The Challenge - Pathology Diagnosis

In the competition, participants are invited to use **MindSpore** as the AI training and inference framework, for developing trustworthy AI pathology diagnosis models that ensures *privacy*, *explainable* and *high accuracy*.

Quota	30 Teams
Team size	1 - 3 Members
Events	Workshops, Pitching, Award Ceremony
Competition Rounds	Qualification and Final Rounds

Organizers:

Competition Timeline

1 — Training Workshop — 17/09

2 — Model Training — MODELARTS + MINDSPORE

3 — Model Evaluation — SUBMIT TO PORTAL
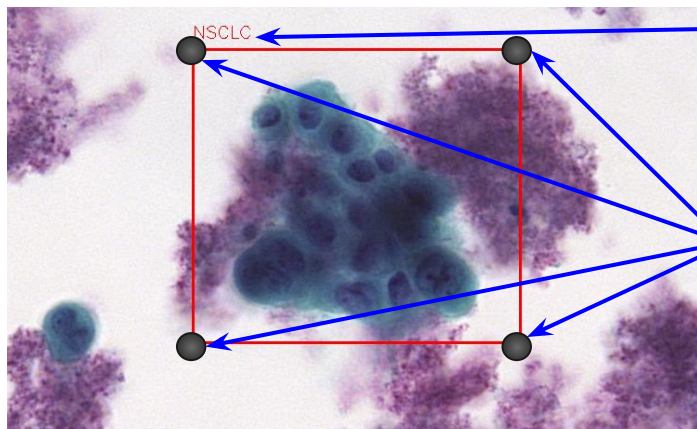
4 — Final Submission — 08/10

5 — Final Pitching — 15/10
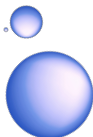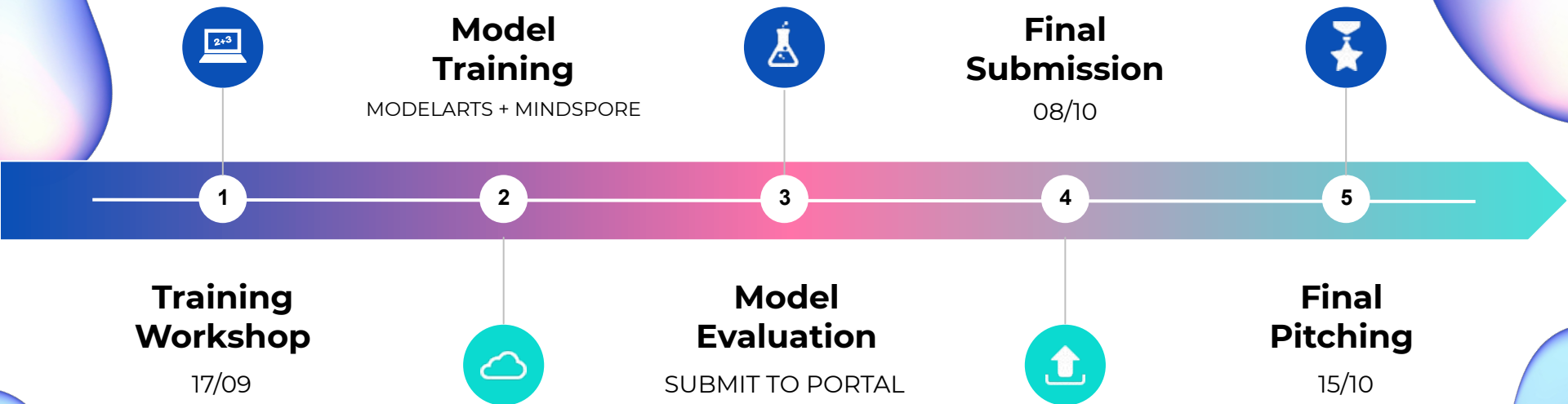
Qualification Round - Problem Statement

Training a **MindSpore** AI model to **identify locations and classifications** of cancer cells in pathological images. The AI Models will **assist pathologists** in the diagnosis of **peripheral pulmonary diseases**.

This is a form of **multi-label object detection**.

Classification:
- Class of diagnosed cell

Location:
- Bounding Boxes

Class	English Name	Subclass	Example
SCC	*Squamous Cell Carcinoma*	*NSCLC*	
AC	*Adenocarcinoma*	*NSCLC*	
SCLC	*Small Cell Lung Cancer*	*-*	
NSCLC	*Non-Small Cell Lung Cancer*	*-*	

Qualification Round - Evaluation

$$\text{Classification Score} = \frac{1}{|M|} \sum_{i \in M} \text{FROC}_i$$

$$\text{AUC} = \frac{1}{M \times N} \sum_{i \in \text{positive class}} rank_i - \frac{M(1+M)}{2}$$

Accuracy - FROC
- The trained MindSpore AI models should **accurately locate** and **classify** cancer cells.

Explainability (Bonus) - AUC
- The trained MindSpore AI models should provides **pixel level feature attribution** as an explanation for the task!

$$\text{Model Score} = \text{Accuracy Score} * 0.8 + \text{Explainable Score} * 0.2$$

The *top 6 highest model score* teams are invited to enter the **FINAL ROUND**

Final Round & Ceremony

Pitching

Date   **15 October 2021**

Venue   **Charles K Kao Auditorium HKSTP**

Time   2 - 6pm

Agenda

- Welcoming Speech
- Solution Pitching
- On-site Evaluation
- Result Announcement

Award Ceremony

Event   **Huawei Cloud Summit 2021**

Date   **26 October 2021**

Venue   TBD

Time   Afternoon

Charles K Kao Auditorium HKSTP

Prizes!

Winning Teams Award	Prizes per Team
Model Score Winner	**HKD 70,000**
Model Score Runner-up	**HKD 50,000**
Pitching Score Winner	**HKD 50,000**
Pitching Score Runner-up	**HKD 35,000**
Special Price for Explainability	**HKD 2,000 (max: 30 winners)**

Register Now!

OFFICIAL WEBSITE
Sign Up!

DISCORD
Get Connected

GITHUB
Get Resources

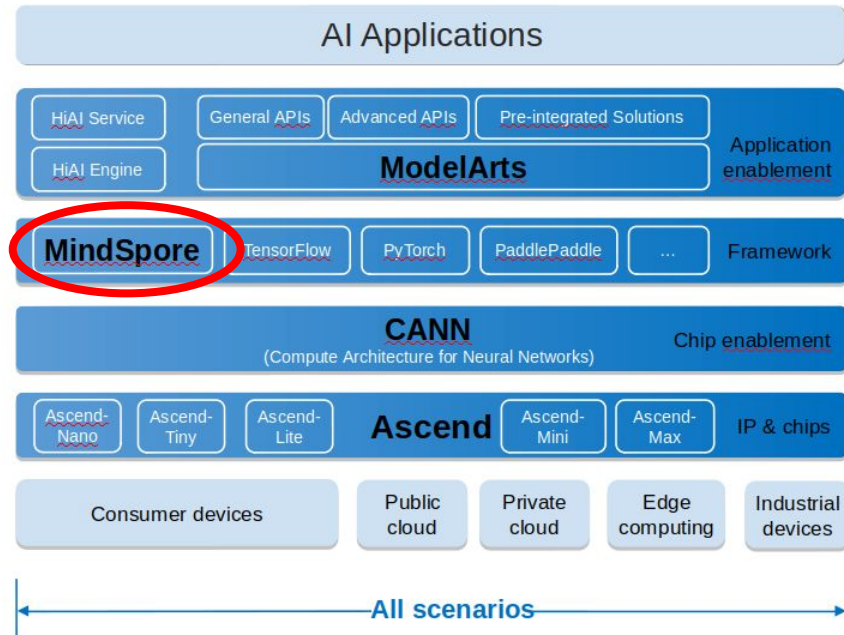**RULE BOOK & GUIDELINES**
Get Informed

MindSpore

Introduction and Examples

What is MindSpore?

MindSpore

An **Open AI-framework** that supports the multi-processor architectures developed by Huawei.

It provides a unified APIs and end-to-end AI capabilities for AI model development, execution and deployment in all scenarios, including cloud, edge and devices.

Friendly Development Experience

Flexible Debugging

Fully Unleashing Hardware Performance

Quick Deployment in All Scenarios

DL Python Modules

	Dataset Preparation and Preprocessing	Network Construction and Training	Explainable XAI
MindSpore Modules	`mindspore.dataset:` Complete solution equipped with vision and text operators.	`mindspore.nn:` network constructions `mindspore.ops:` common operators in neural networks `mindspore.model:` defining model, optimizers and loss function `mindspore.train:` provides common training utilities	`mindspore.explainer:` Provides methods to evaluate generate saliency maps/other explainable figures from inputs.
Tensorflow Pytorch Modules	`tf.data` `torch.utils.data`	`tf.keras.Model` `torch.nn`	-

MindSpore Model Design and Training

```
import mindspore as ms
```

Dataset

```python
dataset = ms.dataset.MnistDataset()

dataset.batch # batching data
dataset.map # preprocessing data
```

Network

```python
class Net(ms.nn.Cell):
    def __init__(self):
        super(Net, self).__init__()
        self.flatten = ms.nn.Flatten()
        self.dense = ms.nn.Dense(1024, 10)

    def construct(self, x):
        x = self.flatten(x)
        x = self.dense(x)
        return x
net = Net()
```

Model

```python
loss = ms.nn.SoftmaxCrossEntropyWithLogits()
optimizers = ms.nn.Adam(
  net.trainable_params(),
  learning_rate=0.01
)

model = ms.Model(
    net,
    loss,
    optimizers,
    metrics={"Accuracy": ms.nn.Accuracy()}
)

model.train(epoch=10, dataset)
```

AI APPS

Huawei Cloud

Elastic Cloud Server

Object Storage Service

ELASTIC CLOUD SERVICE (ECS)

A powerful compute engine for you to deploy any application
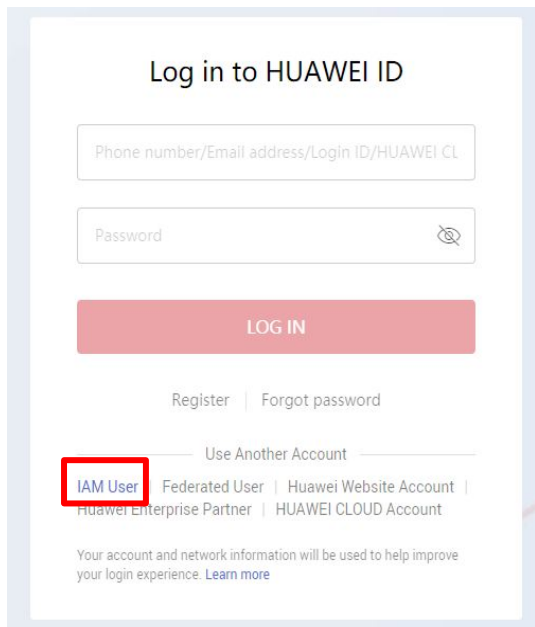
OBJECT STORAGE SERVICE (OBS)

A **cloud storage service** optimized for storing massive amounts of data
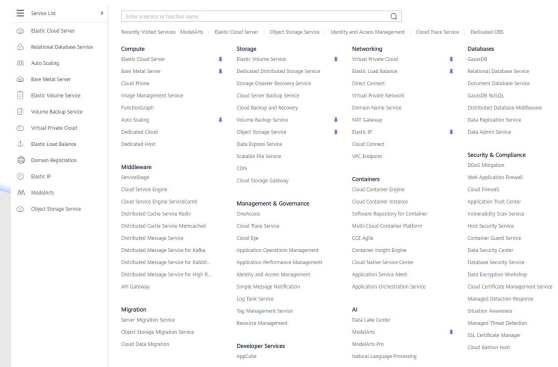
ModelArts

HUAWEI CLOUD

MODELARTS

A one-stop **development platform** for AI developers

AND MANY MORE...
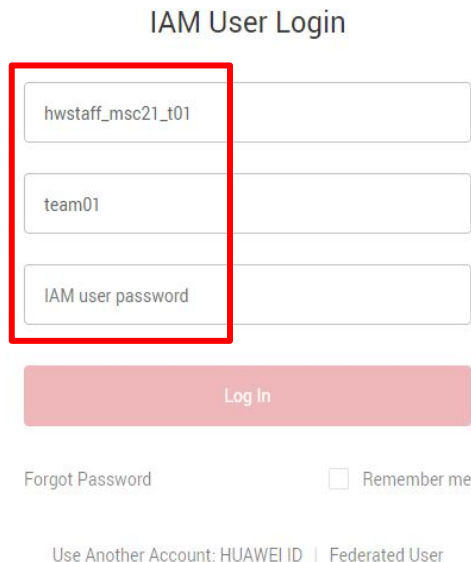
Hands on time!

Press IAM User in Login Page
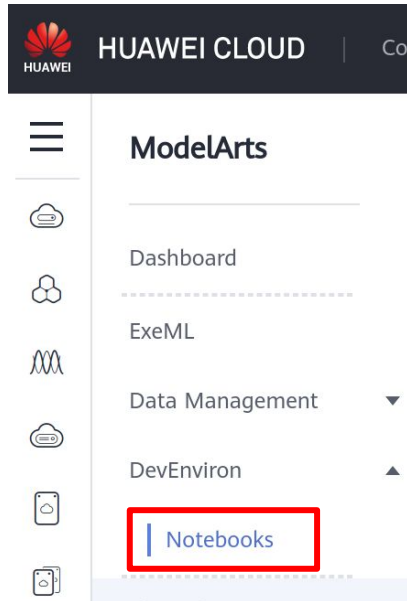

Login with Credentials!
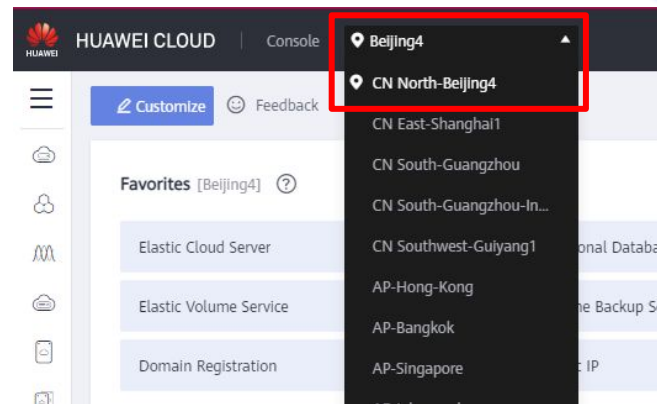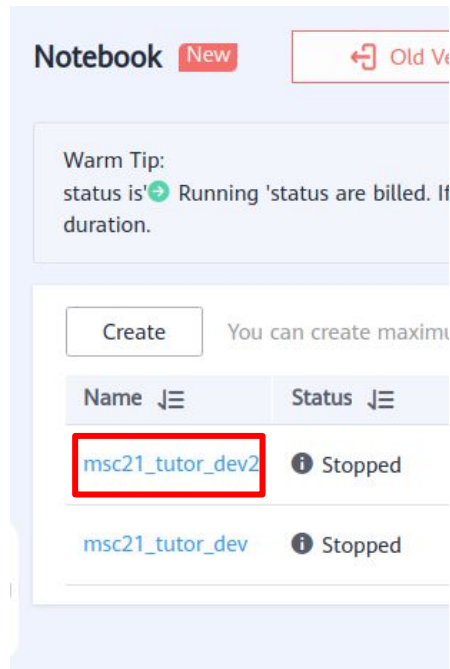

Change the Region to CN-North-Beijing4
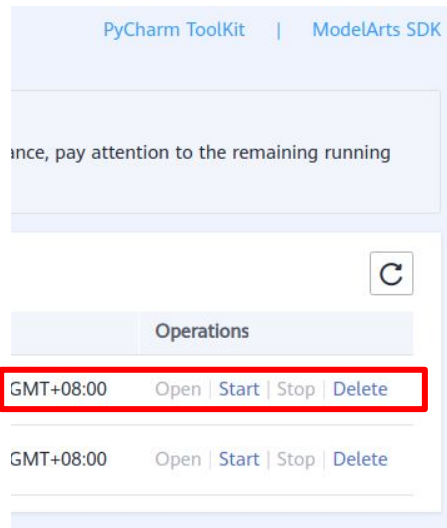
Hands on time!
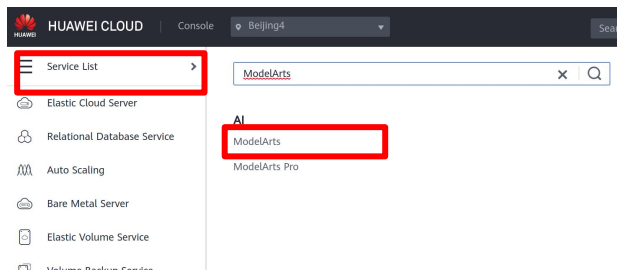
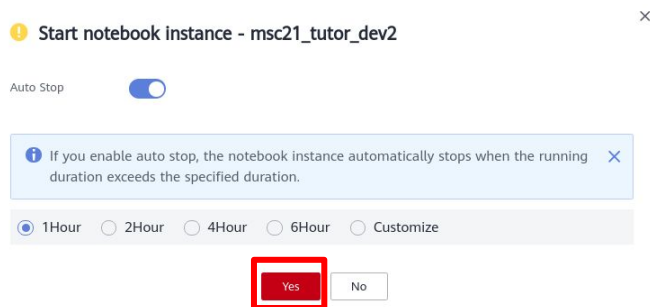Go to Service List,
Search ModelArts

Click DevEnviron > Notebooks

Find your id and
start the notebook

Hands on time!

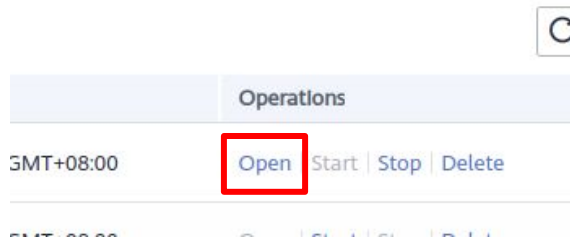PyCharm ToolKit | ModelArts SDK

ance, pay attention to the remaining running

Operations

GMT+08:00   Open | Start | Stop | Delete

GMT+08:00   Open | Start | Stop | Delete

**Start the notebook,
if its not started**

Start notebook instance - msc21_tutor_dev2

Auto Stop

If you enable auto stop, the notebook instance automatically stops when the running duration exceeds the specified duration.

○ 1Hour   ○ 2Hour   ○ 4Hour   ○ 6Hour   ○ Customize

Yes   No

Click OK

Operations

GMT+08:00   Open | Start | Stop | Delete

Open the notebook

Hands on time!

https://github.com/MindSporeChallenge21/resources
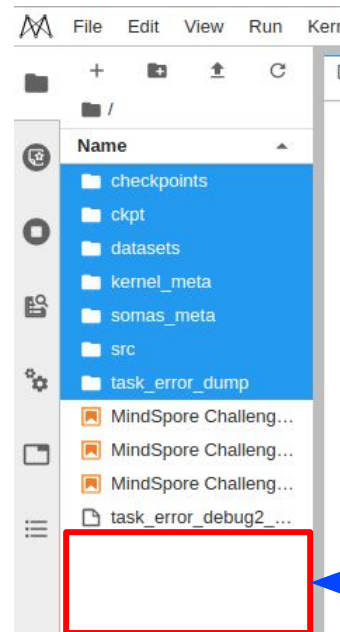
**Download required notebooks
In `notebooks` folder.**
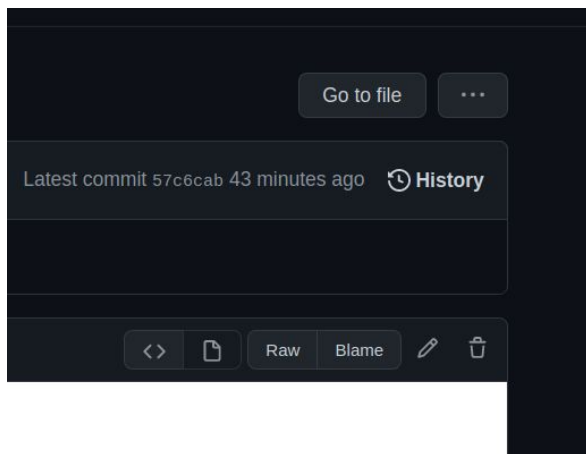
Right Click RAW > save link as ....

EMPTY
REGION

**Drag and drop the file into the
empty region to upload!**

Agenda

Part I - Beginner Tutorial

- MindSpore Dataset
- MindSpore Neural Network Design
- MindSpore Model Training

Part II - Intermediate Tutorial

- Training a YoloV3 model
- Using ModelArts, OBS and Moxing Framework
- Submission to Portal