
COVID-19 detection with DDSM++ using KubeFlow

Covid 19 detection using DDSM

S.NO	Disease classes
1	Atelectasis
2	Cardiomegaly
3	Effusion
4	Infiltration
5	Mass
6	Nodule
7	Pneumonia
8	Pneumothorax
9	Consolidation
10	Edema
11	Emphysema
12	Fibrosis
13	Pleural Thickening
14	Hernia
15	COVID-19



Objective :

To detect 14+1(COVID-19) different class of diseases on given Chest X-ray using deep learning model



Dataset:

NIH dataset-1,12,120 frontal X-ray image of 30K unique patients COVID-19 image data collection

From GitHub repo.

<https://github.com/ieee8023/covid-chestxray-dataset>



Base Architecture:

DDSM based model (CNN)/ Resnet-18 architecture

Model Modifications

Preprocessed with CLAHE technique

Modified Model: Densenet121 + non local block+ Dens layer 512(RELU)+ 14 layer

Input



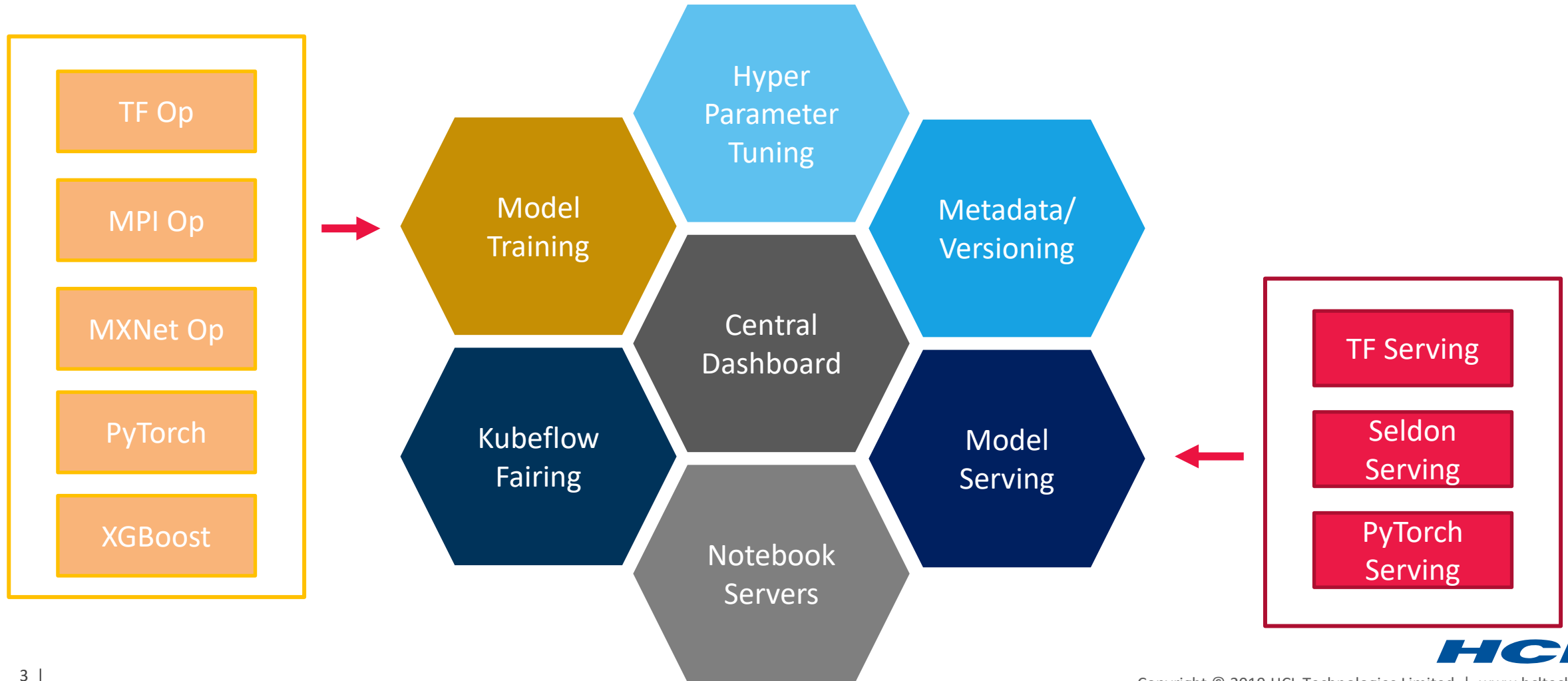
DDSM/Resnet based

Expected Output

COVID-1

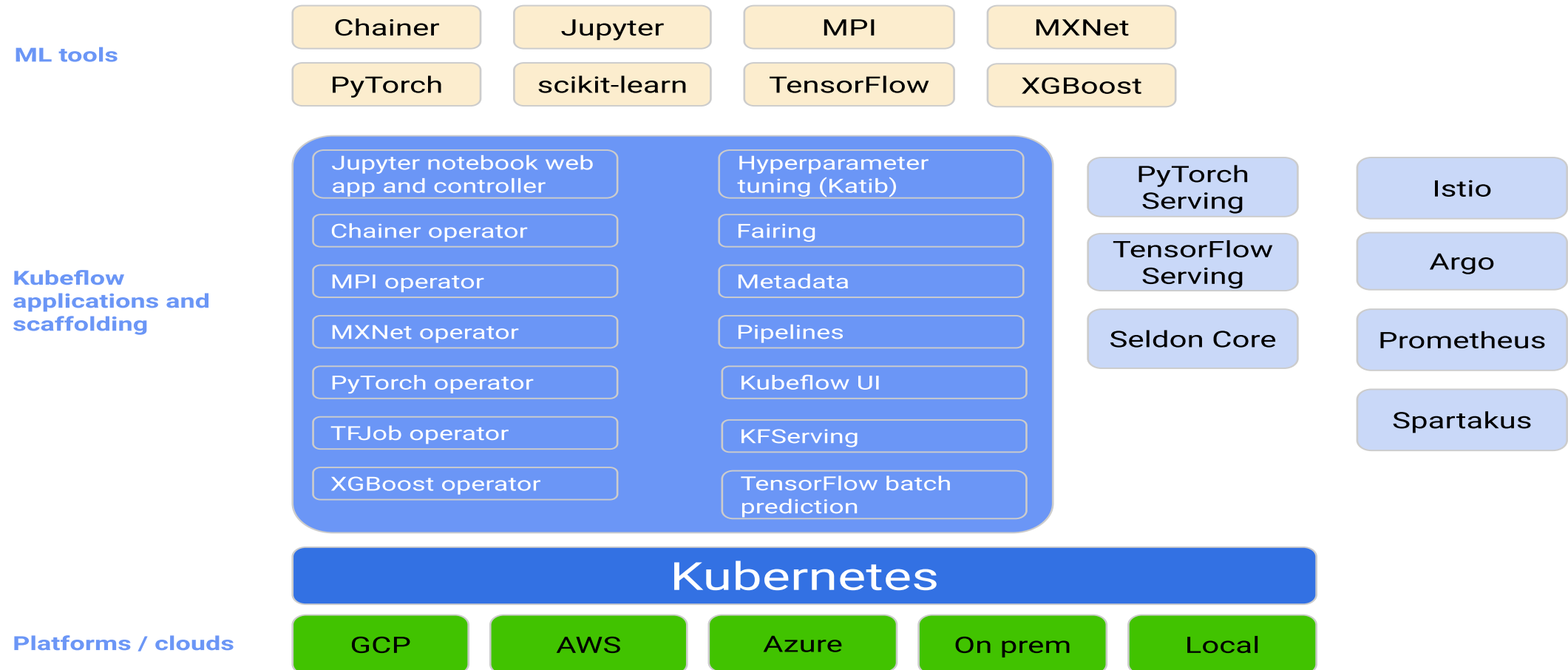


Components

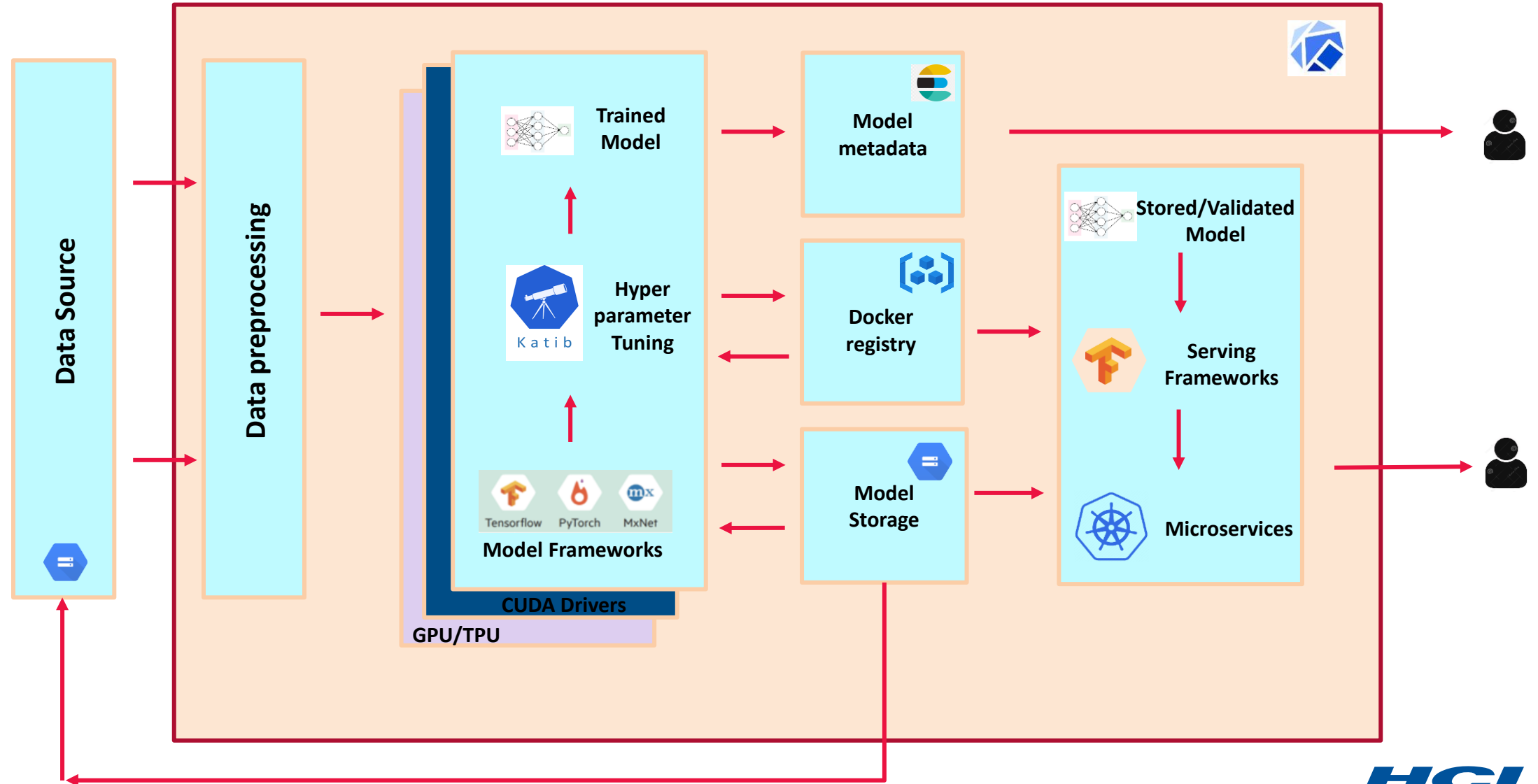


Kubeflow – How it stacks up

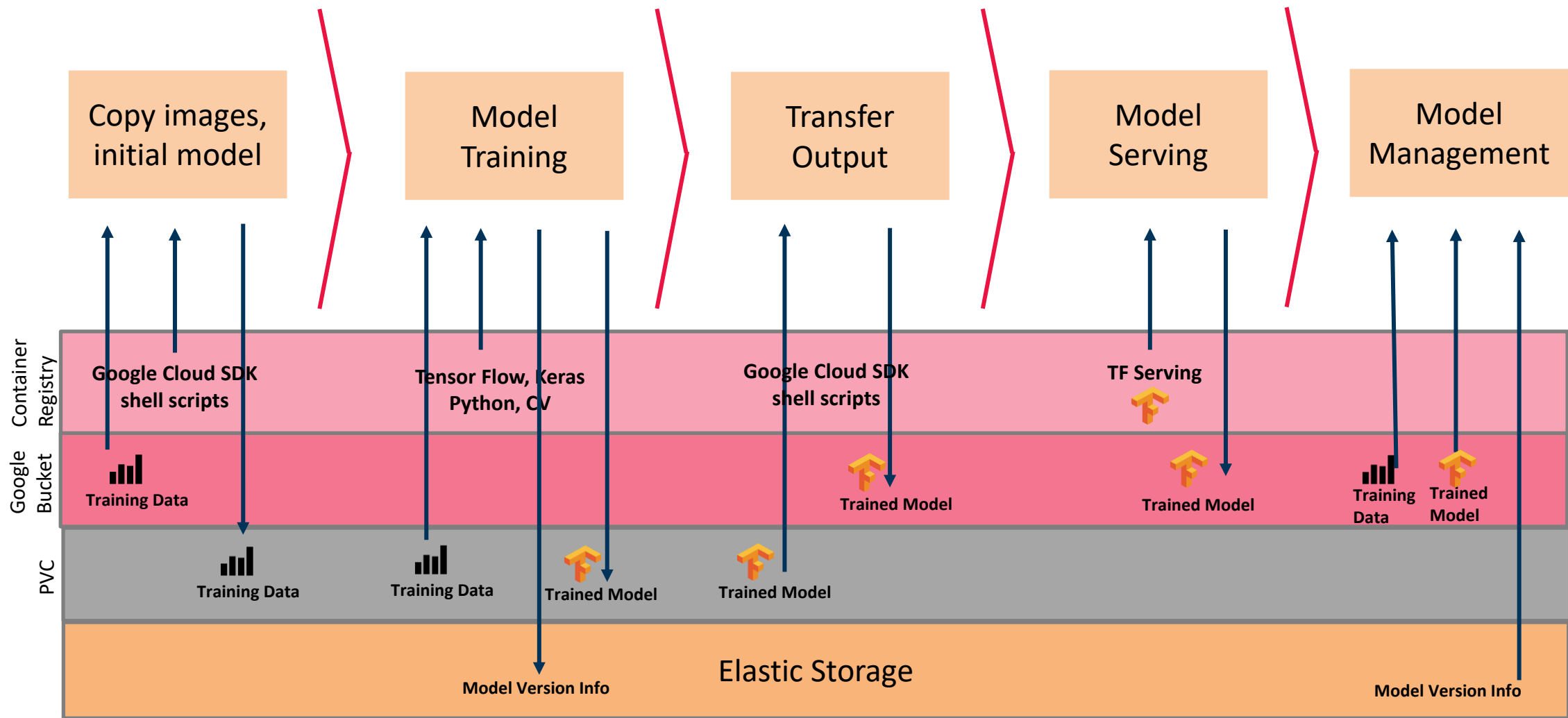
Platform for building and deploying portable, scalable machine learning (ML) workflows based on Docker containers.



High Level View of DDSM Pipeline

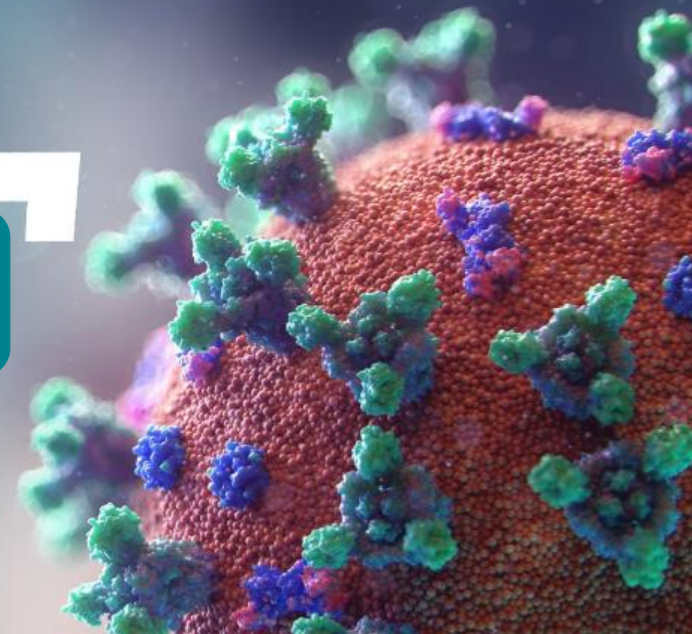


DDSM Pipeline Stages



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Model Information

Version	Data		Model		Parameters				Metric	
#	Name	URI	Name	URI	LR	Optimizer	Batch	Epochs	Loss	AUROC
v1	DDSM input data	gs://ddsmplus/data/v1	DDSM	gs://ddsmplus/output/v1/pb	0.002681	Adam	16	2	0.2194	0.5812
v2	DDSM input data	gs://ddsmplus/data/v2	DDSM	gs://ddsmplus/output/v2/pb	0.002182	Adam	16	2	0.2016	0.78

Screen Shots

Pipelines

Experiments

Artifacts

Executions

Archive

Documentation

Github Repo

AI Hub Samples

<

Cluster name: kubeflow

Build commit: ca58b22

Pipelines

Select namespace

← pipeline (pipeline)

+ Create run

+ Upload pipeline version

+ Create

Graph

Source

prepare-for-training

↓

ddsm-training

↓

copy-output-to-gs

↓

serve

Show summary

Static pipeline graph

Version	Data		Model		Parameters				Metric	
#	Name	URI	Name	URI	LR	Optimizer	Batch	Epochs	Loss	AUROC
v1	DDSM input data	gs://ddsmplus/data/v1	DDSM	gs://ddsmplus/output/v1/pb	0.002681	Adam	16	2	0.2194	0.5812
v2	DDSM input data	gs://ddsmplus/data/v2	DDSM	gs://ddsmplus/output/v2/pb	0.002182	Adam	16	2	0.2016	0.78

Input Image

Example file for inference

Choose file 1.jpeg

Image Preview



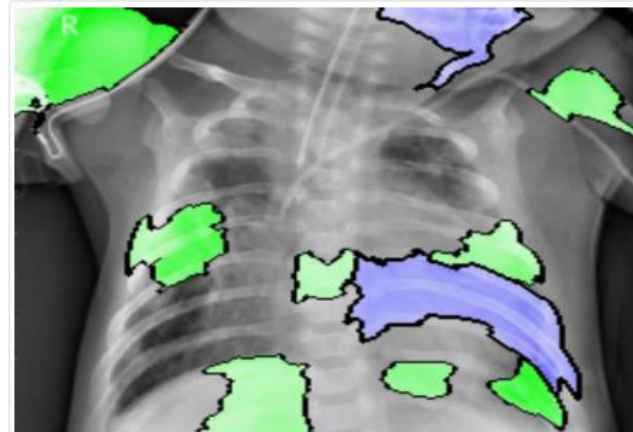
Choose a model: v1 ▼

Submit

Results

Selected Model: v1

Lime Preview



Class

Scores

Effusion	0.505586147
Infiltration	0.505075157
Covid	0.50399214

v2	DDSM input data	gs://ddsmplus/data/v2	DDSM	gs://ddsmplus/output/v2/pb	0.002182	Adam	16	2	0.2016	0.78
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Input Image

Example file for inference

Choose file 1.jpeg

Image Preview



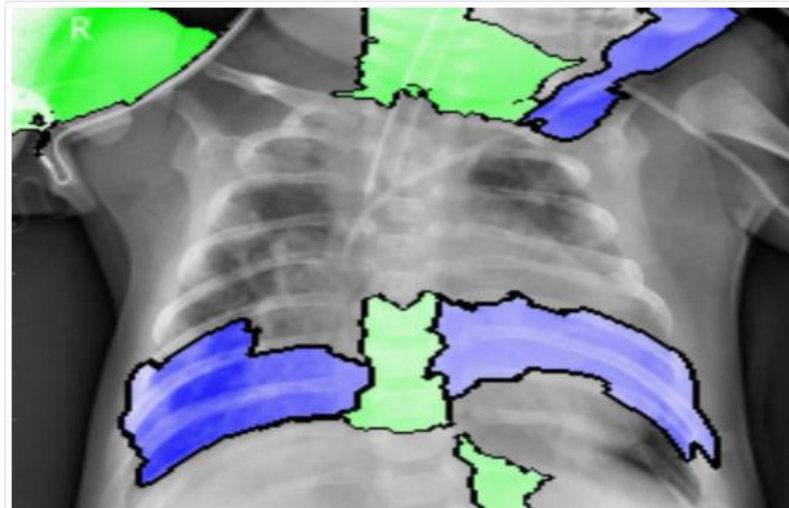
Choose a model: v2 ▼

Submit

Results

Selected Model: v2

Lime Preview



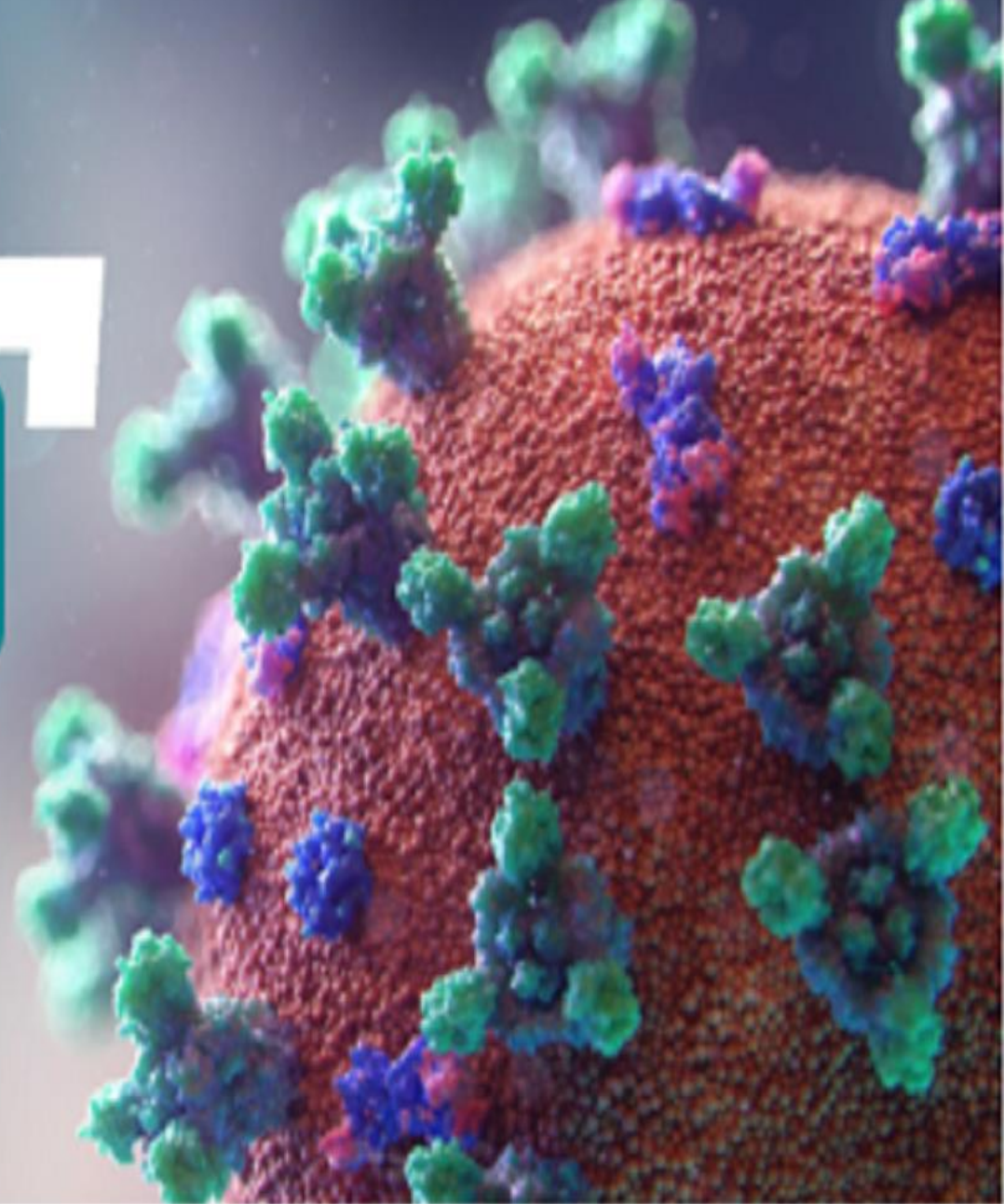
Class	Scores
Covid	0.148629323
Infiltration	0.11223954
Consolidation	0.0216222256

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Demo video link (HCL-internal): [HCL DDSM KF](#)

Realtime Demo hosted on GCP will share the URL based on request



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