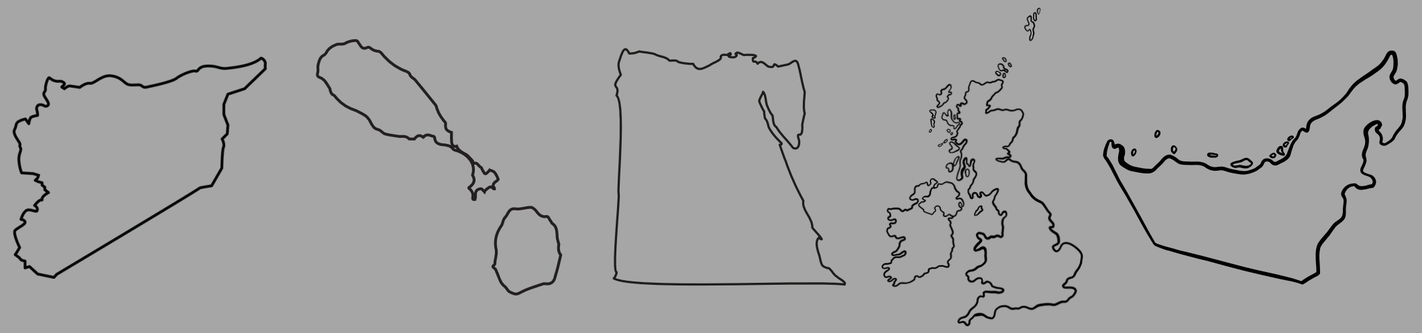
The YOLO WorkShop Space Theme

an intoruction toUltralytics and the YOLO models

Hamze Housam

About Me

originally: from Syria
second nationality: Saint Kitts and Nevis



Lived in:
Syria (11 years), Egypt (9 years)
UK (4 years), UAE (1 year - present)

Work experience:
Embedded system and Machine learning engineer
Vee tech, Egypt, (9 month)
Teaching Assistant
Heriot-Watt University, UAE, (Present)

OUR CLIENTS

Veetech
EMAAR
HASSAN ALLAM HOLDING

Education:
BEng Computer Systems Engineering (Hons), UOE, UK
MSc Robotics, HWU, UAE

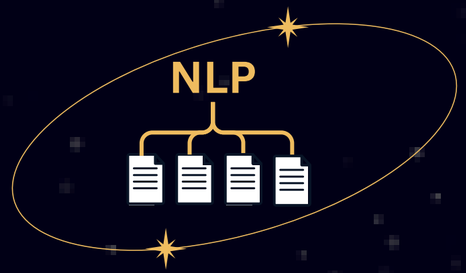
University of Essex
HERIOT WATT UNIVERSITY

Galaxies

COMPUTER VISION (CV)

ANALYZING IMAGES AND VIDEOS

NATUERAL LANGUAGE PROCESSING (NLP)



PROCESS LANGUAGE

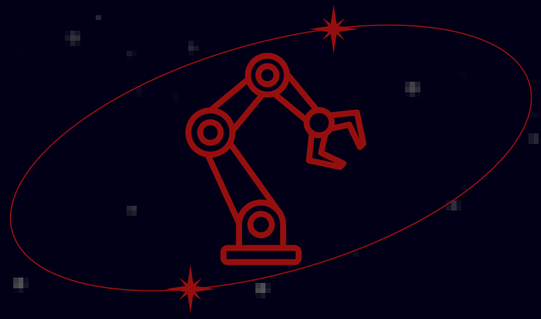
MACHINE LEARNING (ML)

TEACH COMPUTERS TO LEARN

DEEP LEARNING

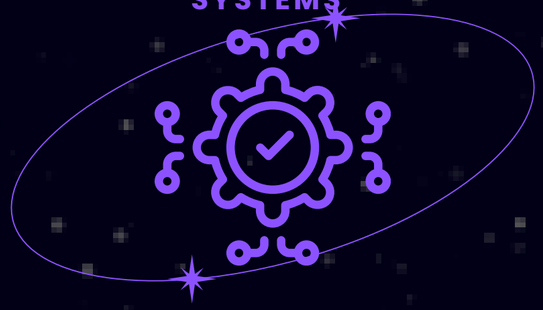
ANALYZES DATA WITH LAYERED NETWORKS

ROBOTICS



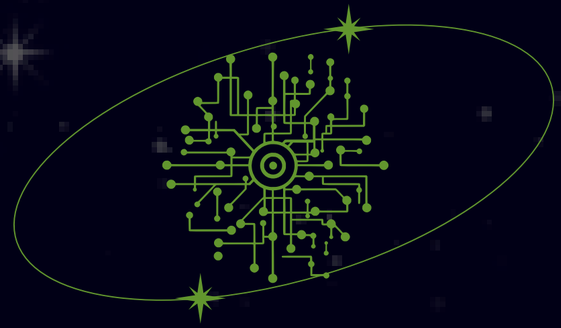
ROBOTS TO PERFORM PHYSICAL ACTIONS

EXPERT SYSTEMS



SPECIALIZED KNOWLEDGE FOR DECISIONS

FUZZY LOGIC



MANAGES UNCERTAINTY IN DECISION-MAKING

SUNS & STARS

GENRATIVE AI

LARGE LANGUAGE MODELS (LLMS)

GENERATIVE ADVERSARIAL NETWORKS (GANS)

VISUAL LANGUAGE MODELS (VLMS)

AUDIO PROCESSING

VOICE SYNTHESIS

AUDIO CLASSIFICATION

AUTOMATIC SPEECH RECOGNITION

REINFORCEMENT LEARNING

AUTONOMOUS VEHICLE NAVIGATION

CREATING GAME AGENTS

SIM-TO-REAL ROBOTIC TRANSFER LEARNING

AGENTIC ML

LLM AGENTS

NETWORK SECURITY AGENTS

MULTI-AGENT SYSTEMS

NEBULAS🌌

XENOLINGUISTICS ??

ARTIFICIAL LIFE ??

SUPER INTELLIGENCE ??

GENERAL INTELLIGENCE ??

TOPOLOGICAL ??

QUANTUM INTELLIGENCE ??

EVOLUTIONARY ??

COGNITIVE ???

ORGANOID INTELLIGENCE ??

BIOACOUSTICS ??

Hands on activity

Start Training Object Detection model in 10 minutes:

Use Roboflow Universe to Search for Dataset

Work on Google Colab to deploy the model and retrieve data without downloading.

Ultralytics on colab and train with YOLOV8

Hands on activity

Task1 find the dataset:

option 1 Use the same dataset

option 2 (recommended) Browse a desired dataset for your own unique detection model

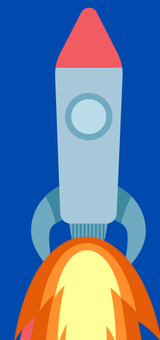
Creating a roboflow is required for this option

Task2 colab script:

use the command to load the dataset and start

training the model per steps shown previously

Stand by, we are preparing for launch! .....



Hands on activity

Trainining Demo:

I will show the required steps to retrive dataset and start training on collab.
Please follow along first and later will help anyone who needs support.

We've got lift-off!.....

while we wait for touchdown, let's uncover the wonders of space

Bonus: Space Inspires💡

In this bonus section, we will visualize four different optimization algorithms on four benchmark functions. This part of the field is known as Physics-Inspired Computation; however, we are focused on a space-themed.

1: ALGORITHM: [BLACK HOLE OPTMIZATION]
FUNCTION: [ACKLEY FUNCTION]

2: ALGORITHM : [BIG BANG CRUNSH OPTMIZATION]
FUNCTION: [RASTRIGIN FUNCTION]

3: ALGORITHM: [SOLAR SYSTEM-BASED OPTIMIZATION]
FUNCTION: [ROSENBROCK FUNCTION]

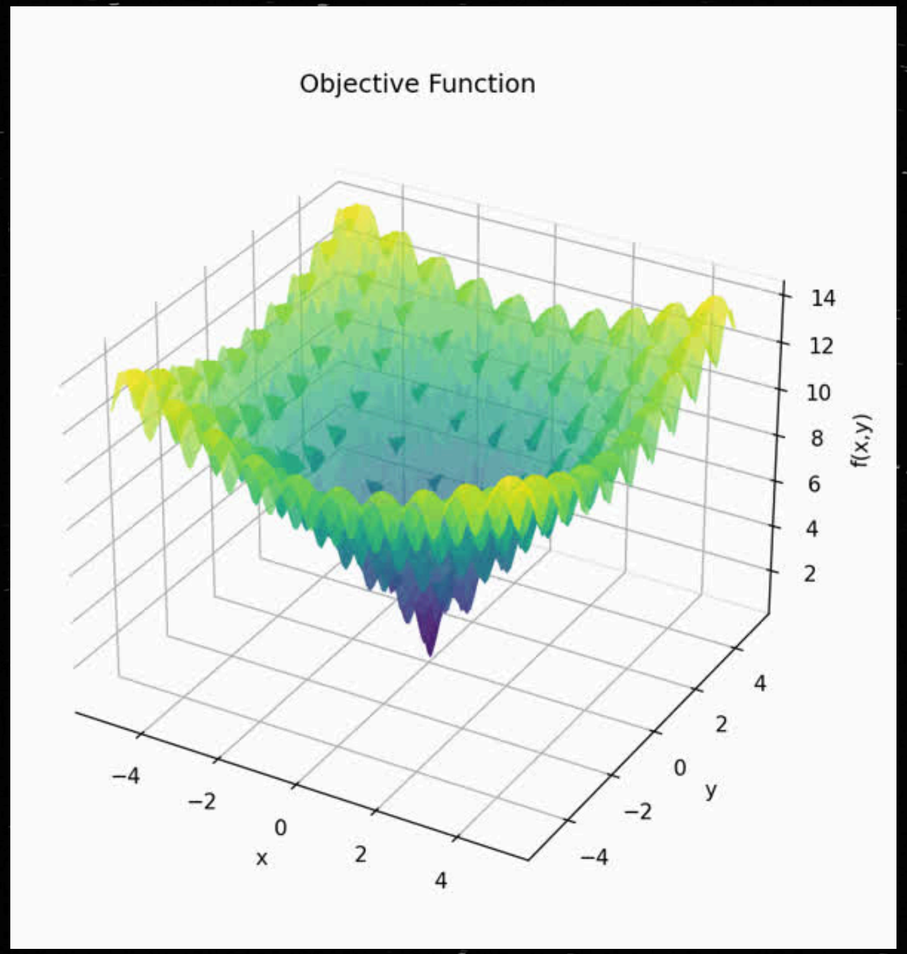
4: ALGORITHM: [SUPERNOVA OPTIMIZATION]
FUNCTION: [HIMMELBLAU FUNCTION]

there is more, but for this workshop will be breifyl talking about these 4.

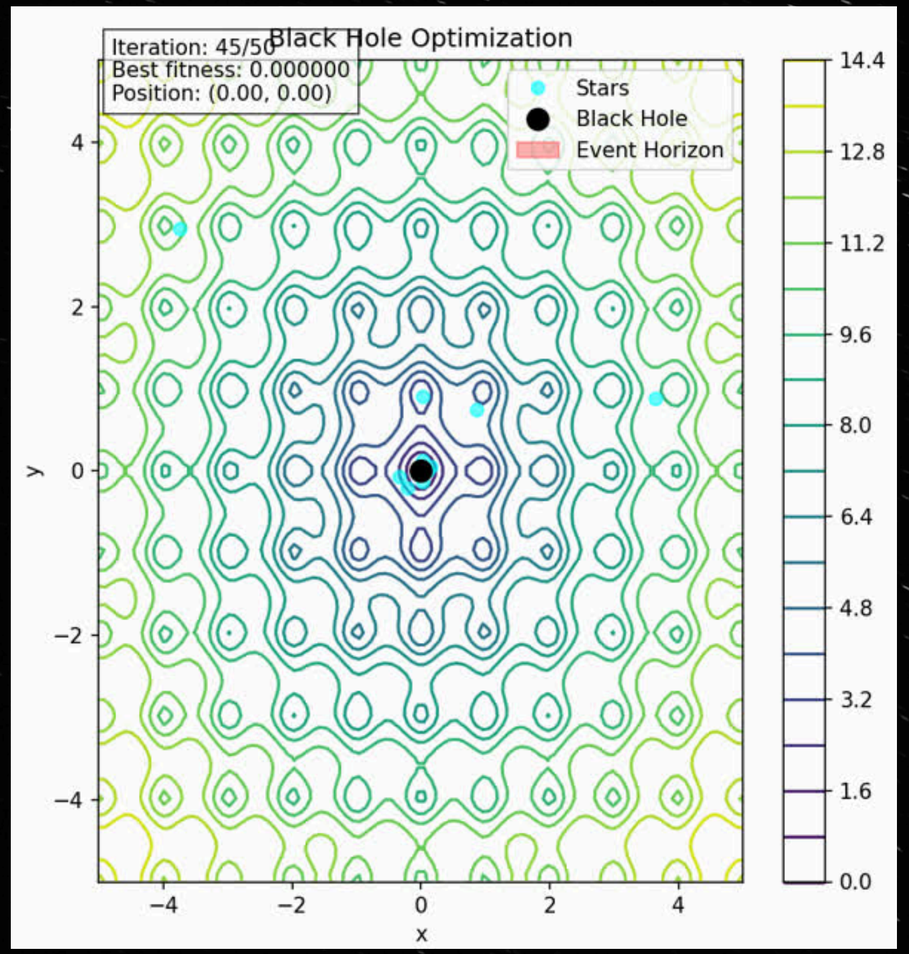
Bonus: Space Inspires

Black Hole Search Algorithm Benchmarked on the Ackley Function

Function



iterations

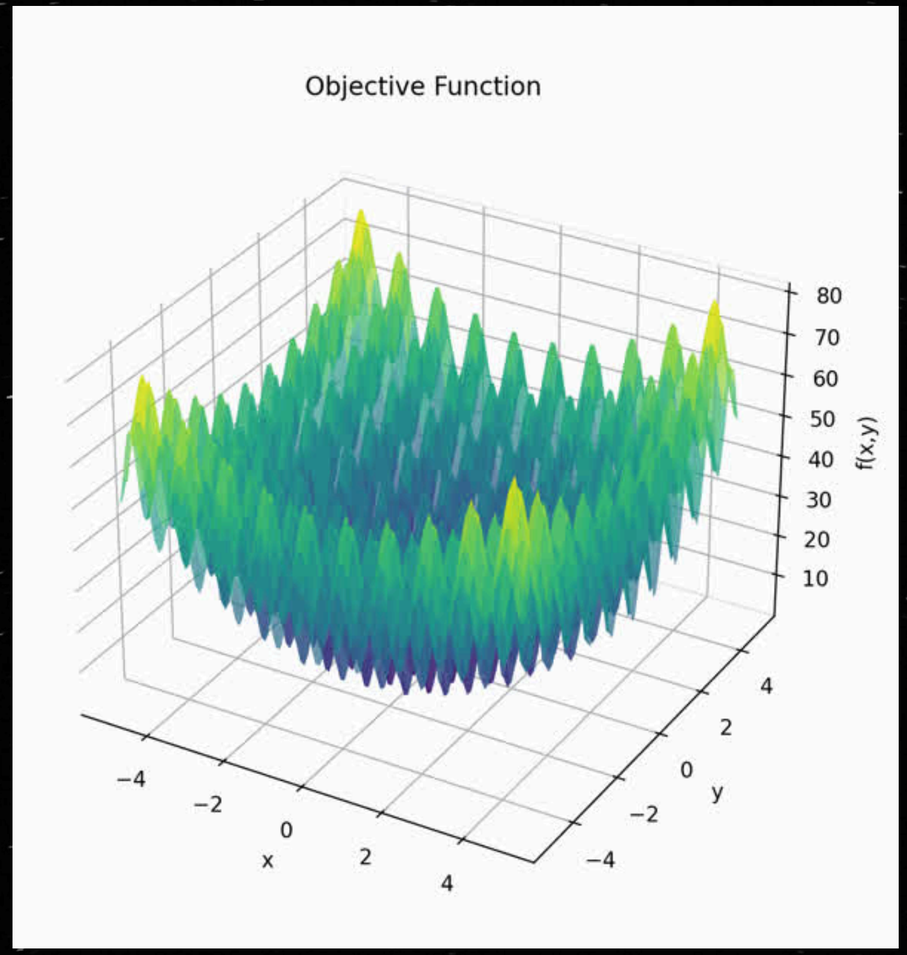


https://www.researchgate.net/publication/281786410_Black_Hole_Algorithm_and_Its_Applications

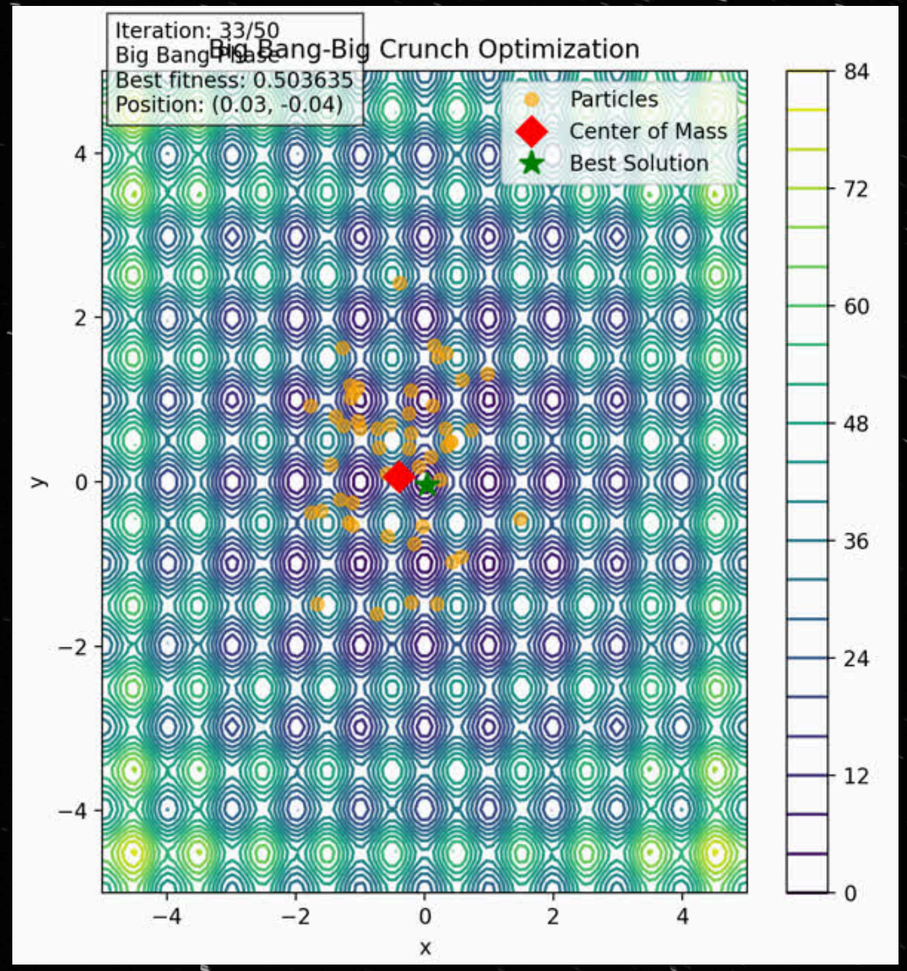
Bonus: Space Inspires

Big Bang Crunsh Algorithm Benchmarked on the Rastrigin Function

Function



iterations

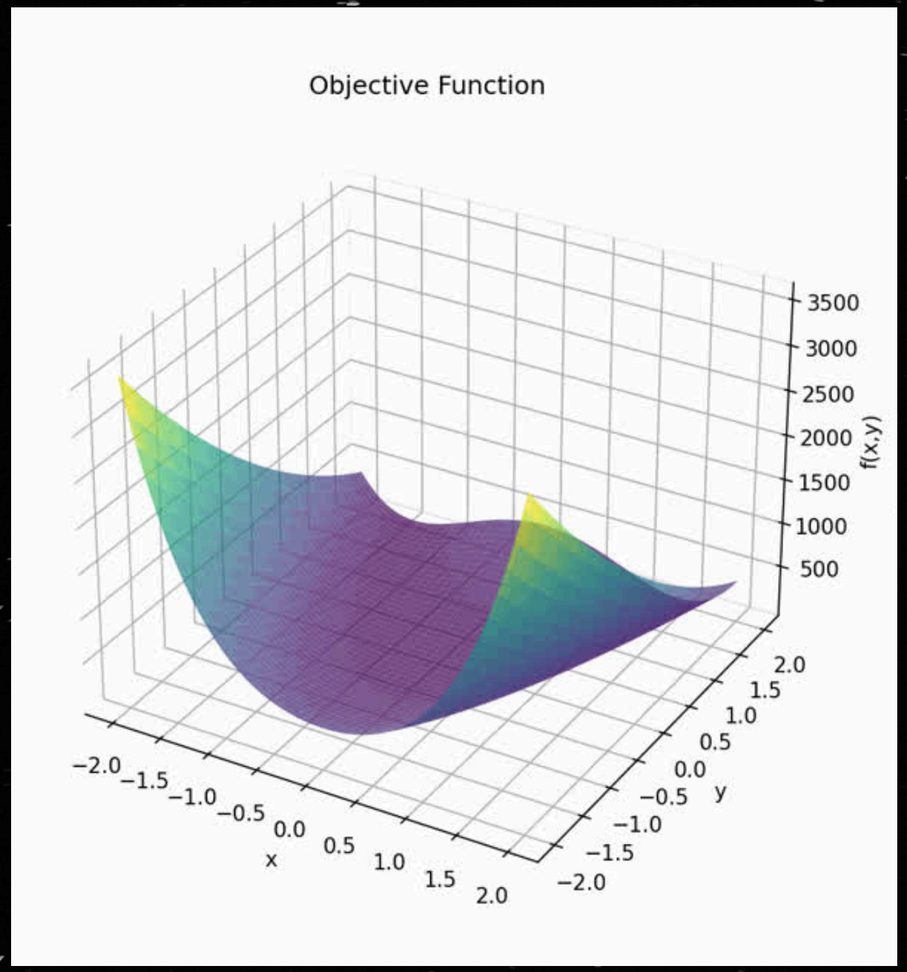


https://link.springer.com/chapter/10.1007/978-3-642-27337-7_36

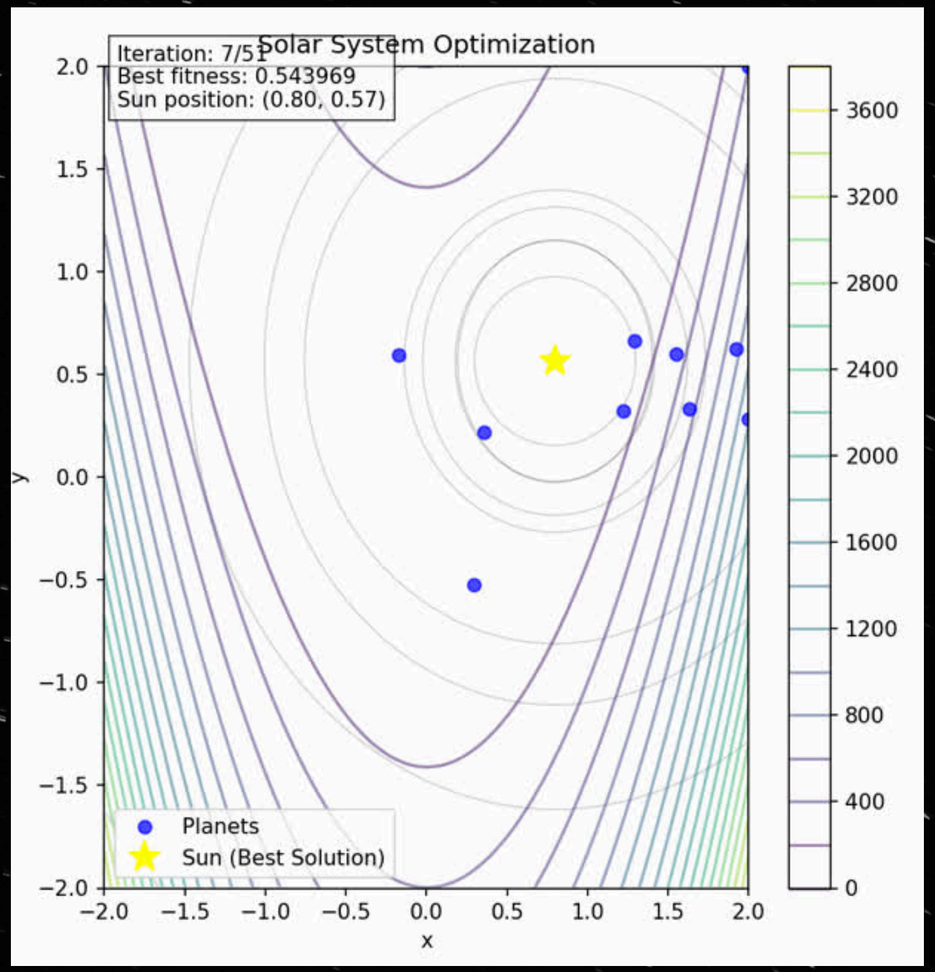
Bonus: Space Inspires

Solar System-Based Optimization Benchmarked on the Rosenbrock Function

Function



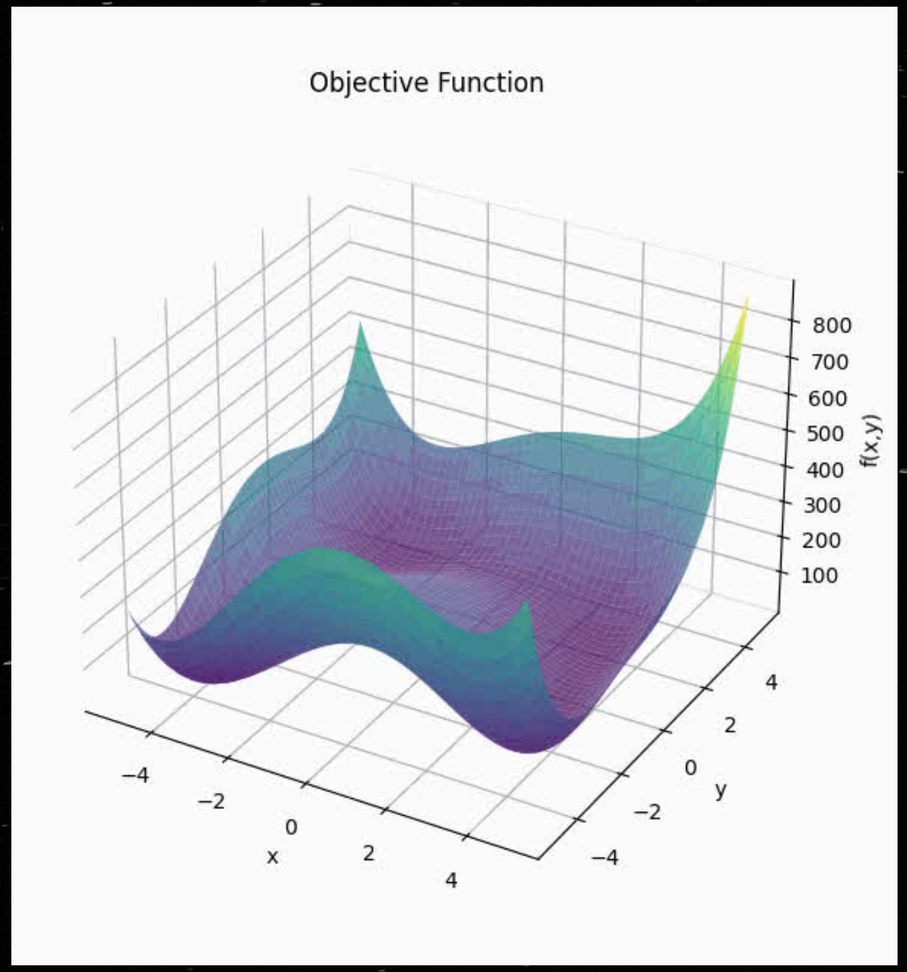
iterations



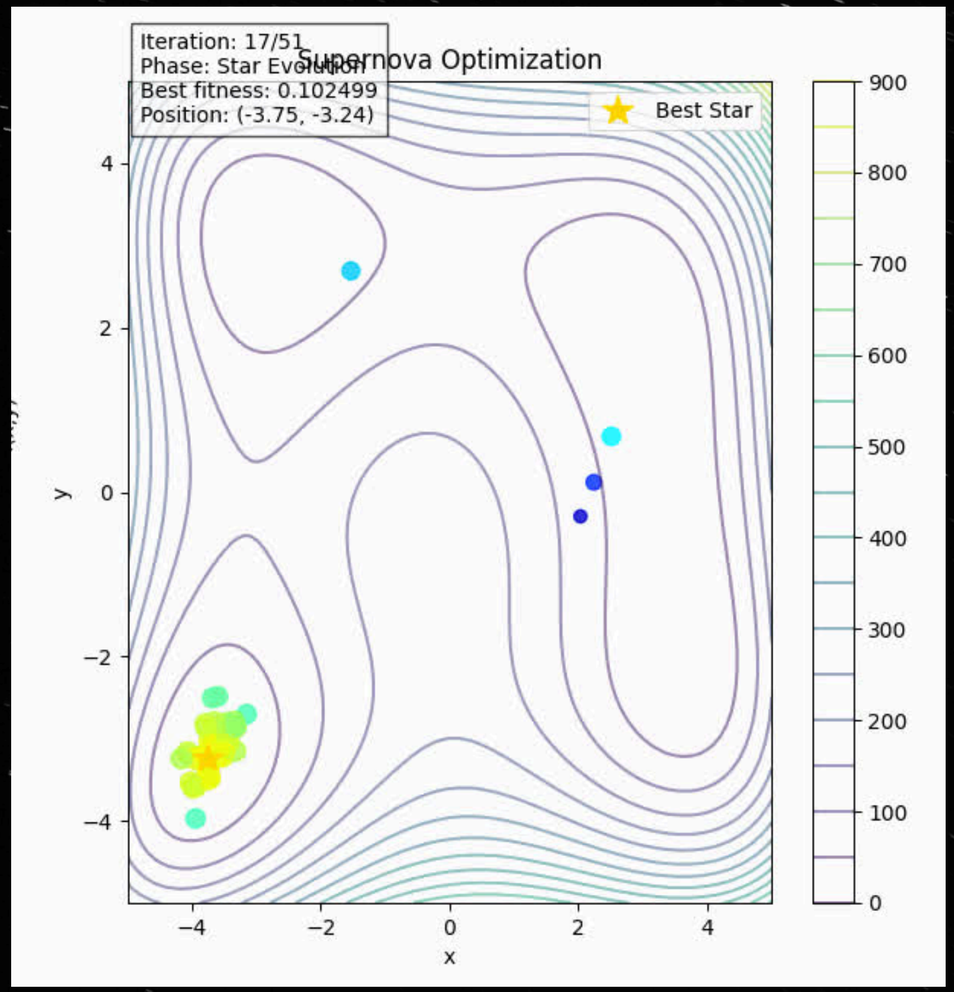
https://ieeexplore.ieee.org/document/9310185

Bonus: Space Inspires

Supernova Optimization Benchmarked on the Himmelblau Function



Function



iterations

https://ccsenet.org/journal/index.php/mas/article/view/72215

Hands on activity continued

We have Landed....

task 2.1

use test data to test your model and see how well it perfomred, sometimes it is provided if not find some images

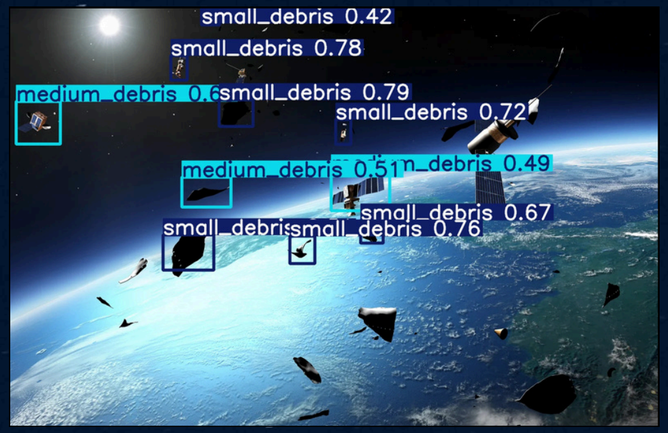
NOTE: DO NOT USE THE TRAINING-IMAGES TO TEST HOW WELL YOUR MODEL IS

Task 3 Detect:

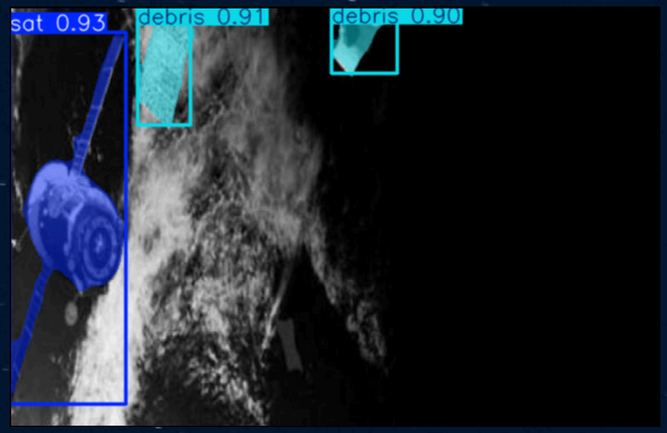
now that your model is done training, use provided script to test it

Output: get a similar if not identical results to images below

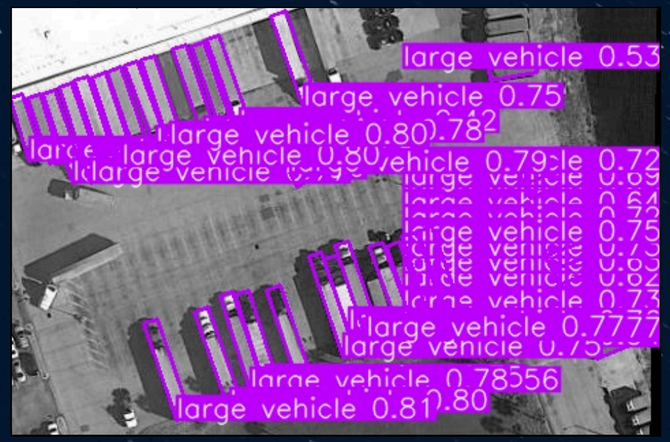
Debris (yolov8)



Debris and Sat(yolov8-seg)



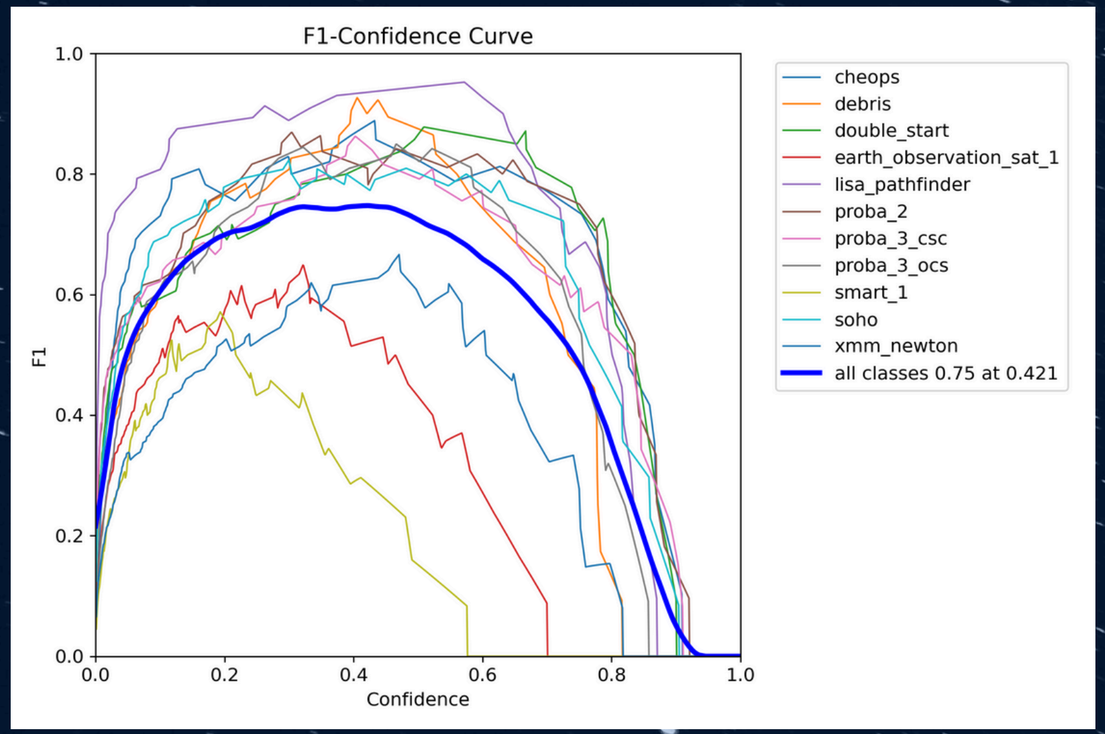
sat images (yolov8-obb)



Hands on activity

Task 4 Evaluate model:

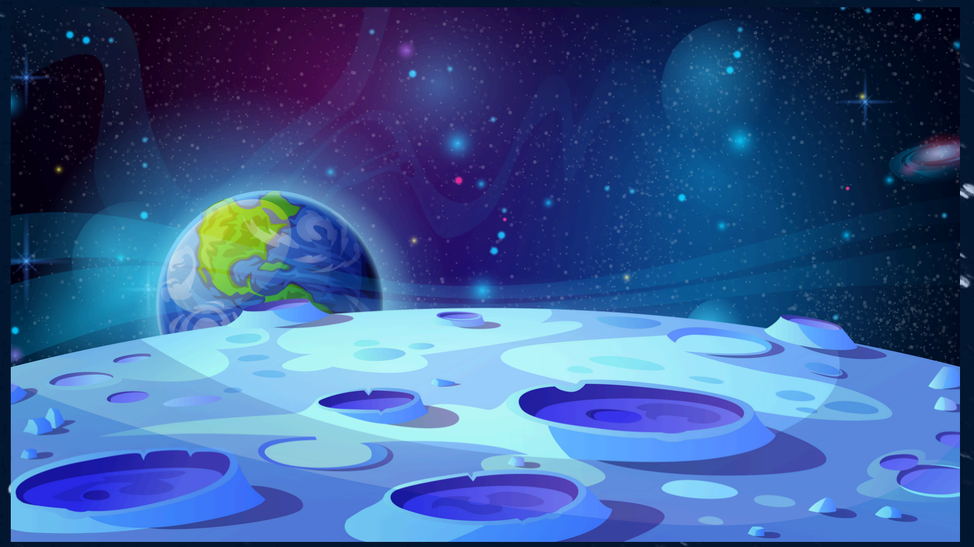
use the tables generated from framework to evaluate how well your model is



Test Models

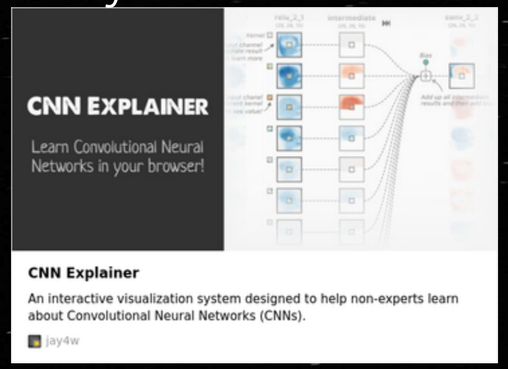
Live Demo Testing on the YOLO and YOLO-seg pre-trained Models, on webcams.

Landing Complete. Let's Explore!



Bonus: Self Read Satalite stations

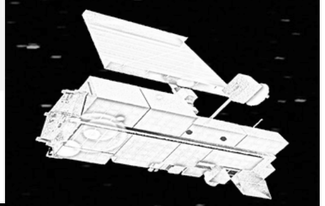
Study and visualise CNN



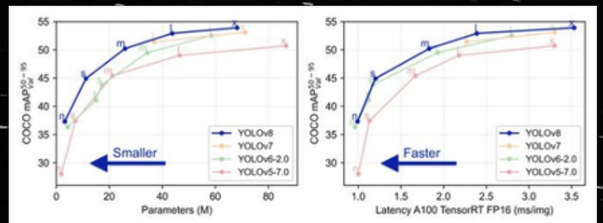
CNN Explainer

An interactive visualization system designed to help non-experts learn about Convolutional Neural Networks (CNNs).

jay4w



Yolov8 Docs



YOLOv8

Discover YOLOv8, the latest advancement in real-time object detection, optimizing performance with an array of pre-trained models for diverse tasks.

ultralytics.com / Feb 26

import Data roboflow universe

Import from Roboflow Universe | Roboflow Docs

Download or clone images from Roboflow Universe for use in your projects.

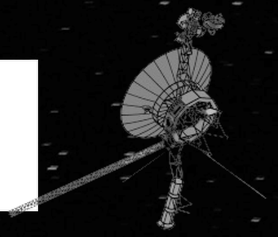
roboflow.com

Hugging Face Computer Vision Course

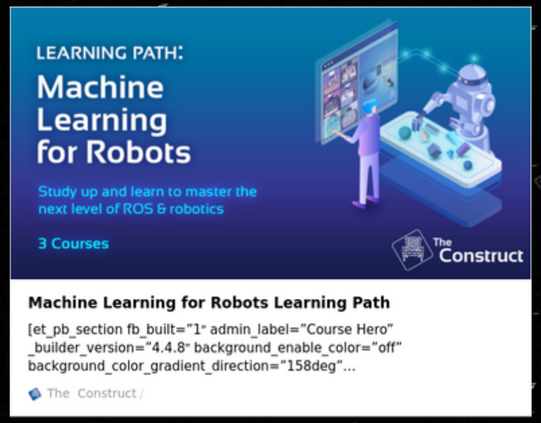
Welcome to the Community Computer Vision Course - Hugging Face Community Computer Vision Course

We're on a journey to advance and democratize artificial intelligence through open source and open science.

huggingface



ML for robots course (paid)



Machine Learning for Robots Learning Path

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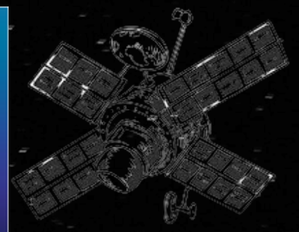
The Construct /

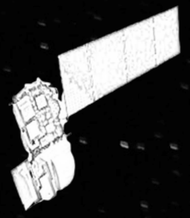


meta's SAM Model tutorial

How to Use the Segment Anything Model (SAM) to Create Masks

By Jess Wilk Hey there! So, you know that buzz about Tesla's autopilot being all futuristic and driverless? Ever thought about how it actually does its magic? Well, let me tell you – it's all about image segmentation...

freeCodeCamp.org / Nov 8, 2023

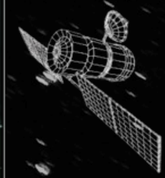


Try this Cool Model like phi-3 VLM on Nividia NIM

phi-3-vision-128k-instruct Model by Microsoft

Cutting-edge open multimodal model exceling in high-quality reasoning from images.

NVIDIA NIM



Thank you for listening

happy Learning

any Further Qustions ?