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MONAI+ MICCAI2021

MONAI on AWS

Short introduction and resources to get you started

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Our mission at AWS

Put machine learning in the
hands of every researcher, data scientist,
and developer

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Options to use MONAI

1

AWS Deep Learning AMIs & Deep Learning Containers

- Preconfigured environments and containers that come with popular DL frameworks
- Include NVIDIA CUDA, cuDNN, and Intel acceleration libraries

2

Amazon SageMaker

- Fully managed, modular Machine Learning service
- More than 20 components such as labeling, Jupyter notebooks, training & inference clusters, distributed training libraries, a CI/CD service
- Accessible via an integrated IDE, APIs and SDKs

3

Augment your on-prem GPUs with 1 and 2

- Use the cloud to scale out
- Train full-sized models in the cloud

NVIDIA®

A100, V100, T4, K80 GPUs

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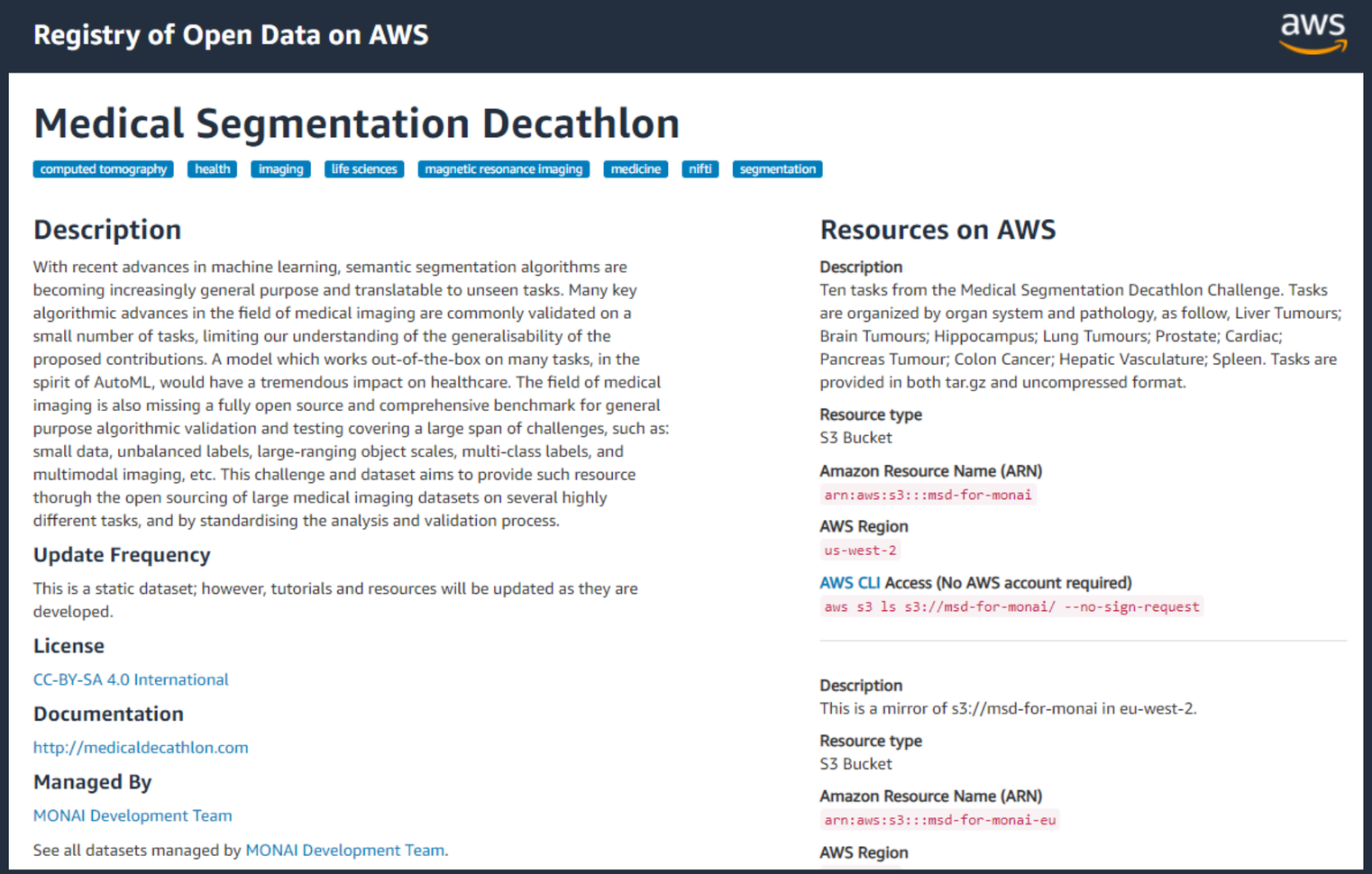
Registry of Open Data on AWS



- Allows researchers to publish & share public datasets
- Costs can be covered by the AWS Open Data Sponsorship Program

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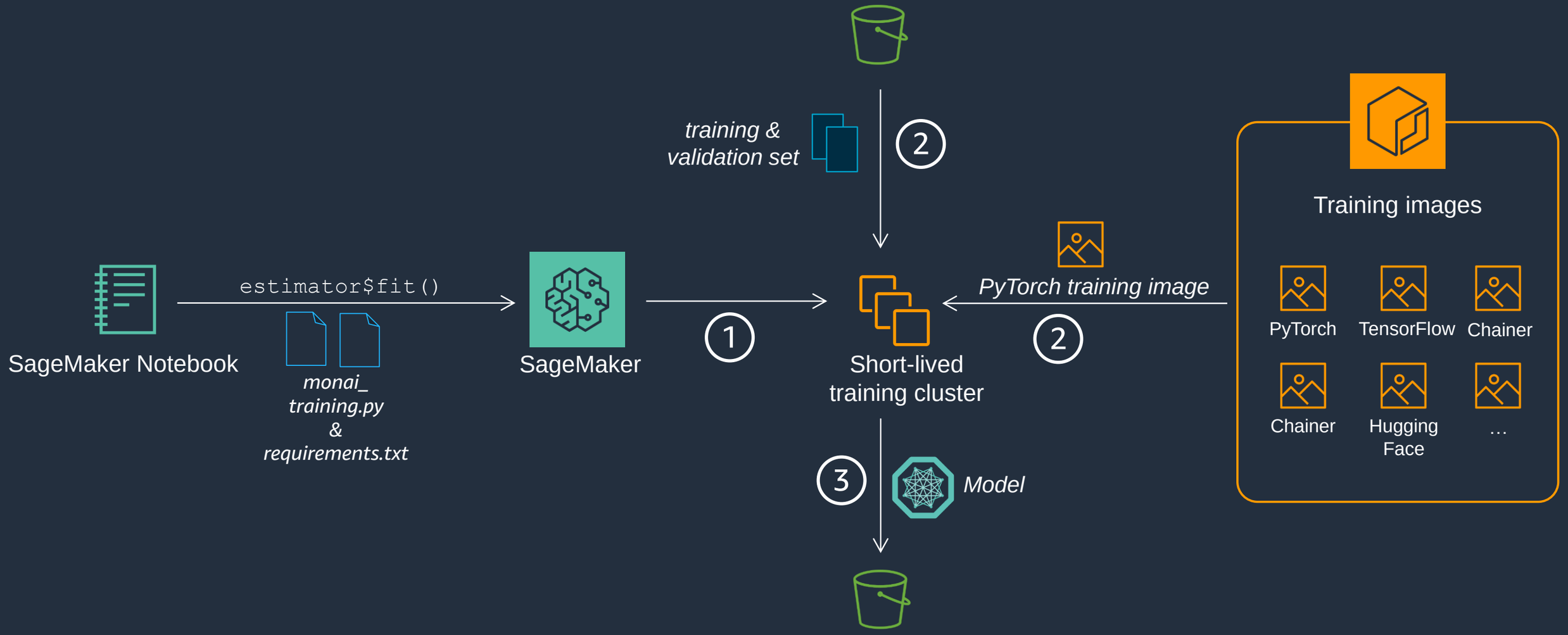
MONAI on Amazon SageMaker

SageMaker Managed Training



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Benefits of using SageMaker in research

1/ Accelerated Research

Explore more architectures, explore more hyper parameters, explore more hypotheses compared to static infrastructure.

2/ Reproducible Workflows

Set up reproducible workflows not just for research but also for FDA approval processes.

3/ Improved Scaling

Start with a small group of people and quickly grow your team based on the underlying standardization.

4/ Financial Flexibility

Trade capital expenses for variable expenses.

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MONAI on AWS

Resources to get you started

1

Launch an AWS Deep Learning AMI
with Amazon EC2

Train a Deep Learning model
with AWS Deep Learning Containers on Amazon EC2

Amazon SageMaker Technical Deep Dive Series
Amazon Web Services

https://aws.amazon.com/getting-started/hands-on/train-deep-learning-model-aws-ec2-containers/

https://aws.amazon.com/getting-started/hands-on/get-started-dlami/

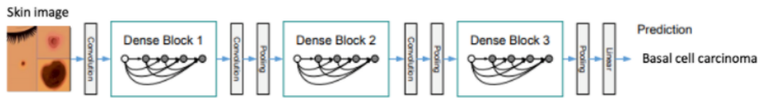
https://www.youtube.com/watch?v=uQc8Itd4UTs&list=PLhr1KZpdzukcOr_6j_zmSrvYnLUtgqsZz

2

Build a medical image analysis pipeline on Amazon SageMaker using the MONAI framework

by Bryan Marsh | on 14 DEC 2020 | in Amazon SageMaker, Healthcare, Industries | Permalink | Comments | Share

Medical imaging has transformed healthcare in a way that allows clinicians to identify diseases, make better diagnosis, and dramatically improve patient outcomes. Digital medical images have several modalities including ultrasound, X-ray, computed tomography (CT) scans and magnetic-resonance imaging (MRI) scans, positron emission tomography (PET) scans, retinal photography, histology slides, and dermoscopy images. Recent developments in deep learning algorithms, such as connected convolutional networks, are helping to identify and classify patterns in medical images that can supplement diagnostics and decision-making to offer clinicians insights into diseases, reduce costs and physician burn-out by automating repetitive tasks, and enable quicker triaging of patients with high-risk conditions.



Depiction of Densely Connected Convolutional Network Model to Classify Skin Cancer

https://aws.amazon.com/blogs/industries/build-a-medical-image-analysis-pipeline-on-amazon-sagemaker-using-the-monai-framework/

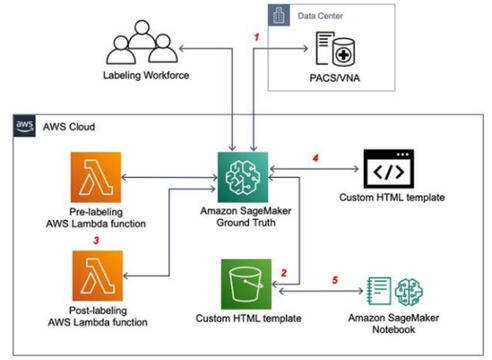
https://github.com/aws-samples/amazon-sagemaker-monai-examples

3

Annotate DICOM images and build an ML model using the MONAI framework on Amazon SageMaker

by Nihir Chadderwala, Bryan Marsh, and Gang Fu | on 04 JUN 2021 | in Amazon SageMaker, Artificial Intelligence, AWS Lambda, Healthcare, Industries | Permalink | Comments | Share

DICOM (Digital Imaging and Communications in Medicine) is an image format that contains visualizations of X-Rays and MRIs as well as any associated metadata. DICOM is the standard for medical professionals and healthcare researchers for visualizing and interpreting X-Rays and MRIs. The purpose of this post is to solve two problems:



https://aws.amazon.com/blogs/machine-learning/annotate-dicom-images-and-build-an-ml-model-using-the-monai-framework-on-amazon-sagemaker/

https://github.com/aws-samples/annotate-medical-images-in-dicom-server-and-build-ml-models-on-amazon-sagemaker

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Grand-Challenge.org

Explore and join medical imaging ML challenges

Radboudumc

https://grand-challenge.org/

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Some logistics for the challenge day

- We will provide support for 280 participants
- We still have a couple of available slots
- Every TWO participants will share ONE AWS account
- EVERY participant will launch a dedicated SageMaker "Classic" Notebook instance. (We won't use SageMaker Studio)
- You will use the SageMaker notebooks for the entire project (We won’t use separate training clusters)
- EACH SageMaker Notebook instance will be powered by a g4dn.2xlarge instance (NVIDIA T4 GPU with 16 GiB GPU Mem, 8x vCPU, 100GB EBS)
- We will share onboarding instructions and open the accounts 30min before the event (7:00AM PST / 4:00PM CEST / 8:30PM IST) via email. Instructions here: https://github.com/alex23lemm/monai2021bootcamp-aws-instructions/
- Challenge participants will have the chance to win AWS credits

Good luck!

https://aws.amazon.com/health/

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