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Subject:- Machine Learning in Finance

Week 4 :- logbook

Code:-

```
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
from tensorflow.keras.optimizers import Adam
from sklearn.datasets import fetch_california_housing
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler

data = fetch_california_housing()
X = data.data
y = data.target

scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

X_train, X_test, y_train, y_test = train_test_split(X_scaled, y, test_size=0.2, random_state=42)

SID = 2461075
n1 = int(str(SID)[-3:]) # 75
n2 = n1 // 2           # 37

model = Sequential([
    Dense(n1, activation='relu', input_shape=(X_train.shape[1],)),
    Dense(n2, activation='relu'),
    Dense(1)
])

model.compile(optimizer=Adam(), loss='mae', metrics=['mae'])
model.summary()

history = model.fit(X_train, y_train, epochs=10, validation_split=0.2, verbose=1)
test_loss, test_mae = model.evaluate(X_test, y_test, verbose=1)
print(f"Test MAE: {test_mae:.4f}")
```

Output:-

Model: "sequential_6"

Layer (type)	Output Shape	Param #
dense_18 (Dense)	(None, 75)	675
dense_19 (Dense)	(None, 37)	2,812
dense_20 (Dense)	(None, 1)	38

Total params: 3,525 (13.77 KB)

Trainable params: 3,525 (13.77 KB)

Non-trainable params: 0 (0.00 B)

Non-trainable params: 0 (0.00 B)

```
Epoch 1/10
413/413 — 2s 3ms/step - loss: 0.6190 - mae: 0.6190 - val_loss: 0.4774 - val_mae: 0.4774
Epoch 2/10
413/413 — 1s 3ms/step - loss: 0.4329 - mae: 0.4329 - val_loss: 0.4400 - val_mae: 0.4400
Epoch 3/10
413/413 — 1s 3ms/step - loss: 0.4177 - mae: 0.4177 - val_loss: 0.4214 - val_mae: 0.4214
Epoch 4/10
413/413 — 1s 3ms/step - loss: 0.4062 - mae: 0.4062 - val_loss: 0.4114 - val_mae: 0.4114
Epoch 5/10
413/413 — 1s 3ms/step - loss: 0.3983 - mae: 0.3983 - val_loss: 0.4023 - val_mae: 0.4023
Epoch 6/10
413/413 — 2s 3ms/step - loss: 0.3931 - mae: 0.3931 - val_loss: 0.4018 - val_mae: 0.4018
Epoch 7/10
413/413 — 1s 4ms/step - loss: 0.3860 - mae: 0.3860 - val_loss: 0.4008 - val_mae: 0.4008
Epoch 8/10
413/413 — 2s 4ms/step - loss: 0.3804 - mae: 0.3804 - val_loss: 0.3922 - val_mae: 0.3922
Epoch 9/10
413/413 — 1s 3ms/step - loss: 0.3753 - mae: 0.3753 - val_loss: 0.3963 - val_mae: 0.3963
Epoch 10/10
413/413 — 1s 2ms/step - loss: 0.3756 - mae: 0.3756 - val_loss: 0.3854 - val_mae: 0.3854
129/129 — 0s 2ms/step - loss: 0.3769 - mae: 0.3769
Test MAE: 0.3769
```