Mount Drive with Colab

In [18]:
```
from google.colab import drive
drive.mount('/content/drive/')
```

```
Drive already mounted at /content/drive/; to attempt to forcibly remount, call drive.mount("/content/drive/", force_remount=True).
```

Import Libraries

In [19]:
```
import os

os.environ['PROTOCOL_BUFFERS_PYTHON_IMPLEMENTATION'] = 'python'
os.environ['TF_CPP_MIN_LOG_LEVEL'] = '3'

import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
import tensorflow as tf
from tensorflow.keras.models import Model
from tensorflow.keras.layers import Dense, Input
```

In [20]:
```
# Load the data
data = pd.read_csv("/content/drive/MyDrive/Colab Dataset/mobilenetv2_meta.csv")
```

In [21]:
```
data
```

Out[21]:

	optimizer	learning_rate	momentum	cpu	memory	time	epochs	predictions	dataset	loss	accuracy
0	adagrad	0.008751	0.104857	81.2750	75.3438	98.9703	8	348.002441	16	0.041280	1.000000
1	adam	0.001269	0.153086	77.1636	73.4545	132.8219	11	304.502136	16	0.065116	0.979167
2	adamax	0.007288	0.211320	75.5429	73.5071	88.2348	7	435.003052	15	0.110147	0.963542
3	ftrl	0.000581	0.469927	75.0548	75.0619	256.7182	21	304.502136	15	0.184383	0.953125
4	nadam	0.000211	0.187863	74.2542	73.8125	135.8448	12	43.500305	15	0.072042	0.984375
...	...	...	...	...	...	...	...	...	...	...	...
1010	ftrl	0.007620	0.787029	52.1591	40.9182	148.7001	11	43.500305	16	0.051317	0.989583
1011	nadam	0.001103	0.559923	53.1643	43.7071	113.8758	7	391.502747	15	0.157909	0.937500
1012	sgd	0.006675	0.477616	51.4250	43.9438	211.1450	16	304.502136	15	0.084905	0.979167
1013	rmsprop	0.008886	0.434062	51.9273	47.0500	139.8019	11	174.001221	15	0.116141	0.989583
1014	adadelta	0.005858	0.087801	49.2650	43.4833	421.5670	30	261.001831	15	0.339677	0.843750

1015 rows × 11 columns

In [22]:
```
data.shape
```

Out[22]:
```
(1015, 11)
```

Dataset Preprocessing

In [23]:
```
# identify the null values
data.isnull().sum()
```

Out[23]:
```
optimizer       0
learning_rate   0
momentum        0
cpu             0
memory          0
time            0
epochs          0
predictions     0
dataset         0
loss            0
accuracy        0
dtype: int64
```

In [24]:
```
# label Encoding

from sklearn import preprocessing
le=preprocessing.LabelEncoder()
data['optimizer']=le.fit_transform(data['optimizer'])
```

In [25]:
```
# first five rows
data.head()
```

Out[25]:

	optimizer	learning_rate	momentum	cpu	memory	time	epochs	predictions	dataset	loss	accuracy
0	1	0.008751	0.104857	81.2750	75.3438	98.9703	8	348.002441	16	0.041280	1.000000
1	2	0.001269	0.153086	77.1636	73.4545	132.8219	11	304.502136	16	0.065116	0.979167
2	3	0.007288	0.211320	75.5429	73.5071	88.2348	7	435.003052	15	0.110147	0.963542
3	4	0.000581	0.469927	75.0548	75.0619	256.7182	21	304.502136	15	0.184383	0.953125
4	5	0.000211	0.187863	74.2542	73.8125	135.8448	12	43.500305	15	0.072042	0.984375

In [ ]:
```
# info of dataset
data.info()
```

In [26]:
```
data.columns
```

Out[26]:
```
Index(['optimizer', 'learning_rate', 'momentum', 'cpu', 'memory', 'time',
       'epochs', 'predictions', 'dataset', 'loss', 'accuracy'],
      dtype='object')
```

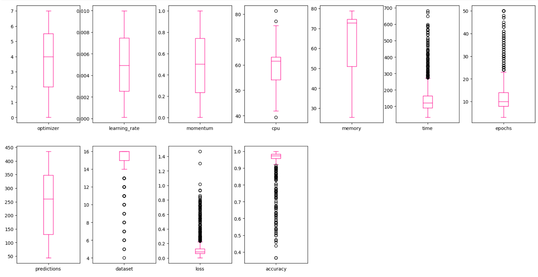
In [27]:
```
input_features = data[['cpu', 'memory', 'dataset']]
output_features = data[['optimizer', 'learning_rate', 'momentum', 'time', 'epochs', 'loss', 'accuracy']]
```

In [28]:
```
x=input_features
y=output_features
```

Visulization

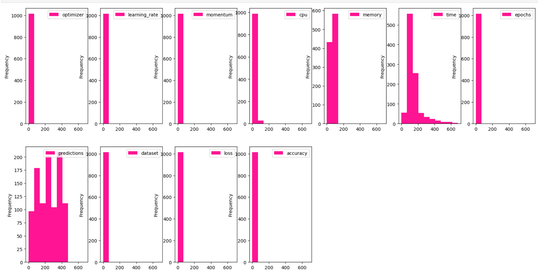
Box Plot

In [47]:
```
data.plot(kind='box', subplots=True, layout=(2,7),
sharex=False,sharey=False, figsize=(20, 10),
color='deeppink');
```



Histogram

In [50]:
```
data.plot(kind='hist', subplots=True, layout=(2,7),
sharex=False,sharey=False, figsize=(20, 10),
color='deeppink');
```



Feature Engineering

In [31]:
```
# feature engineering
x_train , x_test , y_train , y_test=train_test_split(x,y,test_size=0.25)
```

In [32]:
```
x_train
```

Out[32]:

	cpu	memory	dataset
376	61.6700	72.3300	15
827	61.0667	52.1917	16
81	65.7000	75.9167	16
896	53.3000	62.5917	16
131	64.1192	73.3923	16
...	...	...	...
668	54.0188	43.0812	16
816	46.7500	50.5375	16
662	57.7712	50.1167	16
656	49.5222	53.5333	16
104	65.1500	74.5038	15

761 rows × 3 columns

In [33]:
```
# covert dataframe to array
x_train=np.array(x_train)
y_train=np.array(y_train)
x_test=np.array(x_test)
y_test=np.array(y_test)
```

In [34]:
```
# Shape
print(x_train.shape)
print(y_train.shape)
print(x_test.shape)
print(y_test.shape)
```

```
(761, 3)
(761, 7)
(254, 3)
(254, 7)
```

Deep Learning Model (Neural Network)

In [36]:
```
# Define the model architecture
nn_model = tf.keras.models.Sequential([
  tf.keras.layers.Dense(128, activation='relu', input_shape=(3,)),
  tf.keras.layers.Dense(64, activation='relu'),
  tf.keras.layers.Dense(32, activation='relu'),
  tf.keras.layers.Dense(16, activation='relu'),
  tf.keras.layers.Dense(7, activation='softmax')
])
```

In [37]:
```
nn_model.compile(optimizer='adam' , loss=['categorical_crossentropy', 'mse'] , metrics=['accuracy', 'mse'])
```

In [38]:
```
nn_model.summary()
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 dense (Dense)               (None, 128)               512

 dense_1 (Dense)             (None, 64)                8256

 dense_2 (Dense)             (None, 32)                2080

 dense_3 (Dense)             (None, 16)                528

 dense_4 (Dense)             (None, 7)                 119

=================================================================
Total params: 11,495
Trainable params: 11,495
Non-trainable params: 0
_________________________________________________________________
```

In [39]:
```
nn_model.fit(x_train , y_train , epochs=2 , batch_size=32)
```

```
Epoch 1/2
24/24 [==============================] - 2s 2ms/step - loss: 497.6125 - accuracy: 0.6820 - mse: 4386.6069
Epoch 2/2
24/24 [==============================] - 0s 2ms/step - loss: 2216.2354 - accuracy: 1.0000 - mse: 4373.2285
<keras.callbacks.History at 0x7fa972528820>
```