In [ ]:

```
# Import our dependencies
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler,OneHotEncoder, MinMaxScaler
import pandas as pd
import tensorflow as tf
import numpy as np

# Import our input dataset
df = pd.read_csv('../neural-network/pitcher_salaries_cleaned.csv')
df.head()
```

In [ ]:

```
# create log transformed column for salary
df['sal-log']=np.log10(df['Salary'])
df
```

Reduce down to top features

In [ ]:

```
df= df.drop(["Full Name","Team","League","Age","Earned Runs","Home Runs","Wins","Losses","Weight","Height
df.head()
```

Split Features/Target & Training/Testing Sets

Split into features and target

- **y variable**: Our target variable, `Salary`
- **X variable**: Our features; just drop `Salary` and `Full Name`

In [ ]:

```
# Split our preprocessed data into our features and target arrays
y = df["sal-log"].values
X = df.drop(["sal-log"],1).values

# Split the preprocessed data into a training and testing dataset
X_train, X_test, y_train, y_test = train_test_split(X, y, random_state=1)
```

Build and Instantiate `StandardScaler` object, then standardize numerical features

In [ ]:

```
# Create a StandardScaler instance
scaler = MinMaxScaler()

# Fit the StandardScaler
X_scaler = scaler.fit(X_train)

# Scale the data
X_train_scaled = X_scaler.transform(X_train)
X_test_scaled = X_scaler.transform(X_test)
```

In [ ]:

```
# see if data scaled properly
scaled_data=pd.DataFrame(X_train_scaled)
scaled_data.head()
```

In [ ]:

```
# see if data scaled properly
scaled_y=pd.DataFrame(y_train_scaled)
scaled_y.head()
```

Build Neural Net Framework

In [39]:
```
# Define the model - deep neural net
number_input_features = len(X_train[0])
hidden_nodes_layer1 = 50
hidden_nodes_layer2 = 30
hidden_nodes_layer3 = 20
hidden_nodes_layer4 = 15



nn = tf.keras.models.Sequential()

# First hidden layer
nn.add(
    tf.keras.layers.Dense(units=hidden_nodes_layer1, input_dim=number_input_features, activation="selu")
)

# Second hidden layer
nn.add(tf.keras.layers.Dense(units=hidden_nodes_layer2, activation="selu"))

# Third hidden layer
nn.add(tf.keras.layers.Dense(units=hidden_nodes_layer3, activation="selu"))

# Fourth hidden layer
nn.add(tf.keras.layers.Dense(units=hidden_nodes_layer4, activation="selu"))



# Output layer
nn.add(tf.keras.layers.Dense(units=10, activation="selu"))

# Check the structure of the model
nn.summary()
```

```
Model: "sequential_6"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 dense_30 (Dense)            (None, 50)                400

 dense_31 (Dense)            (None, 30)                1530

 dense_32 (Dense)            (None, 20)                620

 dense_33 (Dense)            (None, 15)                315

 dense_34 (Dense)            (None, 10)                160

=================================================================
Total params: 3,025
Trainable params: 3,025
Non-trainable params: 0
_________________________________________________________________
```

Compile the Model

In [47]:
```
# Compile the model
nn.compile(loss="mean_squared_logarithmic_error", optimizer="RMSprop", metrics=["accuracy"])
```

Train the model

In [48]:
```
# Train the model
```

```
fit_model = nn.fit(X_train,y_train,epochs=200)
```

```
Epoch 1/200
116/116 [==============================] - 1s 2ms/step - loss: 0.0069 - accuracy: 0.0014
Epoch 2/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 3/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 0.0014
Epoch 4/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0069 - accuracy: 8.1037e-04
Epoch 5/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 8.1037e-04
Epoch 6/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 5.4025e-04
Epoch 7/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0069 - accuracy: 8.1037e-04
Epoch 8/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0069 - accuracy: 0.0014
Epoch 9/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 5.4025e-04
Epoch 10/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 0.0014
Epoch 11/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 0.0011
Epoch 12/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 0.0014
Epoch 13/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 14/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0069 - accuracy: 8.1037e-04
Epoch 15/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0069 - accuracy: 0.0011
Epoch 16/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0069 - accuracy: 0.0016
Epoch 17/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 8.1037e-04
Epoch 18/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 5.4025e-04
Epoch 19/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 8.1037e-04
Epoch 20/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 0.0027
Epoch 21/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0016
Epoch 22/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 23/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0016
Epoch 24/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 25/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0069 - accuracy: 0.0014
Epoch 26/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 27/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0016
Epoch 28/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 5.4025e-04
Epoch 29/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 8.1037e-04
Epoch 30/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0016
Epoch 31/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 32/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0069 - accuracy: 8.1037e-04
Epoch 33/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 5.4025e-04
Epoch 34/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 35/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0016
Epoch 36/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0024
Epoch 37/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0016
```

```
Epoch 38/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 39/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 8.1037e-04
Epoch 40/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 41/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 42/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 43/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 44/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0019
Epoch 45/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 5.4025e-04
Epoch 46/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 47/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 48/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 49/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0019
Epoch 50/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 5.4025e-04
Epoch 51/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 52/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 8.1037e-04
Epoch 53/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 8.1037e-04
Epoch 54/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 55/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 56/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0022
Epoch 57/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 5.4025e-04
Epoch 58/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 5.4025e-04
Epoch 59/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 60/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 61/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 8.1037e-04
Epoch 62/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0022
Epoch 63/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 64/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0016
Epoch 65/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 66/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0011
Epoch 67/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 68/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0019
Epoch 69/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0027
Epoch 70/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0024
Epoch 71/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0019
Epoch 72/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0019
Epoch 73/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 74/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0027
Epoch 75/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0014
```

```
Epoch 76/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0024
Epoch 77/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0024
Epoch 78/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0032
Epoch 79/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 80/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0027
Epoch 81/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 82/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 8.1037e-04
Epoch 83/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 84/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 8.1037e-04
Epoch 85/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0024
Epoch 86/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0019
Epoch 87/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0019
Epoch 88/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0019
Epoch 89/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 90/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0016
Epoch 91/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 92/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0024
Epoch 93/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 94/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0022
Epoch 95/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 96/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 97/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 98/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0019
Epoch 99/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 100/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0016
Epoch 101/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0027
Epoch 102/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 103/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 104/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 105/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0024
Epoch 106/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 107/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0022
Epoch 108/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 109/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 110/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 111/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 5.4025e-04
Epoch 112/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0032
Epoch 113/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0011
```

```
Epoch 114/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 115/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0024
Epoch 116/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 117/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 8.1037e-04
Epoch 118/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 119/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 120/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 121/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 8.1037e-04
Epoch 122/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 123/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 124/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 125/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 126/200
116/116 [==============================] - 0s 3ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 127/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0027
Epoch 128/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 129/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 130/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 131/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 132/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 133/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 134/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 135/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 136/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 2.7012e-04
Epoch 137/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 138/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 139/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0024
Epoch 140/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 141/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0024
Epoch 142/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 143/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0035
Epoch 144/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0022
Epoch 145/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0024
Epoch 146/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0030
Epoch 147/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 148/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 149/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0066 - accuracy: 0.0019
Epoch 150/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 151/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0019
```

```
Epoch 152/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 153/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 8.1037e-04
Epoch 154/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 155/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 156/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 157/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0027
Epoch 158/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 159/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 160/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 161/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 162/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 8.1037e-04
Epoch 163/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 164/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0066 - accuracy: 0.0019
Epoch 165/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 8.1037e-04
Epoch 166/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0024
Epoch 167/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0068 - accuracy: 0.0014
Epoch 168/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 169/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 170/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 8.1037e-04
Epoch 171/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 172/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 173/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 174/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0014
Epoch 175/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0066 - accuracy: 0.0011
Epoch 176/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 5.4025e-04
Epoch 177/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0066 - accuracy: 0.0011
Epoch 178/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 5.4025e-04
Epoch 179/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 180/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0066 - accuracy: 2.7012e-04
Epoch 181/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0066 - accuracy: 8.1037e-04
Epoch 182/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0011
Epoch 183/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 184/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 5.4025e-04
Epoch 185/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 5.4025e-04
Epoch 186/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 5.4025e-04
Epoch 187/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0066 - accuracy: 0.0014
Epoch 188/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0066 - accuracy: 0.0000e+00
Epoch 189/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 5.4025e-04
```

```
Epoch 190/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0066 - accuracy: 5.4025e-04
Epoch 191/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0066 - accuracy: 8.1037e-04
Epoch 192/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0066 - accuracy: 5.4025e-04
Epoch 193/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 5.4025e-04
Epoch 194/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0067 - accuracy: 8.1037e-04
Epoch 195/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0066 - accuracy: 5.4025e-04
Epoch 196/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0066 - accuracy: 2.7012e-04
Epoch 197/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0066 - accuracy: 5.4025e-04
Epoch 198/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0016
Epoch 199/200
116/116 [==============================] - 0s 2ms/step - loss: 0.0067 - accuracy: 0.0019
Epoch 200/200
116/116 [==============================] - 0s 1ms/step - loss: 0.0066 - accuracy: 2.7012e-04
```

In [49]:

```
# Evaluate the model using the test data
model_loss, model_accuracy = nn.evaluate(X_test_scaled,y_test,verbose=2)
print(f"Loss: {model_loss}, Accuracy: {model_accuracy}")
```

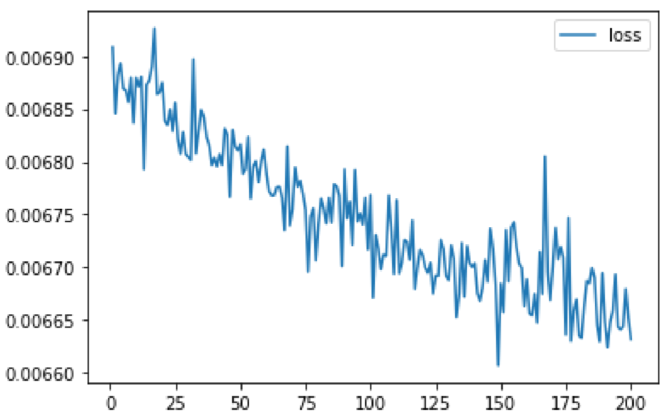
```
39/39 - 0s - loss: 1.0681 - accuracy: 0.0000e+00 - 162ms/epoch - 4ms/step
Loss: 1.0681425333023071, Accuracy: 0.0
```

In [50]:

```
# Create a DataFrame containing training history
history_df = pd.DataFrame(fit_model.history, index=range(1,len(fit_model.history["loss"])+1))

# Plot the loss
history_df.plot(y="loss")
```

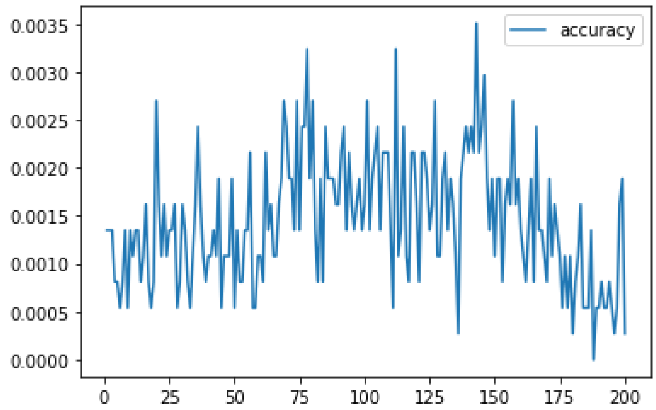
Out[50]: <AxesSubplot:>



In [51]:

```
# Plot the accuracy
history_df.plot(y="accuracy")
```

Out[51]: <AxesSubplot:>



accuracy
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
25
50
75
100
125
150
175
200

In [ ]: