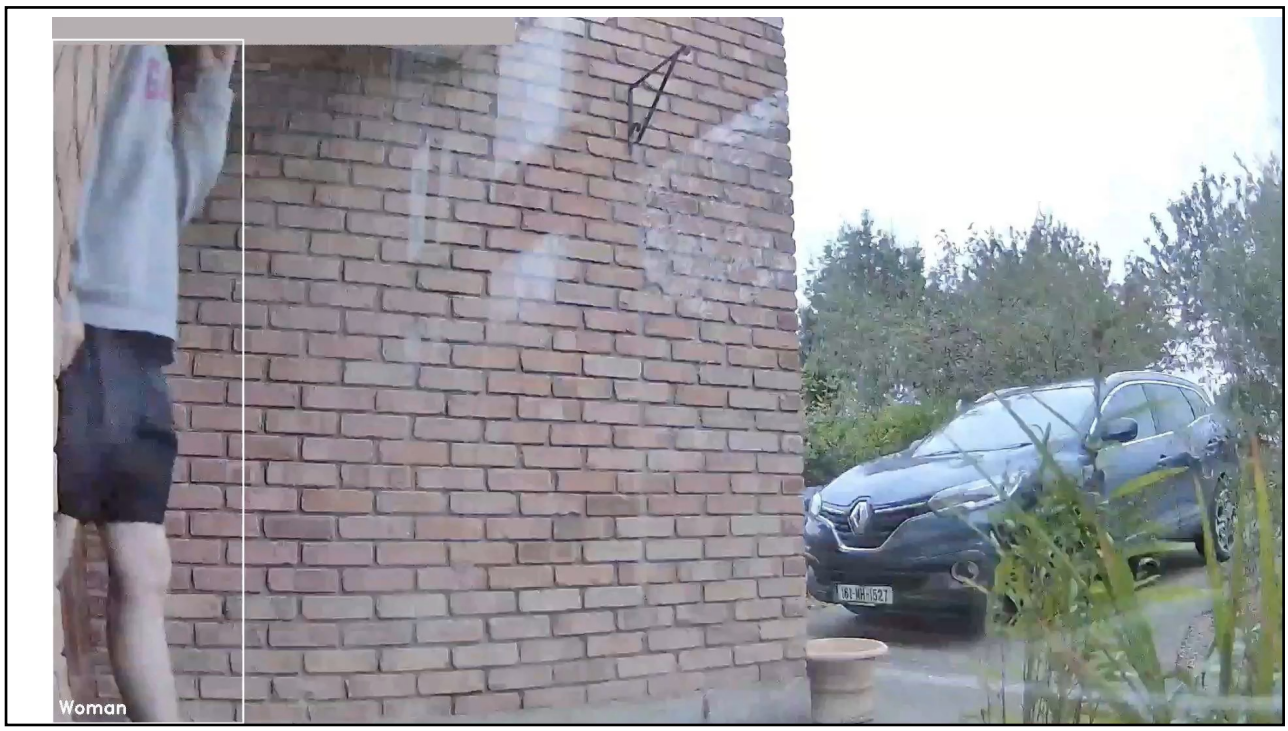
Woman

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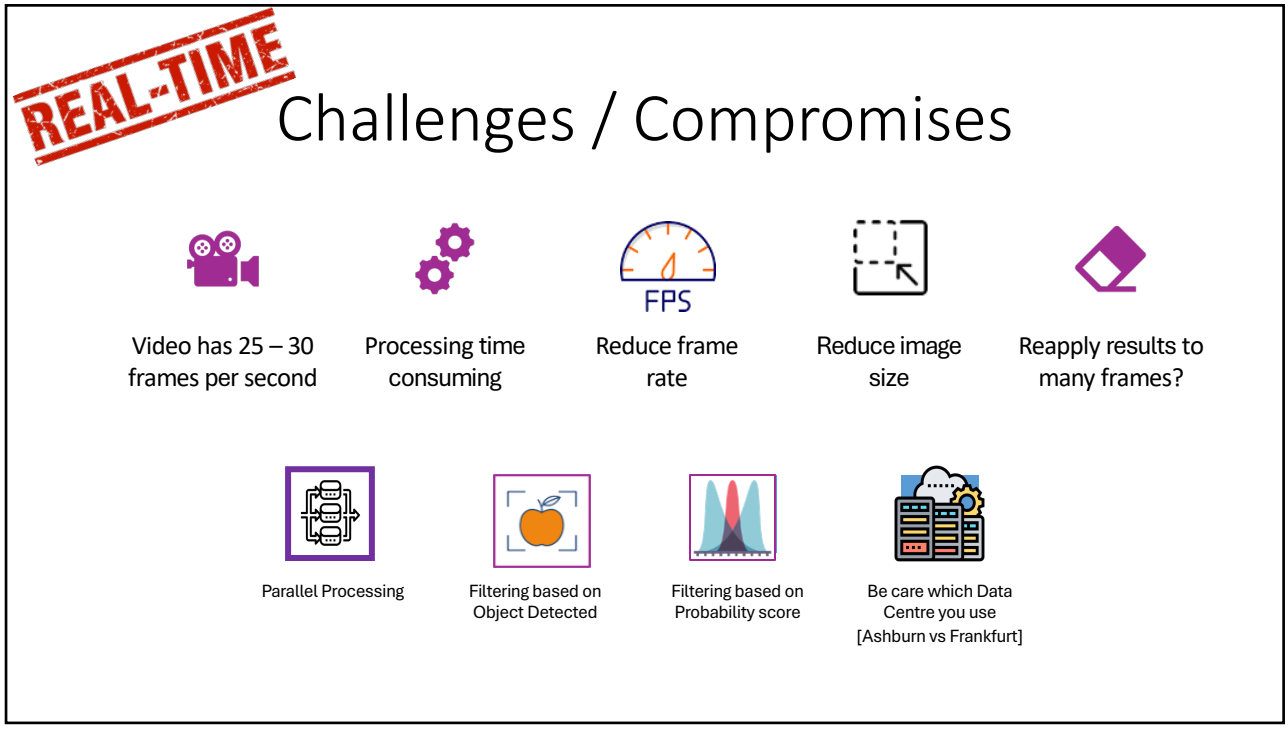
REAL-TIME
Challenges / Compromises
Video has 25 – 30 frames per second
Processing time consuming
FPS
Reduce frame rate
Reduce image size
Reapply results to many frames?
Parallel Processing
Filtering based on Object Detected
Filtering based on Probability score
Be care which Data Centre you use [Ashburn vs Frankfurt]

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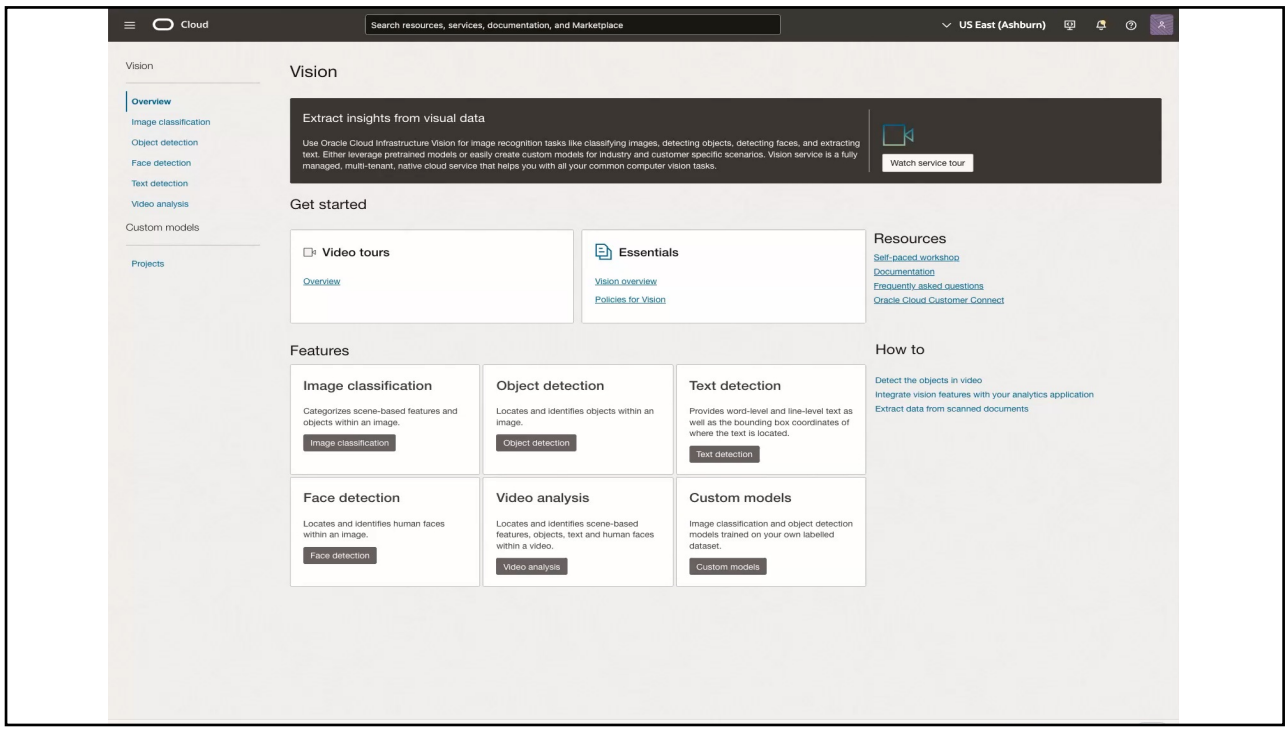
Cloud
Search resources, services, documentation, and Marketplace
US East (Ashburn)
Vision
Overview
Image classification
Object detection
Face detection
Text detection
Video analysis
Custom models
Projects
Vision
Extract insights from visual data
Use Oracle Cloud Infrastructure Vision for image recognition tasks like classifying images, detecting objects, detecting faces, and extracting text. Either leverage pretrained models or easily create custom models for industry and customer specific scenarios. Vision service is a fully managed, multi-tenant, native cloud service that helps you with all your common computer vision tasks.
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Get started
Video tours
Overview
Essentials
Vision overview
Policies for Vision
Resources
Self-paced workshop
Documentation
Frequently asked questions
Oracle Cloud Customer Connect
Features
How to
Image classification
Categorizes scene-based features and objects within an image.
Image classification
Object detection
Locates and identifies objects within an image.
Object detection
Text detection
Provides word-level and line-level text as well as the bounding box coordinates of where the text is located.
Text detection
Face detection
Locates and identifies human faces within an image.
Face detection
Video analysis
Locates and identifies scene-based features, objects, text and human faces within a video.
Video analysis
Custom models
Image classification and object detection models trained on your own labelled dataset.
Custom models
Detect the objects in video
Integrate vision features with your analytics application
Extract data from scanned documents

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