jupyter Keras_Baseline_sgb (unsaved changes)

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Run Code

In [1]:
```
import pandas as pd
from keras.models import Sequential
from keras.layers import Dense, BatchNormalization, Dropout
from keras.layers.advanced_activations import PReLU
from sklearn.model_selection import train_test_split
from tensorflow import keras
import matplotlib.pyplot as plt
#from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error
import tensorflow as tf
import numpy as np
```

In [2]:
```
df = pd.read_csv("row_size25_vector_size8000.csv")
```

In [3]:
```
X = df.iloc[:,7:157]
#X = df[['accelerometer_reading_x_0','accelerometer_reading_y_0','accelerometer_reading_z_0','gyro
#t = df[['linear_position_x','linear_position_y','linear_position_z','angular_position_phi','angul
#t = df[['phi_change','theta_change','psi_change']]
t = df[['phi_change']]
```

In [4]:
```
t.shape
```

Out[4]: (8000, 1)

In [5]:
```
in_dim = X.shape[1]
out_dim = t.shape[1]
```

In [6]:
```
in_dim
```

Out[6]: 150

In [7]:
```
out_dim
```

Out[7]: 1

In [8]:
```
X_train, X_test, t_train, t_test = train_test_split(X, t, test_size=0.2)
```

In [9]:
```
t_train.shape
```

Out[9]: (6400, 1)

In [10]:
```
model = Sequential()
model.add(Dense(256,input_dim=in_dim, activation="sigmoid"))
model.add(PReLU())
model.add(Dropout(.4))
model.add(Dense(128, activation="sigmoid"))
model.add(PReLU())
model.add(BatchNormalization())
model.add(Dropout(.6))
model.add(Dense(64, activation="sigmoid"))
model.add(Dense(32, activation="sigmoid"))
model.add(Dense(out_dim,activation="sigmoid"))
model.compile(loss="mse", optimizer="sgd")
```

In [11]:
```
model.fit(X_train, t_train, epochs=30, batch_size=12, verbose=2)
```

```
Epoch 1/30
534/534 - 0s - loss: 0.0300
Epoch 2/30
534/534 - 1s - loss: 0.0033
Epoch 3/30
534/534 - 0s - loss: 0.0018
Epoch 4/30
534/534 - 0s - loss: 0.0012
Epoch 5/30
534/534 - 1s - loss: 9.4082e-04
```

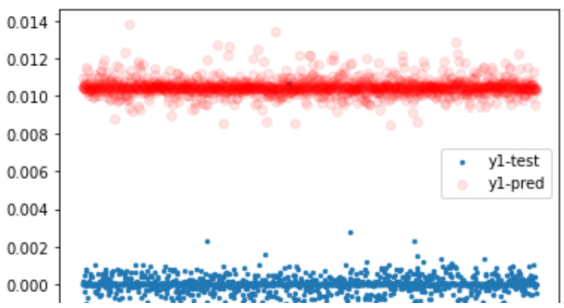
```
Epoch 6/30
534/534 - 1s - loss: 7.5844e-04
Epoch 7/30
534/534 - 0s - loss: 6.3168e-04
Epoch 8/30
534/534 - 0s - loss: 5.3996e-04
Epoch 9/30
534/534 - 0s - loss: 4.7390e-04
Epoch 10/30
534/534 - 1s - loss: 4.1845e-04
Epoch 11/30
534/534 - 1s - loss: 3.7514e-04
Epoch 12/30
534/534 - 0s - loss: 3.4175e-04
Epoch 13/30
534/534 - 0s - loss: 3.1467e-04
Epoch 14/30
534/534 - 1s - loss: 2.8854e-04
Epoch 15/30
534/534 - 0s - loss: 2.6651e-04
Epoch 16/30
534/534 - 1s - loss: 2.4843e-04
Epoch 17/30
534/534 - 0s - loss: 2.3350e-04
Epoch 18/30
534/534 - 1s - loss: 2.1892e-04
Epoch 19/30
534/534 - 1s - loss: 2.0628e-04
Epoch 20/30
534/534 - 0s - loss: 1.9639e-04
Epoch 21/30
534/534 - 0s - loss: 1.8591e-04
Epoch 22/30
534/534 - 1s - loss: 1.7608e-04
Epoch 23/30
534/534 - 0s - loss: 1.6870e-04
Epoch 24/30
534/534 - 1s - loss: 1.6081e-04
Epoch 25/30
534/534 - 0s - loss: 1.5415e-04
Epoch 26/30
534/534 - 0s - loss: 1.4925e-04
Epoch 27/30
534/534 - 1s - loss: 1.4190e-04
Epoch 28/30
534/534 - 1s - loss: 1.3652e-04
Epoch 29/30
534/534 - 1s - loss: 1.3156e-04
Epoch 30/30
534/534 - 1s - loss: 1.2748e-04
```

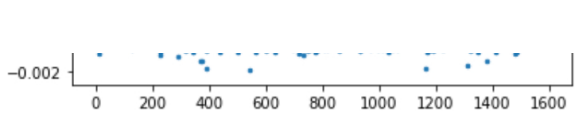
Out[11]:
```
<tensorflow.python.keras.callbacks.History at 0x27510a91040>
```

In [12]:
```
ypred = model.predict(X_test)
print("y1 MSE: ", mean_squared_error(t_test.iloc[:, 0], ypred[:,0]))
#print("y2 MSE: ", mean_squared_error(t_test.iloc[:, 1], ypred[:,1]))
#print("y3 MSE: ", mean_squared_error(t_test.iloc[:, 2], ypred[:,2]))

```

```
y1 MSE:  0.00010965507071041863
```

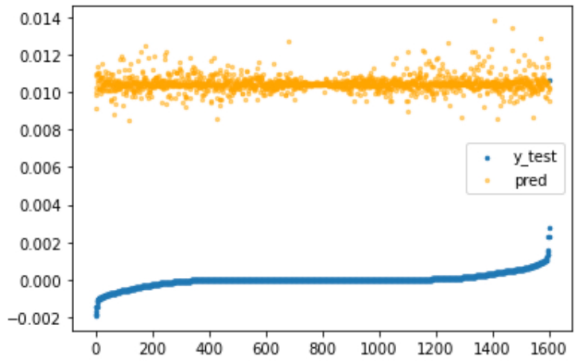
In [13]:
```
x_ax = range(len(X_test))

plt.scatter(x_ax, t_test.iloc[:, 0],  s=6, label="y1-test")
plt.scatter(x_ax, ypred[:,0], label="y1-pred",c="red",alpha = 0.1)

plt.legend()
plt.show()
```





In [14]:

```
x_ax = range(len(X_test))

y_test_index = np.argsort(t_test.iloc[:, 0], axis=0).to_numpy()

f = plt.figure()
plt.scatter(x_ax, t_test.iloc[y_test_index],  s=6, label="y_test")
plt.scatter(x_ax, ypred[y_test_index], s=6, label="pred",c="orange", alpha=0.5)
#plt.ylim(t_test.iloc[y_test_index[0]].to_numpy()[0])
plt.legend()
plt.show()

f.savefig("foo.pdf", bbox_inches='tight')
```



In [ ]:

```
1
```