H2O Wave Training

H2O.ai

Contents

Wave Document: https://wave.h2o.ai/

Getting Started

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Waveの実行にに必要な3つの要素

- Content Server running Wave SDK
  - The waved server is a ~10MB static binary executable that runs anywhere
  - Stores site content, transmits content changes to browsers, transmits browser events to apps

Download: https://github.com/h2oai/wave/releases

- Language Driver
  - The h2o_wave python package used by wave scripts and interactive apps
  - Allows developer to mange content on waved, completely in python

Download(pipインストール): https://pypi.org/project/h2o-wave/

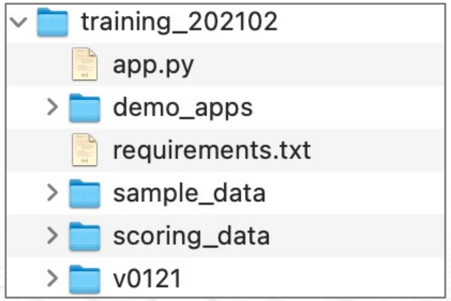
- Browser Based Client
  - The user interface and components
  - Renders content to users and transmits events back to waved

環境構築

1. Wave SDKのダウンロードとフォルダの解凍
   - https://github.com/h2oai/wave/releases

2. Python環境の構築
   1. トレーニング用フォルダを作成し、Python3仮想環境を作成 `$ python3 –m venv your_env`
   2. 作成した仮想環境にログイン `$ source your_env/bin/activate`
   3. "requirements.txt"記載のPythonパッケージをインストール `(your_env) $ pip install –r requirements.txt`

トレーニング用フォルダ（ training_202102 ）を作成
Python仮想環境（v0121）を作成



```
training_202102
    app.py
  > demo_apps
    requirements.txt
  > sample_data
  > scoring_data
  > v0121
```

requirements.txt

```
h2o_wave==0.12.1
driverlessai==1.9.1
pandas
numpy
```

注意
- Wave SDKとh2o_waveのバージョンを揃える
- Driverless AIのバージョンにdriverlessaiのバージョンを揃える

Running App, ‘Hello World’

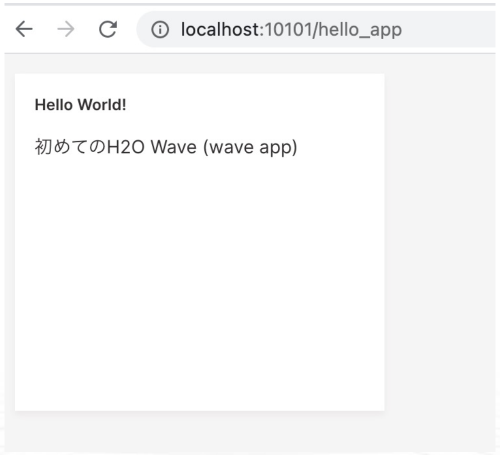
1. Wave Server(Web Server)の起動
    1. ダウンロードし解凍したWave SDKフォルダのwavedファイルを実行 `(your_env) $ ./waved`

2. Appの実行
    1. トレーニング用フォルダのdemo_appsフォルダ内のdemo_hello_app.pyを実行 `(your_env) $ wave run demo_hello_app.py`

demo_hello_app.py

```
from h2o_wave import Q, main, app, ui

@app('/hello_app')
async def serve(q: Q):

        q.page['card_hello'] = ui.markdown_card(
                box = '1 1 2 3',
                title = 'Hello World!',
                content = '初めてのH20 Wave (wave app)',
        )

        await q.page.save()
```

ブラウザからアクセス


localhost:10101/hello_app

Hello World!

初めてのH2O Wave (wave app)

Wave App or Wave Script?

インタラクティブ(ブラウザへのアクション)なアプリケーションの開発の場合はWav Appを用いる

demo_hello_app.py

```
from h2o_wave import Q, main, app, ui

@app('/hello_app')
async def serve(q: Q):

      q.page['card_hello'] = ui.markdown_card(
            box = '1 1 2 3',
            title = 'Hello World!',
            content = '初めてのH2O Wave (wave app)',
      )

      await q.page.save()
```

Wave Appの実行:
(your_env) $ wave run demo_hello_app.py

インタラクティブ無し(ブラウザからのアクションを反映させる必要がない)のダッシュボード開発の場合はWave Scriptを用いる

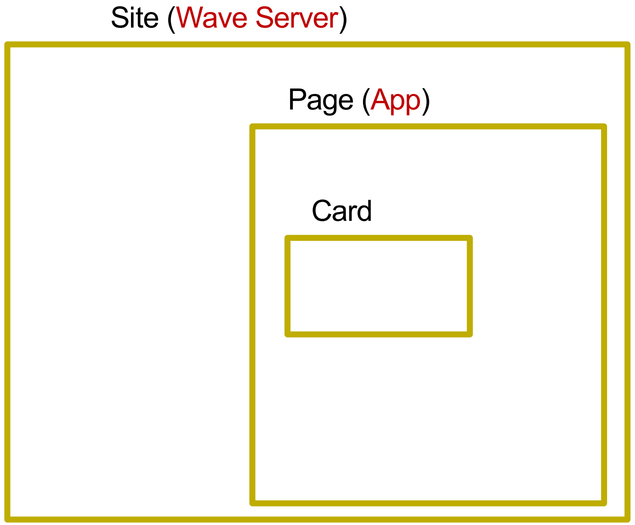
demo_hello_script.py

```
from h2o_wave import site, ui

page = site['/hello_script']

page['card_hello'] = ui.markdown_card(
      box = '1 1 2 3',
      title = 'Hello World!',
      content = '初めてのH2O Wave (wave script)',
)

page.save()
```

Wave Scriptの実行:
(your_env) $ python demo_hello_script.py

✓ 上記コードは同じ結果が得られる
✓ インタラクティブ無しのアプリケーションでも、Wave Appで開発可

Site/Pages/Cards



- Siteは複数のPageを持つことができる
- Pageはそれぞれディレクトリを持つ
- Cardがダッシュボード等のコンテンツとなる
- Pageの中に複数のCardを記述できる

appデコレータ(@app)
- Page(App)のディレクトリ('/hello_app')
- ブラウザからのアクションがあればappデコレータ下の関数(serve)が毎回実行される

```
from h2o_wave import Q, main, app, ui

@app('/hello_app')
async def serve(q: Q):

    q.page['card_hello'] = ui.markdown_card(
            box = '1 1 2 3',
            title = 'Hello World!',
            content = '初めてのH2O Wave (wave app)',
    )

    await q.page.save()
```

Card
- 複数配置できる

“Site”

AKA the Wave server

How it works

- The Wave server stores and manages content
  - Content is stored in a page cache, called a site
- The Wave server runs at a specific address – this is also the site
  - localhost:10101
  - yourpublicaddress:10101
- Multiple apps can be running at a single site, each of these is a page

How to use it

- Reference to browsers interacting with the server is handled with `Q`
- Q is the query object that comes from the browser and lets the developer know how the browser wants to interact with the content on the site

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“Pages”

Collections of information saved on the Wave server

How it works

- Developers add content to specific pages
  - Static content
  - Content that updates in real time
  - Content that is an interactive application
- Use a specific address to reach each page, or app
  - localhost:10101/
  - localhost:10101/test
    localhost:10101/myapp

How you use it

- Use the `@app('/page')` function to tell your code which page to update:
  - Indicates that the next function is where browser requests will be directed to
  - Use to route browsers to a specific Wave page
- Reference a page, make changes, and save
  - No explicit creation step is needed

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“Cards”

A block of content on a specific Wave page

How it works

- Choose the type of card you want
  - 100s of cards to choose from for your exact needs
- Reference the page you want to add the card to, the name of the card, and the type of the card
- Make any content changes to what should be in the card
- Use `page['card_name']` to create and reference a new card

Examples

- Forms
  - This is the most used card in Wave apps
  - Used to show textboxes, dropdowns, and so on and get input from a user
- Content
  - Markdown, Markup (HTML), Image
- Control
  - Header, Navigation Panel, Tabs
- Graphics
  - Plots, graphs

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H2O.ai

Developing a Batch Scoring App

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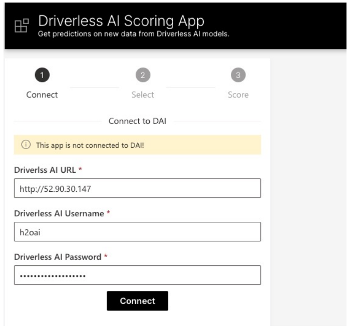
App We Will Build

開発する「Batch Scoring App」に関して


Driverless AI Scoring App
Get predictions on new data from Driverless AI models.

1 Connect — 2 Select — 3 Score

Connect to DAI

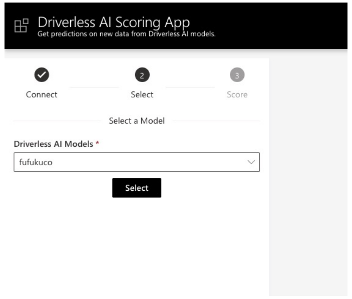
ⓘ This app is not connected to DAI!

Driverlss AI URL *
http://52.90.30.147

Driverless AI Username *
h2oai

Driverless AI Password *
•••••••••••••••••••

Connect

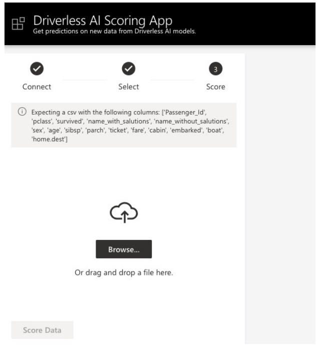

Driverless AI Scoring App
Get predictions on new data from Driverless AI models.

✓ Connect — 2 Select — 3 Score

Select a Model

Driverless AI Models *
fufukuco

Select


Driverless AI Scoring App
Get predictions on new data from Driverless AI models.

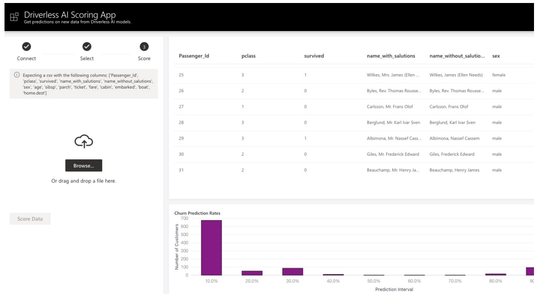
✓ Connect — ✓ Select — 3 Score

ⓘ Expecting a csv with the following columns: ['Passenger_Id', 'pclass', 'survived', 'name_with_salutions', 'name_without_salutions', 'sex', 'age', 'sibsp', 'parch', 'ticket', 'fare', 'cabin', 'embarked', 'boat', 'home.dest']

Browse...

Or drag and drop a file here.

Score Data


Driverless AI Scoring App
Get predictions on new data from Driverless AI models.

✓ Connect — ✓ Select — 3 Score

ⓘ Expecting a csv with the following columns: ['Passenger_Id', 'pclass', 'survived', 'name_with_salutions', 'name_without_salutions', 'sex', 'age', 'sibsp', 'parch', 'ticket', 'fare', 'cabin', 'embarked', 'boat', 'home.dest']

Browse...

Or drag and drop a file here.

Score Data

Passenger_Id	pclass	survived	name_with_salutions	name_without_salutio...	sex
25	3	1	Wilkes, Mrs. James (Ellen ...	Wilkes, James (Ellen Needs)	female
26	2	0	Byles, Rev. Thomas Rousse...	Byles, Rev. Thomas Rousse...	male
27	1	0	Carlsson, Mr. Frans Olof	Carlsson, Frans Olof	male
28	3	0	Berglund, Mr. Karl Ivar Sven	Berglund, Karl Ivar Sven	male
29	3	1	Albimona, Mr. Nassef Cass...	Albimona, Nassef Cassem	male
30	2	0	Giles, Mr. Frederick Edward	Giles, Frederick Edward	male
31	2	0	Beauchamp, Mr. Henry Ja...	Beauchamp, Henry James	male

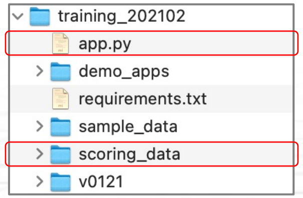
① Driverless AIへの接続

② モデル(学習済み)の選択

③ スコアリング用データのアップロード

④ スコアリング結果の確認、ダウンロード

必要機能
- データのアップロードとダウンロード
- Driverless AIへの接続とスコアリングの実施
- データやスコアリング結果の表示


training_202102
app.py
demo_apps
requirements.txt
sample_data
scoring_data
v0121

アプリのプログラム

アップロード/スコアリング結果データのApp上保存先

Components

必要機能を個別に学習

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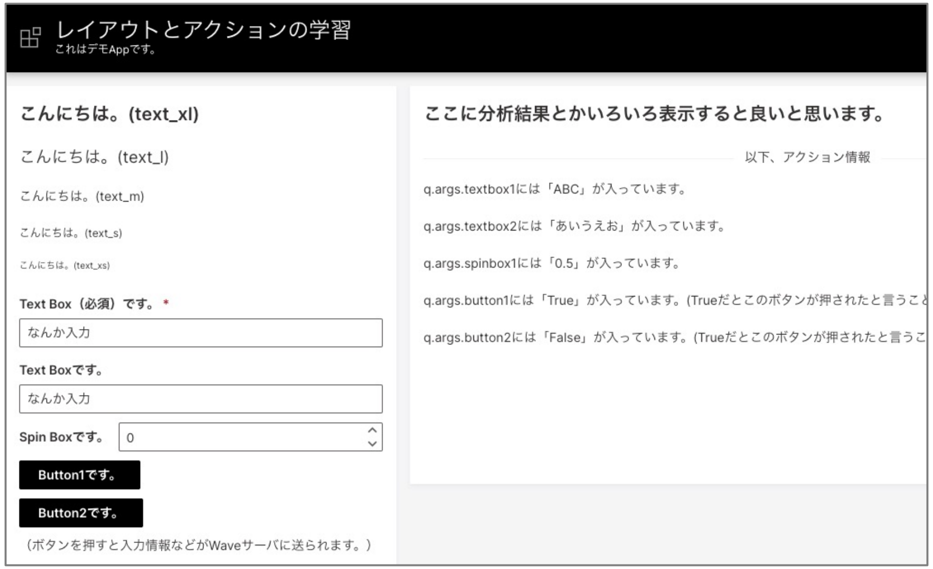
レイアウトとアクション

コード:demo_layout.py

学習内容
- PageにCardsを配置し、カード内に色んなアイテムを配置する
- テクストボックスやボタンなどの動き(ブラウザからのアクション)を理解する


レイアウトとアクションの学習
これはデモAppです。

こんにちは。(text_xl)

こんにちは。(text_l)

こんにちは。(text_m)

こんにちは。(text_s)

こんにちは。(text_xs)

Text Box（必須）です。 *

なんか入力

Text Boxです。

なんか入力

Spin Boxです。 0

Button1です。

Button2です。

（ボタンを押すと入力情報などがWaveサーバに送られます。）

ここに分析結果とかいろいろ表示すると良いと思います。

以下、アクション情報

q.args.textbox1には「ABC」が入っています。

q.args.textbox2には「あいうえお」が入っています。

q.args.spinbox1には「0.5」が入っています。

q.args.button1には「True」が入っています。(Trueだとこのボタンが押されたと言うこと

q.args.button2には「False」が入っています。(Trueだとこのボタンが押されたと言うこ

“Query Arguments”

- Information based on how a user interacts with a page
  - Typing text
  - Clicking buttons
  - Making choices
- The information is available to the app
  - Did the user fill out this textbox and if so what did they write

- Query Arguments are stored in `q.args`
- The `serve` function often holds a series of if statements checking if various user components have been interacted with
  - If this button was clicked do this
  - Else if this other button was clicked do this
  - If this menu bar was selected do this

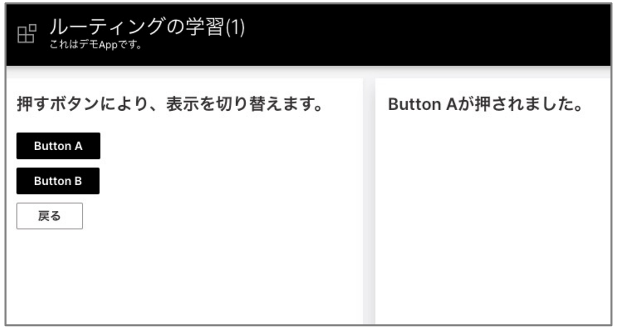
Learn More!

Routing

コード: demo_routing1.py

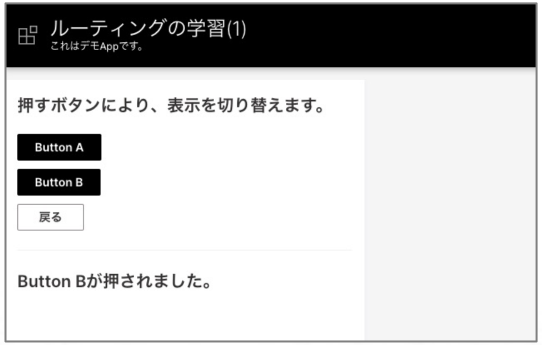
学習内容
- ルーティング(ブラウザからのアクションにしたがって表示を切り替える)の理解

```
async def serve(q: Q):

        if q.args.button_A: # button_Aが押された場合実行。(q.args.button_A==True)
                print('-- button_Aが押された --')
                await do_button_A(q)

        elif q.args.button_B: # button_Bが押された場合実行。(q.args.button_B==True)
                print('-- button_Bが押された --')
                await do_button_B(q)

        else: # 初期画面。button_Aもbutton_Bも押されていない。
                print('-- 初期画面です --')
                await initial_display(q)

        await q.page.save()
```


ルーティングの学習(1)
これはデモAppです。

押すボタンにより、表示を切り替えます。

Button Aが押されました。


ルーティングの学習(1)
これはデモAppです。

押すボタンにより、表示を切り替えます。

Button Bが押されました。

Routing 2

コード：demo_routing2.py

学習内容
- on, handle_onを用いたルーティング
- State（q.client）の理解

```python
from h2o_wave import Q, main, app, ui, on, handle_on

@on('#heads')
async def on_heads(q: Q):
    q.page['sides'].items = [ui.message_bar(text='Heads!')]

@on('#tails')
async def on_heads(q: Q):
    q.page['sides'].items = [ui.message_bar(text='Tails!')]

async def setup_page(q: Q):
    q.page['sides'] = ui.form_card(
        box='1 1 4 4',
        items=[
            ui.button(name='#heads', label='Heads'),
            ui.button(name='#tails', label='Tails'),
        ],
    )

@app('/toss')
async def serve(q: Q):
    if not await handle_on(q):
        await setup_page(q)

    await q.page.save()
```

Document (Routing): https://h2oai.github.io/wave/docs/routing/

“State”

SAVING RUNTIME INFORMATION IN MEMORY

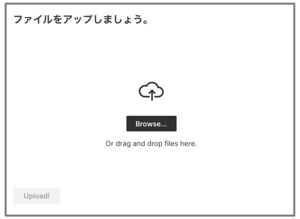
- **App-level:** information shared across all users
- **User-level:** information private to a user, but shared across all browser tabs
- **Client-level:** information private to each browser tab

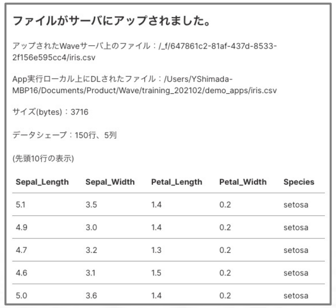
- App-level: `q.app`
  - Shared models
  - Item inventory
  - Stock images
- User-level: `q.user`
  - Items in a shopping cart
  - Log in credentials
- Client-level: `q.client`
  - Current displayed content

ファイルのアップロード/ダウンロード

コード：demo_fileup.py

学習内容
- ファイルのアップロードとダウンロード
- AppとWave Server間のデータのやりとり
- App内でのデータ（pandas.DataFrame）の表示
- App内でのデータ加工




ファイルがサーバにアップされました。

アップされたWaveサーバ上のファイル：/_f/647861c2-81af-437d-8533-2f156e595cc4/iris.csv

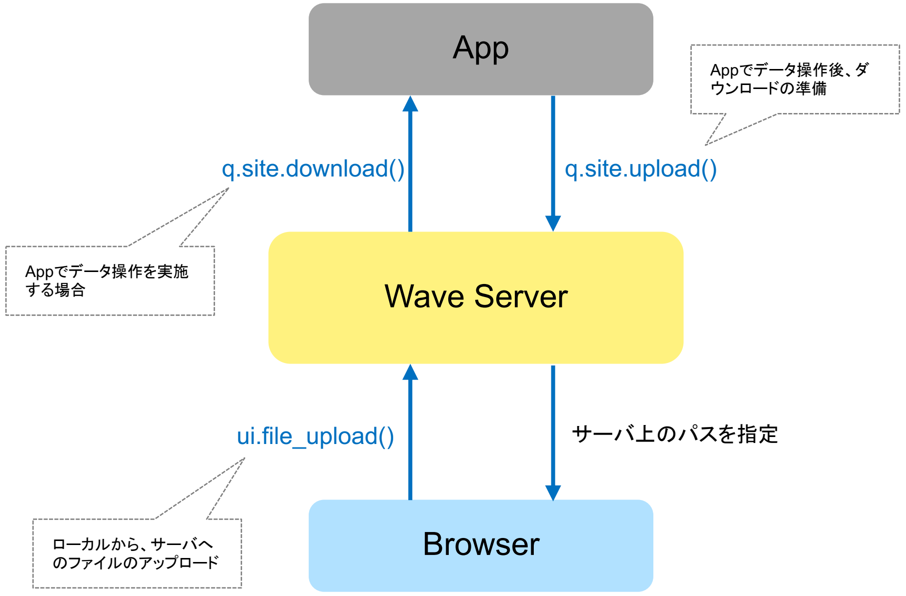
App実行ローカル上にDLされたファイル：/Users/YShimada-MBP16/Documents/Product/Wave/training_202102/demo_apps/iris.csv

サイズ(bytes)：3716

データシェープ：150行、5列

(先頭10行の表示)

Sepal_Length	Sepal_Width	Petal_Length	Petal_Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa

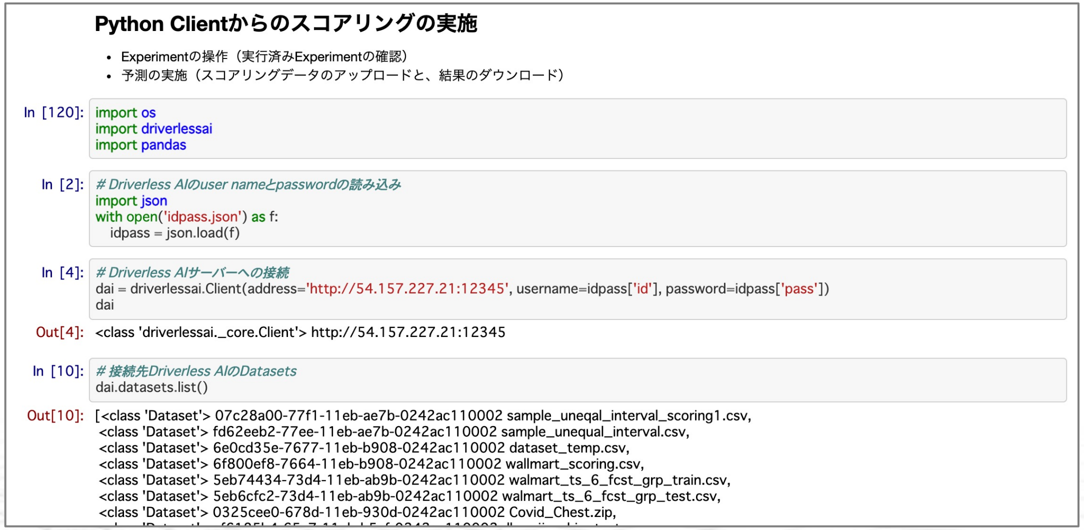

App
Appでデータ操作後、ダウンロードの準備
q.site.download()
q.site.upload()
Appでデータ操作を実施する場合
Wave Server
ui.file_upload()
サーバ上のパスを指定
ローカルから、サーバへのファイルのアップロード
Browser

Driverless AI Client

Github: https://github.com/yukismd/Driverless_AI_ClientAccess

学習内容
- クライアント環境からDriverless AIへの接続
- スコアリングの実施

スコアリング実施例: https://github.com/yukismd/Driverless_AI_ClientAccess/blob/main/IID_Table/handling_experiment.ipynb



Python Clientからのスコアリングの実施

- Experimentの操作（実行済みExperimentの確認）
- 予測の実施（スコアリングデータのアップロードと、結果のダウンロード）

```
In [120]: import os
          import driverlessai
          import pandas
```

```
In [2]: # Driverless AIのuser nameとpasswordの読み込み
        import json
        with open('idpass.json') as f:
            idpass = json.load(f)
```

```
In [4]: # Driverless AIサーバーへの接続
        dai = driverlessai.Client(address='http://54.157.227.21:12345', username=idpass['id'], password=idpass['pass'])
        dai

Out[4]: <class 'driverlessai._core.Client'> http://54.157.227.21:12345
```

```
In [10]: # 接続先Driverless AIのDatasets
         dai.datasets.list()

Out[10]: [<class 'Dataset'> 07c28a00-77f1-11eb-ae7b-0242ac110002 sample_uneqal_interval_scoring1.csv,
          <class 'Dataset'> fd62eeb2-77ee-11eb-ae7b-0242ac110002 sample_unequal_interval.csv,
          <class 'Dataset'> 6e0cd35e-7677-11eb-b908-0242ac110002 dataset_temp.csv,
          <class 'Dataset'> 6f800ef8-7664-11eb-b908-0242ac110002 walmart_scoring.csv,
          <class 'Dataset'> 5eb74434-73d4-11eb-ab9b-0242ac110002 walmart_ts_6_fcst_grp_train.csv,
          <class 'Dataset'> 5eb6cfc2-73d4-11eb-ab9b-0242ac110002 walmart_ts_6_fcst_grp_test.csv,
          <class 'Dataset'> 0325cee0-678d-11eb-930d-0242ac110002 Covid_Chest.zip,
```

Batch Scoring App

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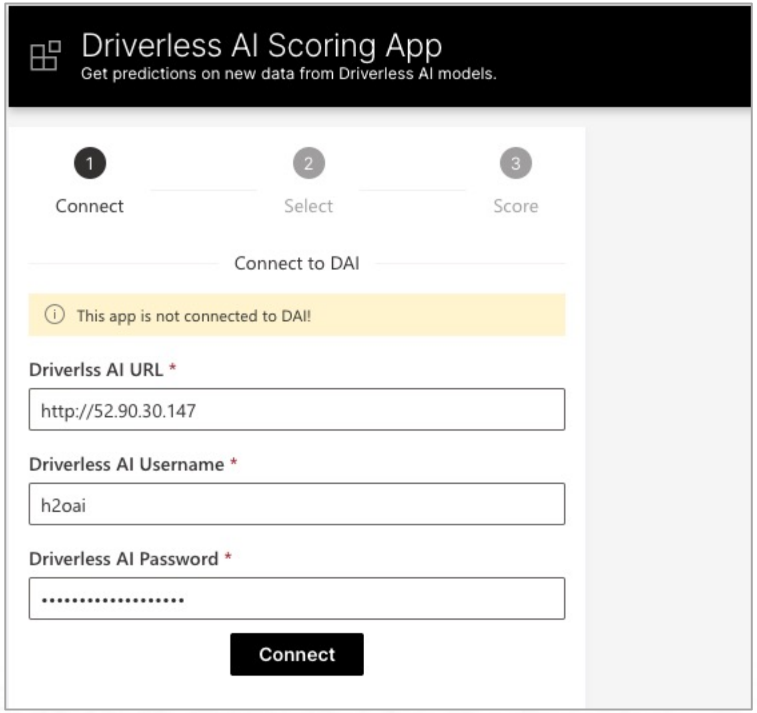
① Driverless AIへの接続


Driverless AI Scoring App

Get predictions on new data from Driverless AI models.

Connect to DAI

This app is not connected to DAI!

Driverlss AI URL *

http://52.90.30.147

Driverless AI Username *

h2oai

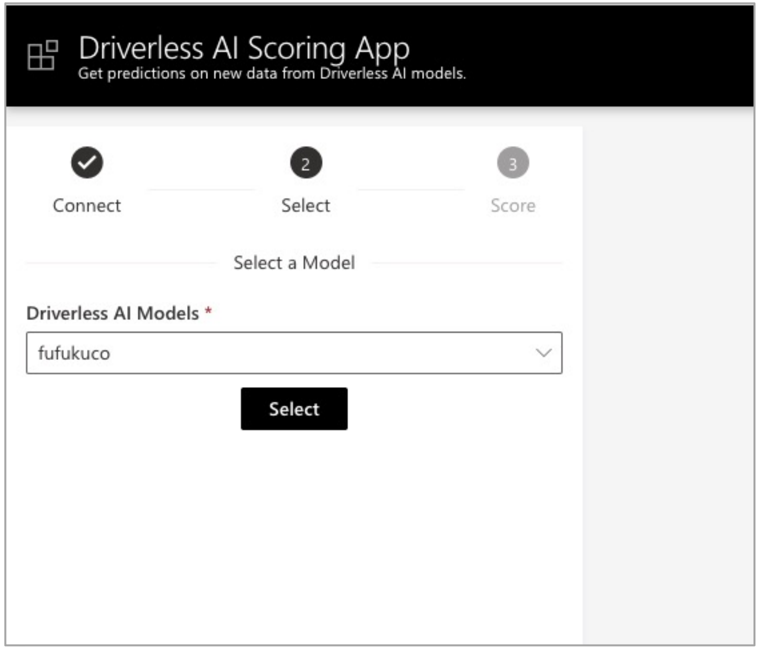
Driverless AI Password *

••••••••••••••••••••

実行される機能（関数）
- serve
- initialize_app_for_new_client
- render_sidebar_content
- get_dai_configure_items

ボタンクリック後に返されるアクション情報（q.args）
- dai_url:'http://52.90.30.147'
- dai_username:'h2oai'
- dai_password:'i-0f12db80917c39394'
- dai_connect_button:True

② モデル(学習済み)の選択


Driverless AI Scoring App
Get predictions on new data from Driverless AI models.

Select a Model

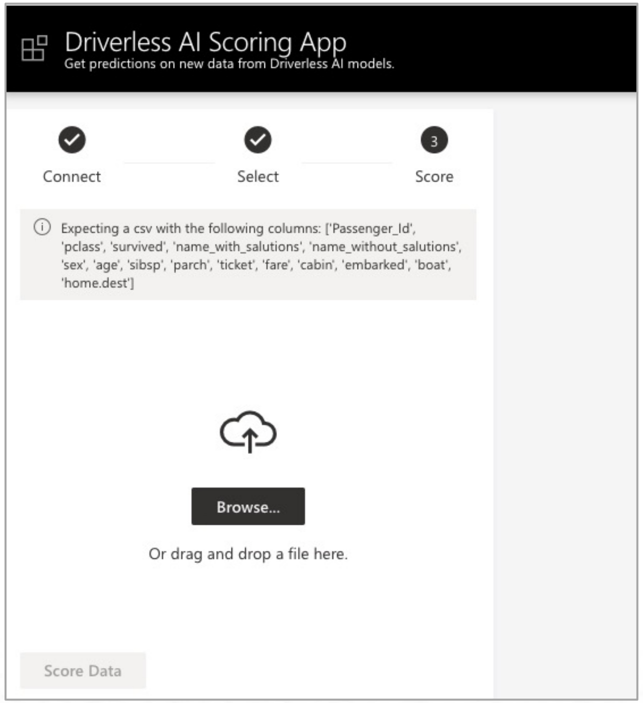
Driverless AI Models *

fufukuco

実行される機能(関数)
- serve
- handle_dai_connection
- create_dai_connection
- render_sidebar_content
- get_model_selection_items
- create_dai_connection

ボタンクリック後に返されるアクション情報(q.args)
- experiment_dropdown:'0559f2ec-678b-11eb-930d-0242ac110002’
- select_model_button:True

③ スコアリング用データのアップロード

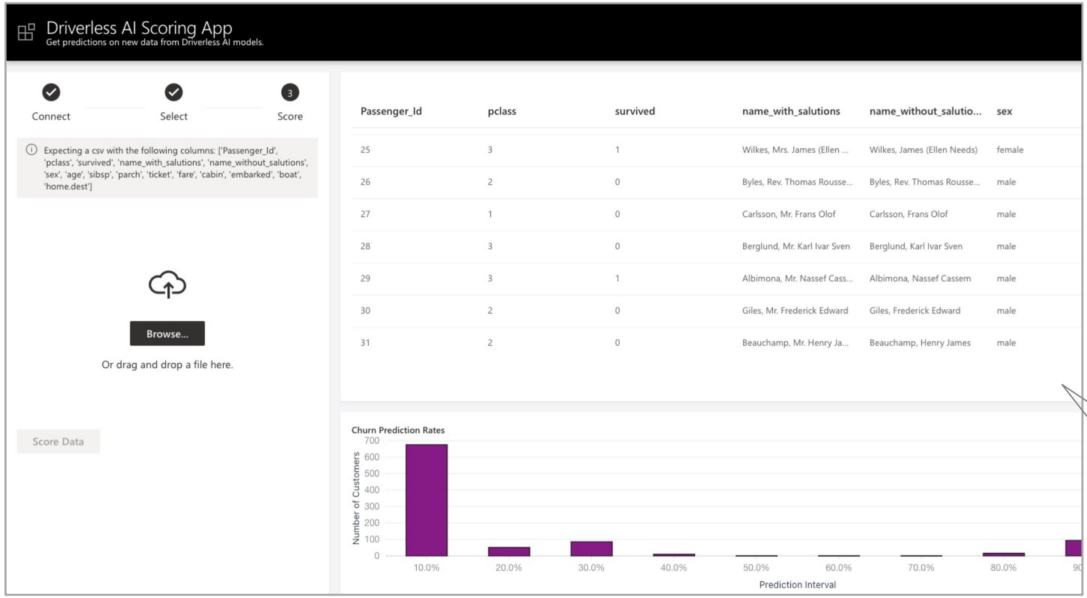

Driverless AI Scoring App
Get predictions on new data from Driverless AI models.

Expecting a csv with the following columns: ['Passenger_Id', 'pclass', 'survived', 'name_with_salutions', 'name_without_salutions', 'sex', 'age', 'sibsp', 'parch', 'ticket', 'fare', 'cabin', 'embarked', 'boat', 'home.dest']

実行される機能（関数）
- serve
- handle_model_selection
- render_sidebar_content
- get_batch_score_items
- create_dai_connection

ボタンクリック後に返されるアクション情報（q.args）
- file_upload:['/_f/441bac5c-d925-4948-bfa0-35e51a23e334/TitanicData.csv']

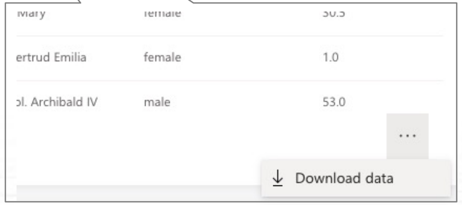
④ スコアリング結果の確認、ダウンロード



Driverless AI Scoring App
Get predictions on new data from Driverless AI models.
Connect
Select
3
Score
Browse...
Or drag and drop a file here.
Score Data
Churn Prediction Rates
Number of Customers
Prediction Interval

Expecting a csv with the following columns: ['Passenger_Id', 'pclass', 'survived', 'name_with_salutions', 'name_without_salutions', 'sex', 'age', 'sibsp', 'parch', 'ticket', 'fare', 'cabin', 'embarked', 'boat', 'home.dest']

Passenger_Id	pclass	survived	name_with_salutions	name_without_salutio...	sex
25	3	1	Wilkes, Mrs. James (Ellen ...	Wilkes, James (Ellen Needs)	female
26	2	0	Byles, Rev. Thomas Rousse...	Byles, Rev. Thomas Rousse...	male
27	1	0	Carlsson, Mr. Frans Olof	Carlsson, Frans Olof	male
28	3	0	Berglund, Mr. Karl Ivar Sven	Berglund, Karl Ivar Sven	male
29	3	1	Albimona, Mr. Nassef Cass...	Albimona, Nassef Cassem	male
30	2	0	Giles, Mr. Frederick Edward	Giles, Frederick Edward	male
31	2	0	Beauchamp, Mr. Henry Ja...	Beauchamp, Henry James	male



実行される機能（関数）
- serve
- handle_batch_scoring
- render_center_content
- get_dai_new_predictions
- create_dai_connection

関数 – serve

WHAT HAPPENS WHEN USERS INTERACT WITH OUR APP

- Waiting for users at the root URL
  - localhost:10101/
  - myurl:10101/
- This function runs each time any user interacts with your app
  - Setup the browser tab if this is a new user
  - Handle any user events like button clicks or file uploads
  - Save new content to the server

```
@app('/')
async def serve(q: Q):

    if not q.client.initialized:
        await initialize_app_for_new_client(q)
    else:
        await handle_on(q)
    await q.page.save()
```

関数 – initialize_app_for_new_client

INFORMATION NEEDED THE FIRST TIME A CLIENT COMES TO THE APP

- Record that this tab has not completed any of the configuration steps
  - Each browser tab visiting your app can see different content!
  - Use `q.client.*` to create variables for saving information about this tab you want to reference throughout the app
- While developing, we can hard-code our DAI credentials for an easier experience
- Call two functions which render UI elements to the tab
- Record that this browser tab is setup

```
async def initialize_app_for_new_client(q: Q):

    # Save which activities each tab has successfully accomplished
    q.client.dai_connection = False
    q.client.model_selected = False
    q.client.data_uploaded = False

    # TODO: delete
    q.client.dai_url = 'http://54.84.100.125:12345'
    q.client.dai_username = 'h2oai'
    q.client.dai_password = 'i-0d7fabc9ac7b049ab'

    render_main(q)
    render_sidebar(q)

    q.client.initialized = True
```

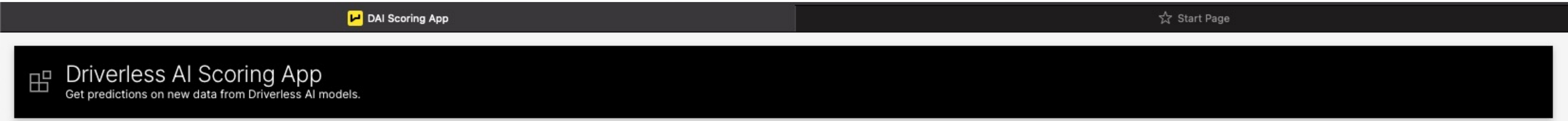
関数 – render_main

UI ELEMENTS WE WANT USERS TO ALWAYS SEE

- Create a meta card
  - Information used in the app that is not an explicit card
  - Browser tab title
  - Color theme
  - Google Analytics
- Create a header card
  - Located at the top of the app, for the whole width of the screen

```
def render_main(q: Q):
    q.page['meta'] = ui.meta_card(
        box='',
        title='DAI Scoring App',
        theme='light'
    )

    q.page['header'] = ui.header_card(
        box='1 1 11 1',
        title='Driverless AI Scoring App',
        subtitle='Get predictions on new data from Driverless AI
models.',
    )
```



Driverless AI Scoring App
Get predictions on new data from Driverless AI models.

関数 – render_sidebar

UI ELEMENT WE WANT USERS TO ALWAYS SEE, WITH DIFFERENT CONTENT

- Create a list of UI elements to show based on which steps this user has completed so far
  - Do they have a valid connection to Driverless AI?
  - Have they selected a model to batch score on?
  - Have they uploaded a dataset?
- Show a 1-2-3 Stepper with their progress in the app and the appropriate elements

```
def render_sidebar(q: Q):

    if not q.client.dai_connection:
        sidebar_items = ...
    elif not q.client.model_selected:
        sidebar_items = ...
    elif not q.client.data_uploaded:
        sidebar_items = ...
    else:
        sidebar_items = ...

    q.page['sidebar'] = ui.form_card(
        box='1 2 3 8',
        items=[
            ui.stepper(name='scoring_config_stepper', items=[
                ui.step(label='Connect', done=q.client.dai_connection),
                ui.step(label='Select', done=q.client.model_selected),
                ui.step(label='Score', done=q.client.data_uploaded),
                ui.step(label='Complete', done=False)
            ])
        ] + sidebar_items
    )
```

関数 – handle_dai_credentials

WHAT HAPPENS WHEN A USER CLICKS THE CONNECT BUTTON

- If a button called `dai_connect_button` is clicked, this function is called
- Save the credentials to be used later in the app
- Call a function which attempts to connect to DAI and returns and error message if it fails
- Save information to use elsewhere
  - Connection error message
  - If connection as successful
  - List of available experiments
- Update the sidebar UI

```
@on('dai_connect_button')
async def handle_dai_credentials(q: Q):

    q.client.dai_url = q.args.dai_url
    q.client.dai_username = q.args.dai_username
    q.client.dai_password = q.args.dai_password

    dai, q.client.error = create_dai_connection(q)


    if q.client.error is None:
        q.client.dai_connection = True
        q.client.experiment_list = dai.experiments.list()

    render_sidebar(q)
```

関数 – handle_model_selection

WHAT HAPPENS WHEN A USER CLICKS THE CONNECT BUTTON

- If a button called `select_model_button` is clicked, this function is called
- Save these experiment id that was selected
  - Save that this tab has selected a model
- Call a function which attempts to connect to DAI and returns and error message if it fails
  - Get a list of expected columns so the user knows what their dataset should look like
- Update the sidebar UI

```
@on('select_model_button')
async def handle_model_selection(q: Q):

    q.client.experiment_key = q.args.experiment_dropdown
    q.client.model_selected = True

    dai, error = create_dai_connection(q)

    q.client.expected_columns =
      dai.experiments.get(q.client.experiment_key)
         .datasets['train_dataset'].columns

    render_sidebar(q)
```

関数 – handle_batch_scoring

WHAT HAPPENS WHEN A USER CLICKS THE CONNECT BUTTON

- If a button called `file_upload` is clicked, this function is called
- Use the `q.site.download` function to download the user's dataset
  - Save that this tab has uploaded data
- Call a function which gets predictions using the DAI python client
  - For binary classification problems, aggregate the data to show predictions
- Update the sidebar and center content UI

```
@on('file_upload')
async def handle_batch_scoring(q: Q):

    q.client.batch_data_path = await
q.site.download(url=q.args.file_upload[0], path='./data')
    q.client.data_uploaded = True

    q.client.scored_df = get_dai_new_predictions(q)

    grouped_predictions = …
    q.client.distribution_data = data(
        fields=grouped_predictions.columns.tolist(),
        rows=grouped_predictions.values.tolist(),
        pack=True,
    )

    render_sidebar(q)
    render_center(q)
```

関数 – render_center

THE CENTER TABLE CONTENT OF DATA AND PREDICTIONS

- The Wave Table widget allows us to create a table object which users can download the data
  - We take the pandas dataframe and create wave table columns and rows

```
def render_center(q: Q):
    df = q.client.df

    table = ui.table(
        name='my_table',
        columns=[ui.table_column(name=str(x),
                                 label=str(x)) for x in df.columns.values],
        rows=[ui.table_row(name=str(i),
                           cells=[str(df[col].values[i])
                                  for col in df.columns.values])
              for i in range(df.shape[0])],
        downloadable=True,
        height='400px'
    )

    q.page['predictions'] = ui.form_card(
        box='4 2 8 5',
        items=[table]
    )
```

おまけ

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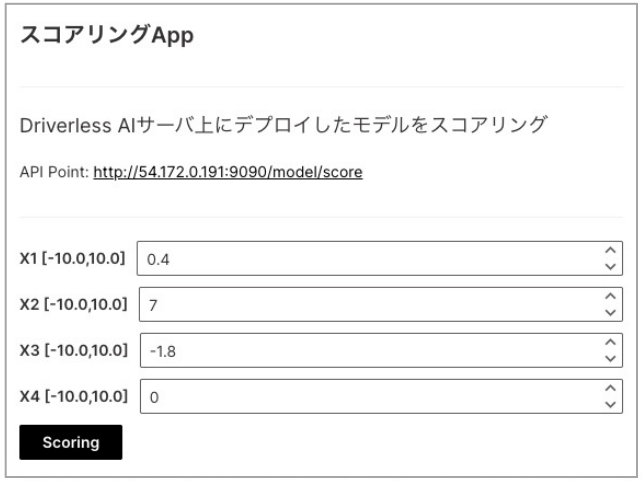
おまけ1

Rest APIによるスコアリングのサンプル

コード：demo_scoring.py

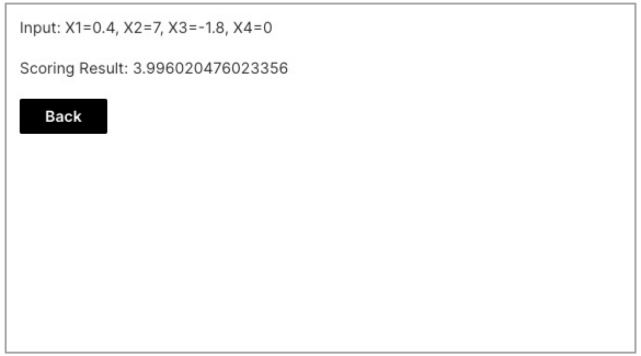


スコアリングApp

Driverless AIサーバ上にデプロイしたモデルをスコアリング

API Point: http://54.172.0.191:9090/model/score

X1 [-10.0,10.0]	0.4
X2 [-10.0,10.0]	7
X3 [-10.0,10.0]	-1.8
X4 [-10.0,10.0]	0



Input: X1=0.4, X2=7, X3=-1.8, X4=0

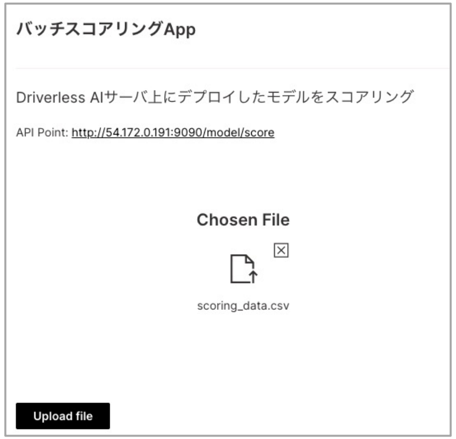
Scoring Result: 3.996020476023356

学習用データ: sample_data/sample_simple.csv

おまけ2

Rest APIによるスコアリングのサンプル

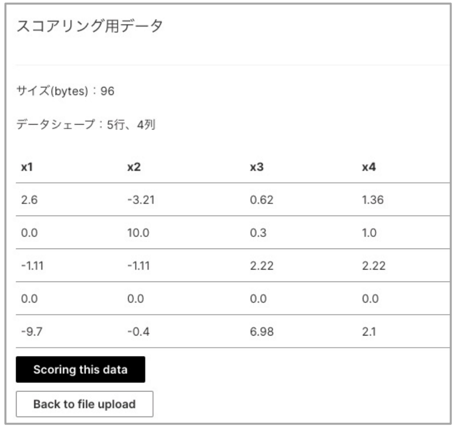
コード：demo_scoring.py



バッチスコアリングApp

Driverless AIサーバ上にデプロイしたモデルをスコアリング

API Point: http://54.172.0.191:9090/model/score

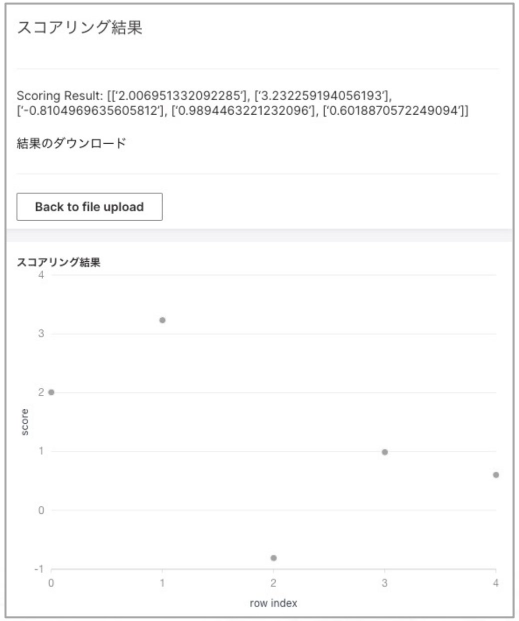


スコアリング用データ

サイズ(bytes)：96

データシェープ：5行、4列

x1	x2	x3	x4
2.6	-3.21	0.62	1.36
0.0	10.0	0.3	1.0
-1.11	-1.11	2.22	2.22
0.0	0.0	0.0	0.0
-9.7	-0.4	6.98	2.1



スコアリング結果

Scoring Result: [['2.006951332092285'], ['3.232259194056193'], ['-0.8104969635605812'], ['0.9894463221232096'], ['0.6018870572249094']]

結果のダウンロード

学習用データ: sample_data/sample_simple.csv
スコアリング用データ: sample_data/ scoring_data.csv

Thank You

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