```
import warnings
warnings.filterwarnings('ignore')
```

Generate a slider using jupyter widgets Close

```
import tensorflow as tf


from tensorflow.keras.datasets import boston_housing


(x_train,y_train),(x_test, y_test) = boston_housing.load_data()
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/boston_housing.npz
57026/57026 ━━━━━━━━━━━━━━━━━━━━ 0s 0us/step
```

```
# standardization
from sklearn.preprocessing import StandardScaler
sca = StandardScaler()
x_train = sca.fit_transform(x_train)
x_test = sca.fit_transform(x_test)



from tensorflow.keras import layers, models
from sklearn.metrics import mean_squared_error


# define the architecture

model = models.Sequential()



x_train.shape
```

```
(404, 13)
```

```
(x_train.shape[1],)
```

```
(13,)
```

```
model.add(layers.Dense(64, activation = 'relu',
                       input_shape= (x_train.shape[1],)))


model.add(layers.Dense(64, activation= 'relu'))


model.add(layers.Dense(1))  # output layer


# compile the model
model.compile(optimizer= 'adam', loss = 'mse', metrics= ['mae'])


history = model.fit(x_train, y_train, epochs= 30, batch_size = 32)
```

```
Epoch 1/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 1s 2ms/step - loss: 593.6095 - mae: 22.3686
Epoch 2/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 491.6975 - mae: 20.2339
Epoch 3/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 433.4400 - mae: 18.4977
Epoch 4/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 343.6497 - mae: 16.2352
Epoch 5/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 263.4110 - mae: 13.5809
Epoch 6/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 146.9597 - mae: 9.9951
Epoch 7/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 94.5893 - mae: 7.7518
Epoch 8/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 70.4218 - mae: 6.5052
Epoch 9/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 60.8015 - mae: 5.5726
Epoch 10/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 36.0753 - mae: 4.3646
Epoch 11/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 34.3407 - mae: 4.1898
Epoch 12/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 26.9817 - mae: 3.7248
Epoch 13/30
```

```
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 26.7283 - mae: 3.5835
Epoch 14/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 19.6226 - mae: 3.1308
Epoch 15/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 17.2632 - mae: 3.0794
Epoch 16/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 19.0908 - mae: 3.1402
Epoch 17/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 15.9594 - mae: 2.8709
Epoch 18/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 18.3115 - mae: 3.0881
Epoch 19/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 16.8742 - mae: 2.7857
Epoch 20/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 16.0212 - mae: 2.9375
Epoch 21/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 13.1070 - mae: 2.5418
Epoch 22/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 10.3159 - mae: 2.3953
Epoch 23/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 12.3642 - mae: 2.5366
Epoch 24/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 18.7194 - mae: 2.9164
Epoch 25/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 11.9317 - mae: 2.5242
Epoch 26/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 14.5320 - mae: 2.5714
Epoch 27/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 10.1146 - mae: 2.3841
Epoch 28/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 16.2848 - mae: 2.6905
Epoch 29/30
13/13 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 13.5563 - mae: 2.5007
```

```
model.evaluate(x_test, y_test)
```

```
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 4ms/step - loss: 17.6902 - mae: 3.0209
[22.358211517333984, 3.211611270904541]
```

```
y_pred = model.predict(x_test)
```

```
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 25ms/step
```

```
mean_squared_error(y_test, y_pred)
```

```
22.358212699385046
```