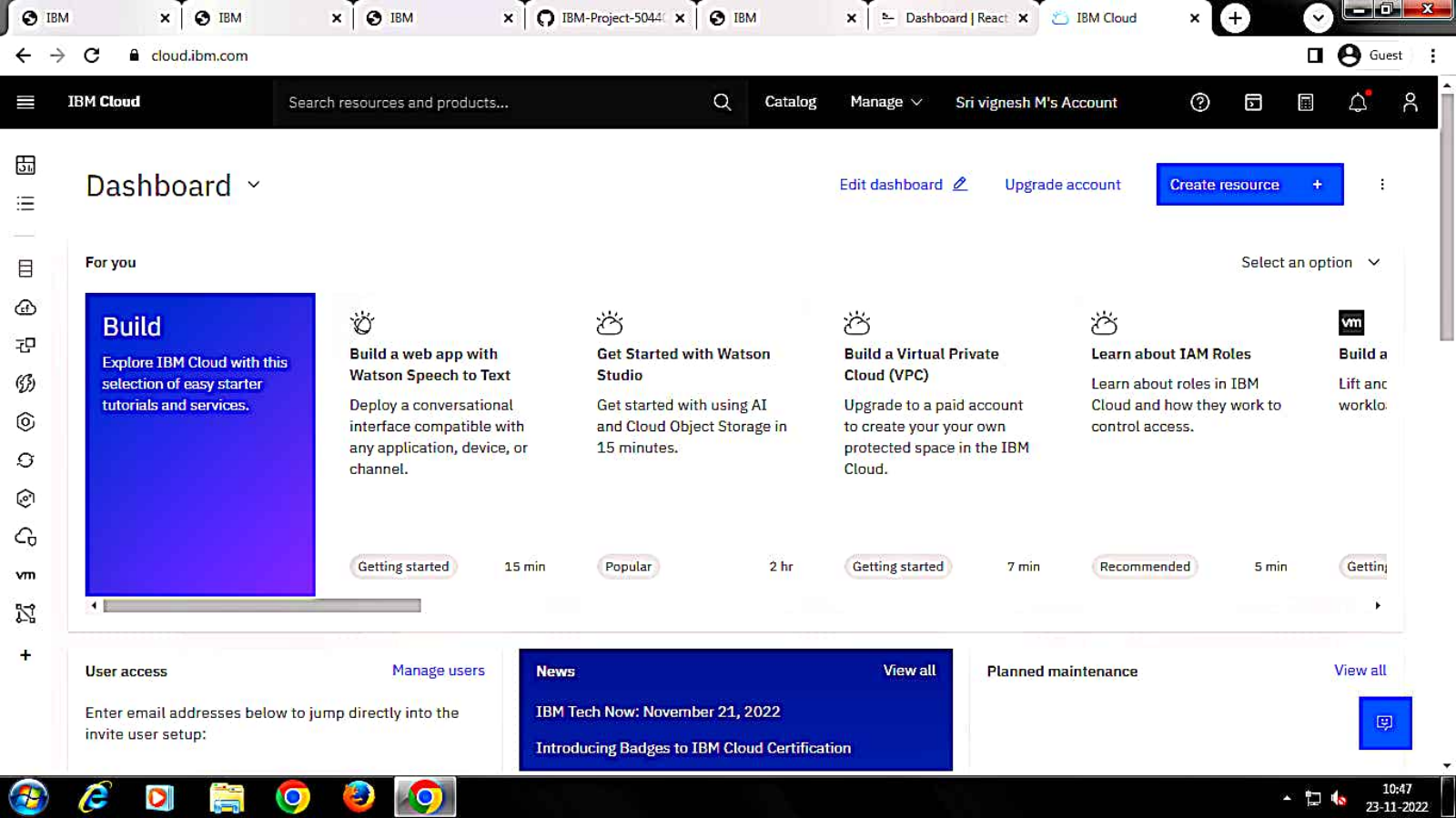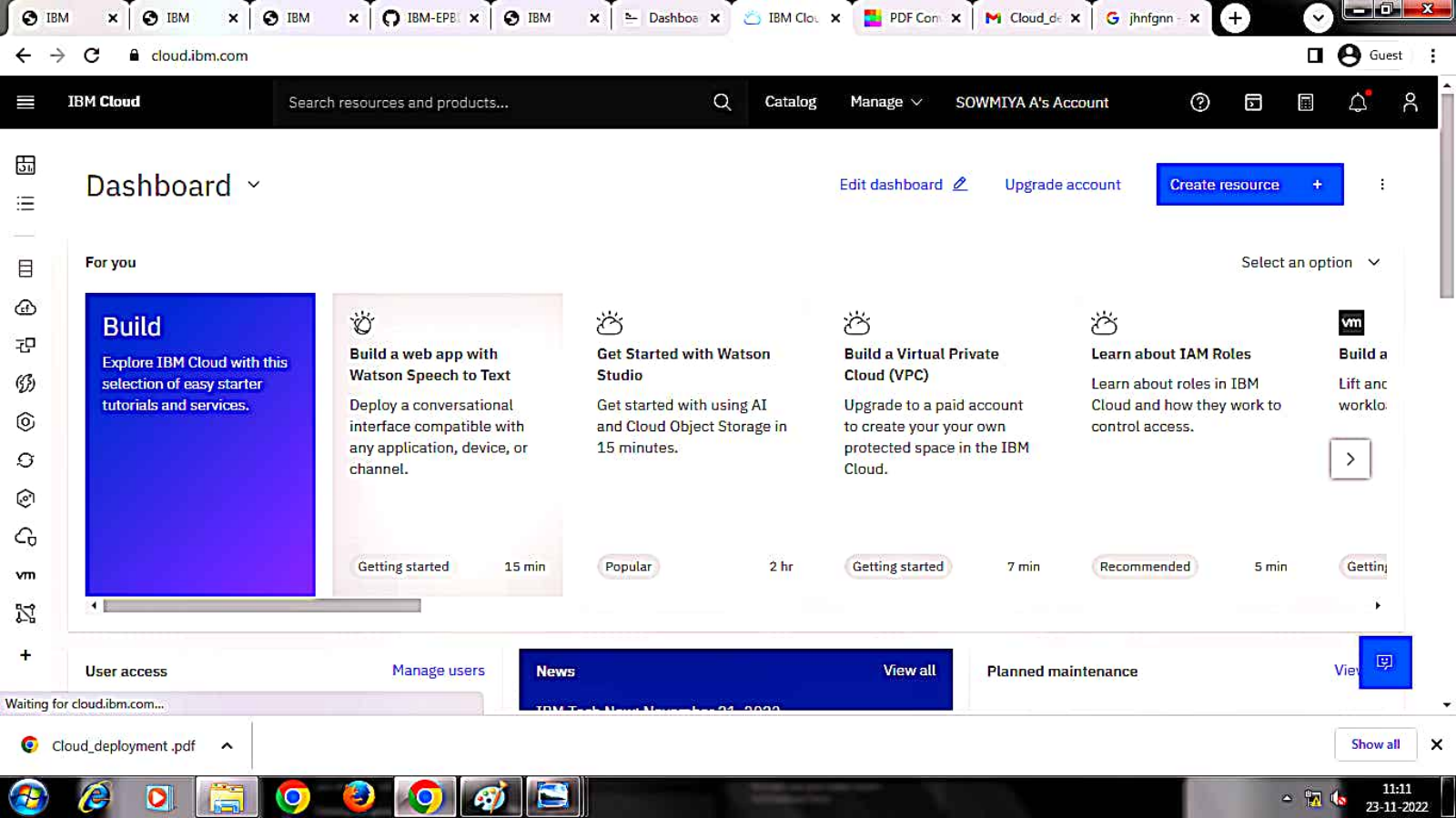| Date	14 OCT 2022
Team ID	PNT2022TMID54114
Project Name	A Novel Method for Handwritten Digit Recognition System
Maximum marks	4 Marks

Date	14 October 2022
Team ID	PNT2022TMID54113
Project Name	AI FOR A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM
Maximum Marks	4 Marks

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Name ↑	Group	Location	Product	Status	Tags
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⌄ Compute (0)

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⌄ AI / Machine Learning (2)

| | Watson Machine Learning-si | Default | Dallas | Watson Machine Learning | ✓ Active | 1 | ⋮ |
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∧ Containers (0)

∧ Networking (0)

∧ Storage (1)

	Cloud Object Storage-ui	Default	Global	Cloud Object Storage	● Active	1	⋮

∧ AI / Machine Learning (2)

	Watson Machine Learning-hg	Default	Dallas	Watson Machine Learning	● Active	1	⋮
	Watson Studio-90	Default	Dallas	Watson Studio	● Active	—	⋮

∧ Analytics (0)

∧ Blockchain (0)

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Watson Studio-zz   ● Active   Add tags ✎
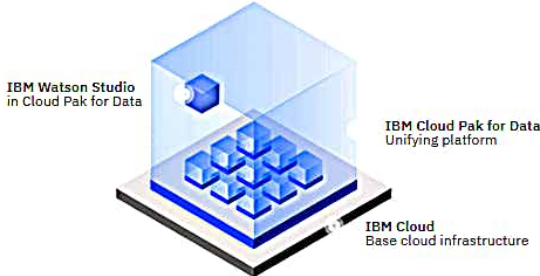
Details   Actions... ⌄

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Watson Studio is one of the core services in Cloud Pak for Data as a Service. Build, deploy and manage AI models, and optimize decisions on IBM Cloud Pak for Data.

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Learn about tools, features, and how to

Learning path
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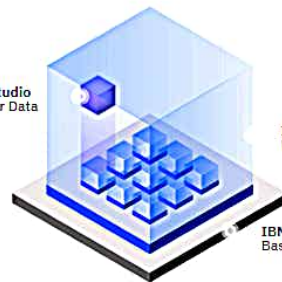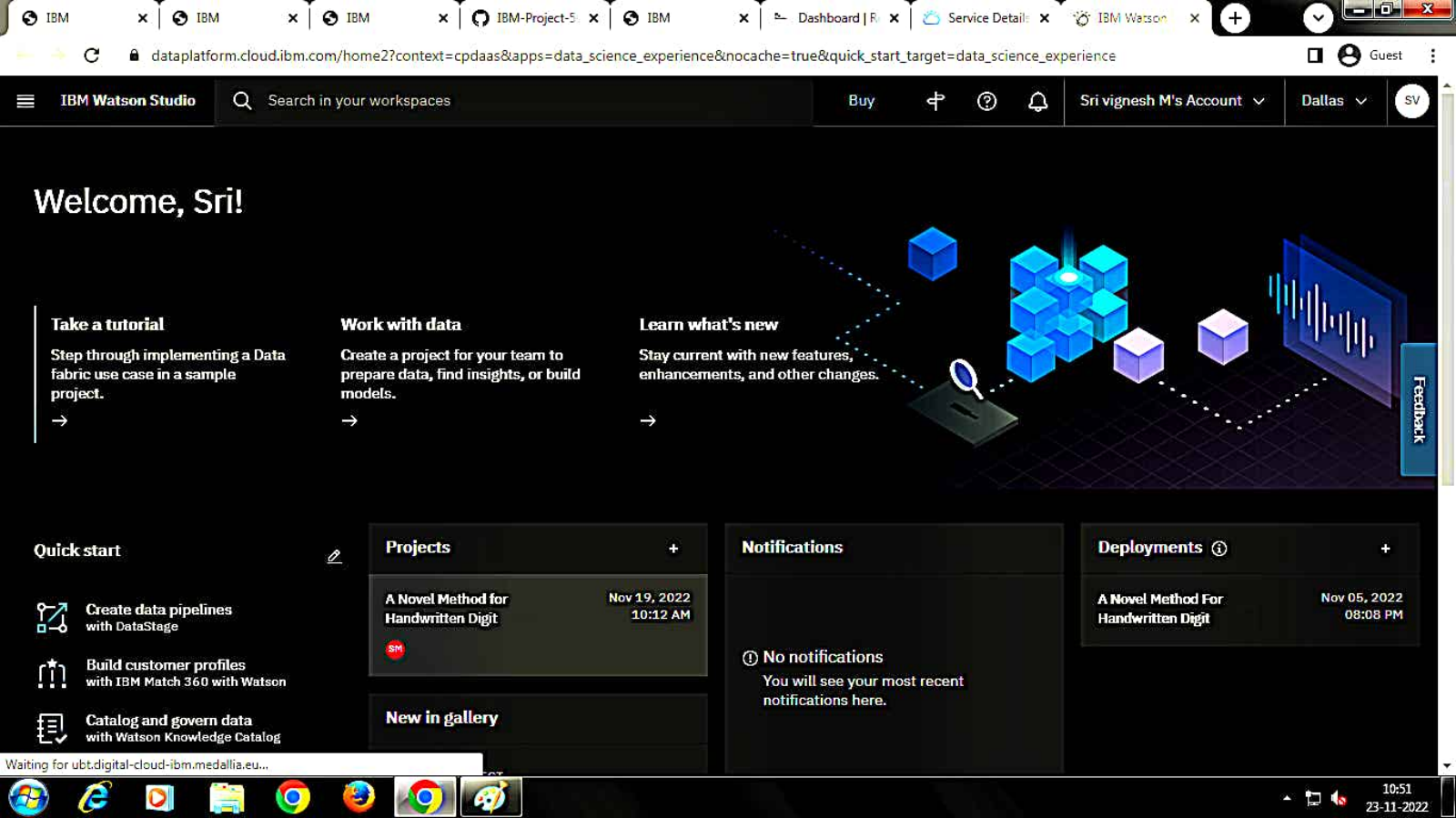
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with DataStage

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with IBM Match 360 with Watson

Catalog and govern data
with Watson Knowledge Catalog

Build and manage ML models
with Watson Studio

Query data anywhere
with Watson Query

What's new

New Runtime 2022 release for Python

Projects

A Novel Method for Handwritten Digit
Oct 26, 2022
11:13 AM

A NOVEL METHOD FOR HANDWRITTEN DIGIT
Oct 15, 2022
11:05 AM

New in gallery

SAMPLE PROJECT

Text Analysis with Watson Natural Language...

In this project, you will find examples on how to

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Deployments ⓘ

models
Nov 05, 2022
08:48 PM

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dataplatform.cloud.ibm.com/projects/bf105390-db83-414c-89d3-d124a99cd2b6?context=cpdaas

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Launch IDE

Overview

Assets

Jobs

Manage

Data in this project

Assets

A NOVEL METHOD FOR H
4 days ago by you

CNN_DEPLOYMENTS
3 weeks ago by you

View all

Resource usage

For this month in this project

7.3 CUH

Readme
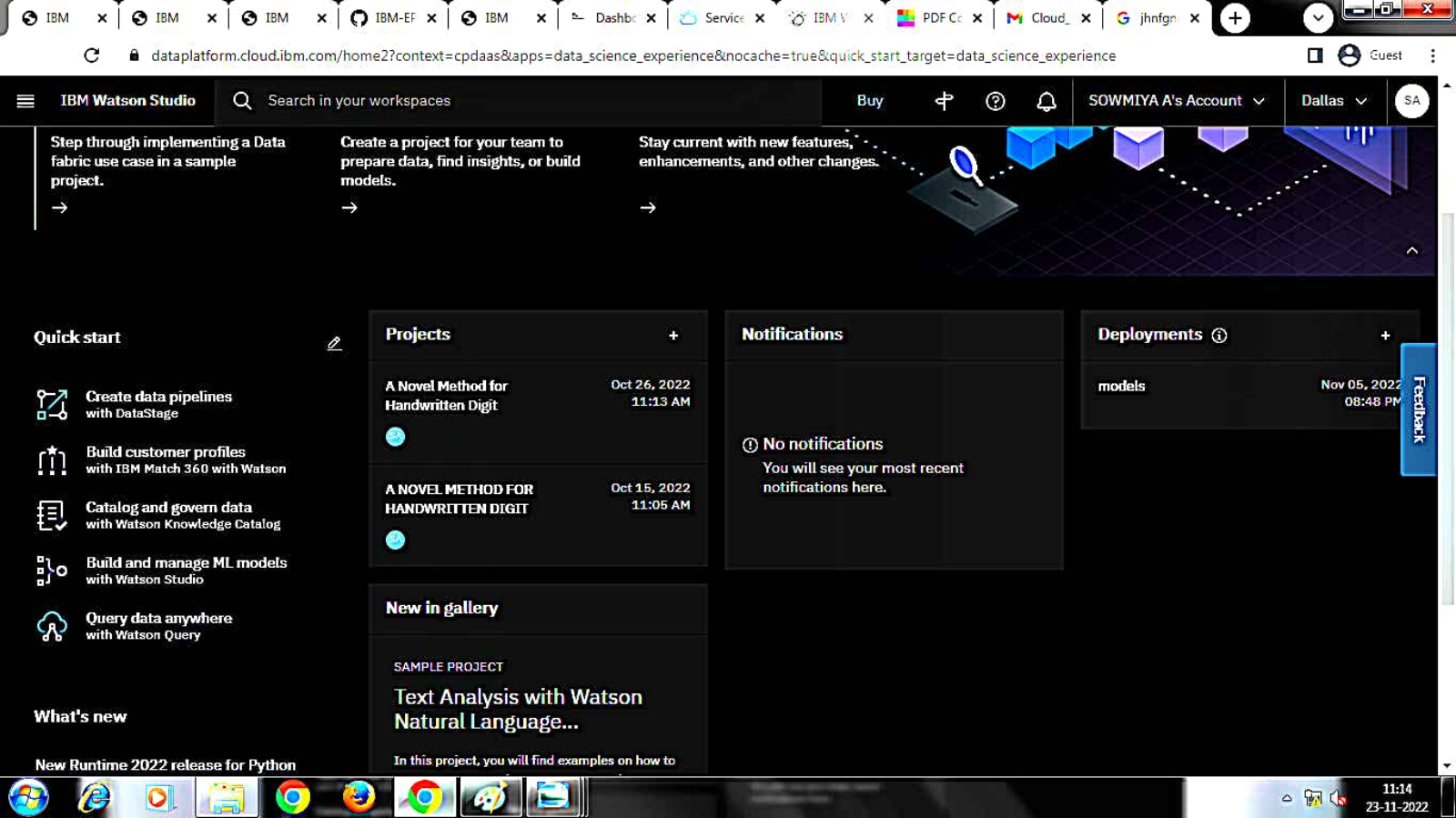
Type project notes, reminders,
or instructions

Project history

You created project A Novel Method for Handwritten Digit
Recognition System

Oct 16, 2022 07:26 PM

Drop data files here or
browse for files to upload

10:51
23-11-2022

dataplatform.cloud.ibm.com/projects/d2da74a1-1a1f-4658-9eb1-059fe0076e78/assets?context=cpdaas

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Overview | **Assets** | Jobs | Manage

Data in this project ✕

Find assets

Import assets   New asset +

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3 assets

All assets

All assets

Asset types

> Data   1
Notebooks   2

All assets

Name	Last modified ↓	
🔖 CNN_DEPLOYMENTS 🔒 Notebook	4 days ago Modified by you	⋮
🔖 HDR DEPLOYMENTS 🔒 Notebook	4 days ago Modified by you	⋮
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```
In [2]:  !pip install tensorflow --upgrade
```

```
Requirement already satisfied: tensorflow in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (2.7.2)
Collecting tensorflow
  Downloading tensorflow-2.11.0-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (588.3 MB)
     |████████████████████████████████| 588.3 MB 25 kB/s /s eta 0:00:0104 | 334.6 MB 131.2 MB/s eta 0:00:02████████████     | 412.9 MB 131.2 MB/s eta 0:00:02████████
| 419.1 MB 131.2 MB/s eta 0:00:02��████████████     | 494.5 MB 124.4 MB/s eta 0:00:01579.6 MB 140.6 MB/s eta 0:00:01�████████████████████| 586.6 MB 140.6 MB/s eta 0:00:01
Requirement already satisfied: gast<=0.4.0,>=0.2.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (0.4.0)
Collecting keras<2.12,>=2.11.0
  Downloading keras-2.11.0-py2.py3-none-any.whl (1.7 MB)
     |████████████████████████████████| 1.7 MB 109.2 MB/s eta 0:00:01
Requirement already satisfied: numpy>=1.20 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (1.20.3)
Collecting libclang>=13.0.0
  Downloading libclang-14.0.6-py2.py3-none-manylinux2010_x86_64.whl (14.1 MB)
     |████████████████████████████████| 14.1 MB 105.2 MB/s eta 0:00:01    |███     | 1.5 MB 105.2 MB/s eta 0:00:01
Collecting tensorflow-estimator<2.12,>=2.11.0
  Downloading tensorflow_estimator-2.11.0-py2.py3-none-any.whl (439 kB)
     |████████████████████████████████| 439 kB 110.9 MB/s eta 0:00:01
Requirement already satisfied: typing-extensions>=3.6.6 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (4.1.1)
Collecting tensorboard<2.12,>=2.11
  Downloading tensorboard-2.11.0-py3-none-any.whl (6.0 MB)
     |████████████████████████████████| 6.0 MB 98.7 MB/s eta 0:00:01 0:00:01
Requirement already satisfied: wrapt>=1.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (1.12.1)
Requirement already satisfied: opt-einsum>=2.3.2 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (3.3.0)
Requirement already satisfied: six>=1.12.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (1.15.0)
Requirement already satisfied: setuptools in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (58.0.4)
Requirement already satisfied: protobuf<3.20,>=3.9.2 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (3.19.1)
Requirement already satisfied: h5py>=2.9.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (3.2.1)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (1.42.0)
Collecting absl-py>=1.0.0
  Downloading absl_py-1.3.0-py3-none-any.whl (124 kB)
```

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```
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```

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     |████████████████| 588.3 MB 25 kB/s /s eta 0:00:0104 | 334.6 MB 131.2 MB/s eta 0:00:02█████    | 412.9 MB 131.2 MB/s eta 0:00:02████
     | 419.1 MB 131.2 MB/s eta 0:00:02██████    | 494.5 MB 124.4 MB/s eta 0:00:01579.6 MB 140.6 MB/s eta 0:00:01████████| 586.6 MB 140.6 MB/s eta 0:00:01
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  Downloading keras-2.11.0-py2.py3-none-any.whl (1.7 MB)
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Requirement already satisfied: grpcio<2.0,>=1.24.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow) (1.42.0)
Collecting absl-py>=1.0.0
  Downloading absl_py-1.3.0-py3-none-any.whl (124 kB)
```

```
In [1]: pwd
```

```
Out[1]: '/home/wsuser/work'
```

```
In [2]: import cv2
        import numpy as np
        from keras.datasets import mnist
        from keras.layers import Dense, Flatten, MaxPooling2D, Dropout
        from keras.layers.convolutional import Conv2D
        from keras.models import Sequential
        from tensorflow.keras.utils import to_categorical
        import matplotlib.pyplot as plt
```

```
In [3]: (X_train, y_train), (X_test, y_test) = mnist.load_data()
```

```
        Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
        11493376/11490434 [==============================] - 0s 0us/step
        11501568/11490434 [==============================] - 0s 0us/step
```

```
In [4]: ## Looking at a sample
        plt.imshow(X_train[0], cmap="gray")
        plt.show()
        print (y_train[0])
```

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```

```
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        Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
        11493376/11490434 [==============================] - 0s 0us/step
        11501568/11490434 [==============================] - 0s 0us/step
```

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