DNS Utilization Prediction

In [25]:

```
import numpy as np
import pandas as pd
preprocessed_df=pd.read_csv('Data/preprocessed_data.csv')
preprocessed_df.drop(['Unnamed: 0'],1,inplace=True)


df=preprocessed_df.loc[preprocessed_df['Application'] == 'dns']
df=df[['Timestamp','Utilization(bps)']]
training_set=df[0:len(df)-3000]
print(training_set.shape)
training_set_sliced = training_set.iloc[:, 1:2].values
```

```
(13132, 2)
```

In [26]:

```
real_pattern_prediction=df[len(df)-3000:]


from sklearn.preprocessing import MinMaxScaler
sc = MinMaxScaler(feature_range = (0, 1))
training_set_scaled = sc.fit_transform(training_set_sliced)


# Getting the Random predictiond data
dataset_total = pd.concat((training_set['Utilization(bps)'], real_pattern_prediction['Utili
inputs = dataset_total[len(dataset_total) - len(real_pattern_prediction) - 200:].values
inputs = inputs.reshape(-1,1)
inputs = sc.transform(inputs)
X_test = []
for i in range(200, len(real_pattern_prediction)+200):
    X_test.append(inputs[i-200:i, 0])
X_test = np.array(X_test)
X_test = np.reshape(X_test, (X_test.shape[0], X_test.shape[1], 1))
```

In [27]:

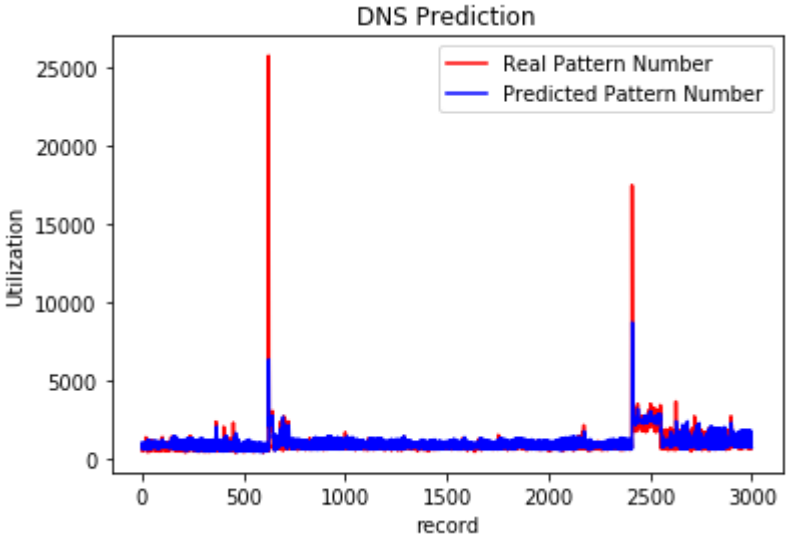
```
from keras.models import load_model
regressor_dns_1=load_model('dns(100 epo- 50 neuron-200 time).h5')
```

In [28]:

```
predicted_pattern = regressor_dns_1.predict(X_test)
predicted_pattern = sc.inverse_transform(predicted_pattern)
```

In [29]:

```
import matplotlib.pyplot as plt
%matplotlib inline
real_pattern_prediction=real_pattern_prediction.iloc[:, 1:2].values
# Visualising the results
plt.plot(real_pattern_prediction, color = 'red', label = 'Real Pattern Number')
plt.plot(predicted_pattern, color = 'blue', label = 'Predicted Pattern Number')
plt.title('DNS Prediction')
plt.xlabel('record')
plt.ylabel('Utilization')
plt.legend()
plt.show()
```



In [30]:

```
regressor_dns_1.summary()
```

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
lstm_20 (LSTM)               (None, 200, 50)           10400
_________________________________________________________________
dropout_18 (Dropout)         (None, 200, 50)           0
_________________________________________________________________
lstm_21 (LSTM)               (None, 50)                20200
_________________________________________________________________
dropout_19 (Dropout)         (None, 50)                0
_________________________________________________________________
dense_6 (Dense)              (None, 1)                 51
=================================================================
Total params: 30,651
Trainable params: 30,651
Non-trainable params: 0
_________________________________________________________________
```

In [33]:

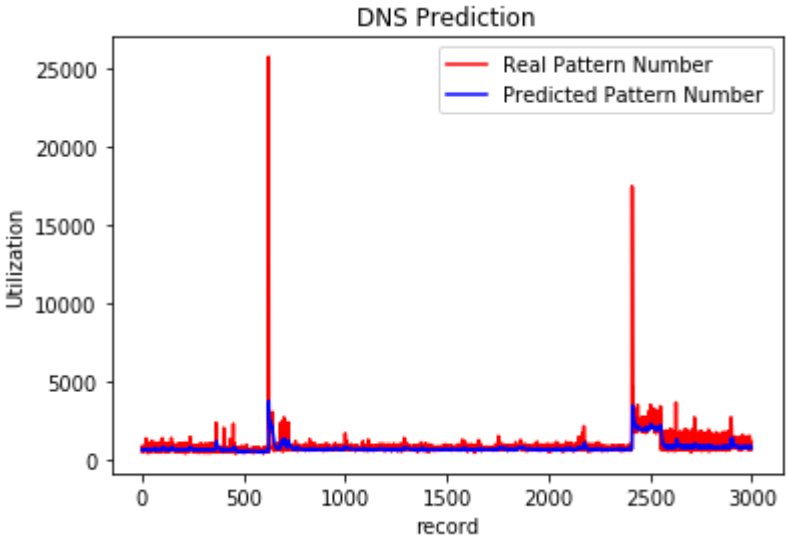
```
from keras.models import load_model
regressor_dns_2=load_model('dns.h5')
```

In [34]:

```
predicted_pattern = regressor_dns_2.predict(X_test)
predicted_pattern = sc.inverse_transform(predicted_pattern)
```

In [36]:

```
import matplotlib.pyplot as plt
%matplotlib inline
#real_pattern_prediction=real_pattern_prediction.iloc[:, 1:2].values
# Visualising the results
plt.plot(real_pattern_prediction, color = 'red', label = 'Real Pattern Number')
plt.plot(predicted_pattern, color = 'blue', label = 'Predicted Pattern Number')
plt.title('DNS Prediction')
plt.xlabel('record')
plt.ylabel('Utilization')
plt.legend()
plt.show()
```



In [42]:

```
regressor_dns_2.summary()
```

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
lstm_20 (LSTM)               (None, 200, 50)           10400
_________________________________________________________________
dropout_18 (Dropout)         (None, 200, 50)           0
_________________________________________________________________
lstm_21 (LSTM)               (None, 50)                20200
_________________________________________________________________
dropout_19 (Dropout)         (None, 50)                0
_________________________________________________________________
dense_6 (Dense)              (None, 1)                 51
=================================================================
Total params: 30,651
Trainable params: 30,651
Non-trainable params: 0
_________________________________________________________________
```

In [37]:

```
preprocessed_df=pd.read_csv('Data/preprocessed_data.csv')
preprocessed_df.drop(['Unnamed: 0'],1,inplace=True)


df=preprocessed_df.loc[preprocessed_df['Application'] == 'dns']
df=df[['Timestamp','Utilization(bps)']]
training_set=df[0:len(df)-3000]
print(training_set.shape)
training_set_sliced = training_set.iloc[:, 1:2].values
```

```
(13132, 2)
```

In [38]:

```
real_pattern_prediction=df[len(df)-3000:]


from sklearn.preprocessing import MinMaxScaler
sc = MinMaxScaler(feature_range = (0, 1))
training_set_scaled = sc.fit_transform(training_set_sliced)


# Getting the Random predictiond data
dataset_total = pd.concat((training_set['Utilization(bps)'], real_pattern_prediction['Utili
inputs = dataset_total[len(dataset_total) - len(real_pattern_prediction) - 100:].values
inputs = inputs.reshape(-1,1)
inputs = sc.transform(inputs)
X_test = []
for i in range(100, len(real_pattern_prediction)+100):
    X_test.append(inputs[i-100:i, 0])
X_test = np.array(X_test)
X_test = np.reshape(X_test, (X_test.shape[0], X_test.shape[1], 1))
```

In [39]:

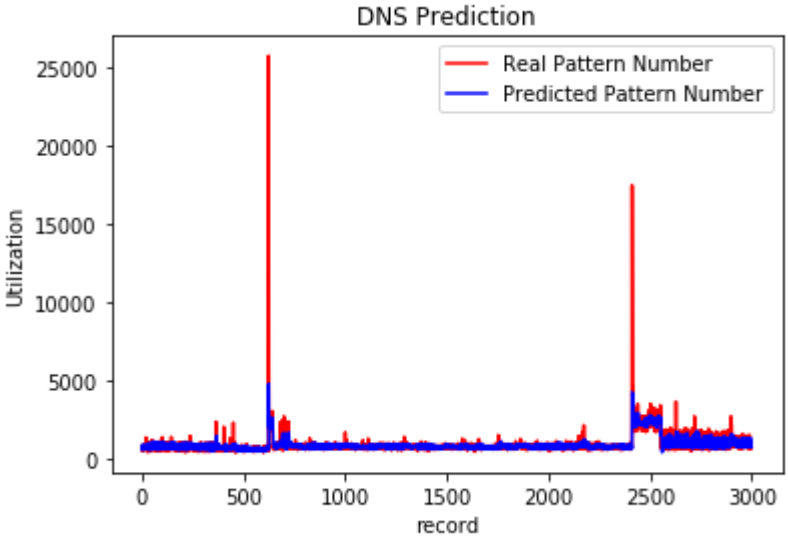
```
from keras.models import load_model
regressor_dns_3=load_model('dns(100 epo- 100 neuron-100 time).h5')
```

In [40]:

```
predicted_pattern = regressor_dns_3.predict(X_test)
predicted_pattern = sc.inverse_transform(predicted_pattern)
```

In [41]:

```
import matplotlib.pyplot as plt
%matplotlib inline
real_pattern_prediction=real_pattern_prediction.iloc[:, 1:2].values
# Visualising the results
plt.plot(real_pattern_prediction, color = 'red', label = 'Real Pattern Number')
plt.plot(predicted_pattern, color = 'blue', label = 'Predicted Pattern Number')
plt.title('DNS Prediction')
plt.xlabel('record')
plt.ylabel('Utilization')
plt.legend()
plt.show()
```



In [43]:

```
regressor_dns_3.summary()
```

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
lstm_7 (LSTM)                (None, 100, 100)          40800
_________________________________________________________________
lstm_8 (LSTM)                (None, 100)               80400
_________________________________________________________________
dropout_4 (Dropout)          (None, 100)               0
_________________________________________________________________
dense_4 (Dense)              (None, 1)                 101
=================================================================
Total params: 121,301
Trainable params: 121,301
Non-trainable params: 0
_________________________________________________________________
```

In [50]:

```
preprocessed_df=pd.read_csv('Data/preprocessed_data.csv')
preprocessed_df.drop(['Unnamed: 0'],1,inplace=True)


df=preprocessed_df.loc[preprocessed_df['Application'] == 'dns']
df=df[['Timestamp','Utilization(bps)']]
training_set=df[0:len(df)-3000]
print(training_set.shape)
training_set_sliced = training_set.iloc[:, 1:2].values
```

```
(13132, 2)
```

In [51]:

```
real_pattern_prediction=df[len(df)-3000:]


from sklearn.preprocessing import MinMaxScaler
sc = MinMaxScaler(feature_range = (0, 1))
training_set_scaled = sc.fit_transform(training_set_sliced)


# Getting the Random predictiond data
dataset_total = pd.concat((training_set['Utilization(bps)'], real_pattern_prediction['Utili
inputs = dataset_total[len(dataset_total) - len(real_pattern_prediction) - 120:].values
inputs = inputs.reshape(-1,1)
inputs = sc.transform(inputs)
X_test = []
for i in range(120, len(real_pattern_prediction)+120):
    X_test.append(inputs[i-120:i, 0])
X_test = np.array(X_test)
X_test = np.reshape(X_test, (X_test.shape[0], X_test.shape[1], 1))
```

In [52]:

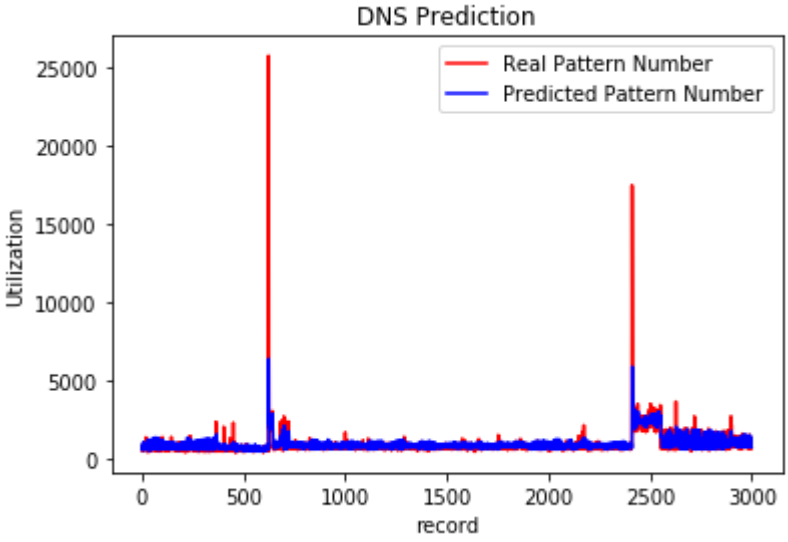
```
from keras.models import load_model
regressor_dns_4=load_model('dns(100 epo- 75 neuron-120 time-rmsprop).h5')
```

In [53]:

```
predicted_pattern = regressor_dns_4.predict(X_test)
predicted_pattern = sc.inverse_transform(predicted_pattern)
```

In [54]:

```
import matplotlib.pyplot as plt
%matplotlib inline
real_pattern_prediction=real_pattern_prediction.iloc[:, 1:2].values
# Visualising the results
plt.plot(real_pattern_prediction, color = 'red', label = 'Real Pattern Number')
plt.plot(predicted_pattern, color = 'blue', label = 'Predicted Pattern Number')
plt.title('DNS Prediction')
plt.xlabel('record')
plt.ylabel('Utilization')
plt.legend()
plt.show()
```



In [55]:

```
regressor_dns_4.summary()
```

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
lstm_17 (LSTM)               (None, 120, 75)           23100
_________________________________________________________________
lstm_18 (LSTM)               (None, 75)                45300
_________________________________________________________________
dropout_9 (Dropout)          (None, 75)                0
_________________________________________________________________
dense_9 (Dense)              (None, 1)                 76
=================================================================
Total params: 68,476
Trainable params: 68,476
Non-trainable params: 0
_________________________________________________________________
```

Https Utilization Prediction

In [45]:

```
preprocessed_df=pd.read_csv('Data/preprocessed_data.csv')
preprocessed_df.drop(['Unnamed: 0'],1,inplace=True)


df=preprocessed_df.loc[preprocessed_df['Application'] == 'https']
df=df[['Timestamp','Utilization(bps)']]
training_set=df[0:len(df)-3000]
print(training_set.shape)
training_set_sliced = training_set.iloc[:, 1:2].values
```

```
(13132, 2)
```

In [46]:

```
real_pattern_prediction=df[len(df)-3000:]


from sklearn.preprocessing import MinMaxScaler
sc = MinMaxScaler(feature_range = (0, 1))
training_set_scaled = sc.fit_transform(training_set_sliced)


# Getting the Random predictiond data
dataset_total = pd.concat((training_set['Utilization(bps)'], real_pattern_prediction['Utili
inputs = dataset_total[len(dataset_total) - len(real_pattern_prediction) - 100:].values
inputs = inputs.reshape(-1,1)
inputs = sc.transform(inputs)
X_test = []
for i in range(100, len(real_pattern_prediction)+100):
    X_test.append(inputs[i-100:i, 0])
X_test = np.array(X_test)
X_test = np.reshape(X_test, (X_test.shape[0], X_test.shape[1], 1))
```

In [47]:

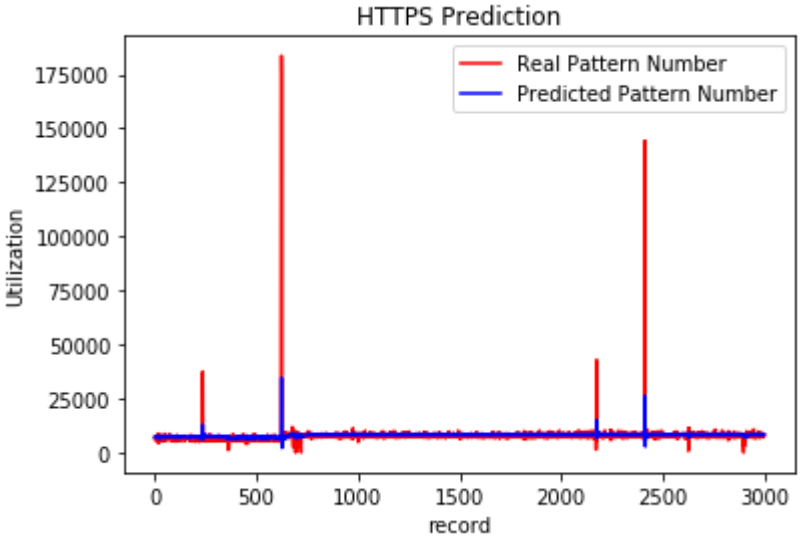
```
regressor_https_1=load_model('https(75 epo- 75&50 neuron-100 time).h5')
```

In [48]:

```
predicted_pattern = regressor_https_1.predict(X_test)
predicted_pattern = sc.inverse_transform(predicted_pattern)
```

In [49]:

```
import matplotlib.pyplot as plt
%matplotlib inline
real_pattern_prediction=real_pattern_prediction.iloc[:, 1:2].values
# Visualising the results
plt.plot(real_pattern_prediction, color = 'red', label = 'Real Pattern Number')
plt.plot(predicted_pattern, color = 'blue', label = 'Predicted Pattern Number')
plt.title('HTTPS Prediction')
plt.xlabel('record')
plt.ylabel('Utilization')
plt.legend()
plt.show()
```



In [56]:

```
regressor_https_1.summary()
```

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
lstm_1 (LSTM)                (None, 100, 75)           23100
_________________________________________________________________
lstm_2 (LSTM)                (None, 50)                25200
_________________________________________________________________
dropout_1 (Dropout)          (None, 50)                0
_________________________________________________________________
dense_1 (Dense)              (None, 1)                 51
=================================================================
Total params: 48,351
Trainable params: 48,351
Non-trainable params: 0
_________________________________________________________________
```

In [ ]: