Graph Plot for GRU vs. LSTM

December 12, 2018

In [ ]:
```
# Depression Analysis in Bangla with GRU-LSTM COMPARISON
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```

In [1]:
```
import matplotlib.pyplot as plt
from scipy.interpolate import spline
import numpy as np
```

In [2]:
```
# GRU 10 FOLD CROSS VALIDATION MODEL ACCURACY::
gru_10_fold_cross_val_folds_acc_list = [0.4435,0.4957,0.7130,0.8609,0.9478,0.9478,0.956
gru_10_fold_cross_val_model_acc = sum(gru_10_fold_cross_val_folds_acc_list)/len(gru_10_
print('GRY 10 FOLD CROSS VALIDATION MODEL ACCURACY =',gru_10_fold_cross_val_model_acc)
```

```
GRY 10 FOLD CROSS VALIDATION MODEL ACCURACY = 0.8339099999999998
```

In [3]:
```
# LSTM 10 FOLD CROSS VALIDATION MODEL ACCURACY::
lstm_10_fold_cross_val_folds_acc_list = [0.4870,0.4696,0.7913,0.8435,0.9565,0.9391,0.9
lstm_10_fold_cross_val_model_acc = sum(lstm_10_fold_cross_val_folds_acc_list)/len(lstm_
print('LSTM 10 FOLD CROSS VALIDATION MODEL ACCURACY =',lstm_10_fold_cross_val_model_acc
```

```
LSTM 10 FOLD CROSS VALIDATION MODEL ACCURACY = 0.84435
```

In [ ]:

In [4]:
```
gru_model_8_val_acc = [0.435,0.296,0.348,0.470,0.409,0.409,0.730,0.539,0.374,0.426,0.42
lstm_model_8_val_acc = [0.435,0.496,0.435,0.400,0.426,0.270,0.522,0.504,0.548,0.461,0.4
lstm_model_9_val_acc = [0.475,0.475,0.466,0.517,0.449,0.466,0.466,0.466,0.458,0.398,0.3

print(len(gru_model_8_val_acc))
print(len(lstm_model_8_val_acc))
print(len(lstm_model_9_val_acc))
```

```
22
22
75
```

In [5]:
```
gru_models_test_acc_list = [59.1,70.0,67.3,74.5,69.1,52.0,61.0,75.7,70.3,57.0,61.0,74.8
lstm_models_test_acc_list = [50.0,73.6,72.7,69.1,70.9,36.0,59.0,73.9,77.1,57.0,40.0,73

print(len(gru_models_test_acc_list))
print(len(lstm_models_test_acc_list))
```

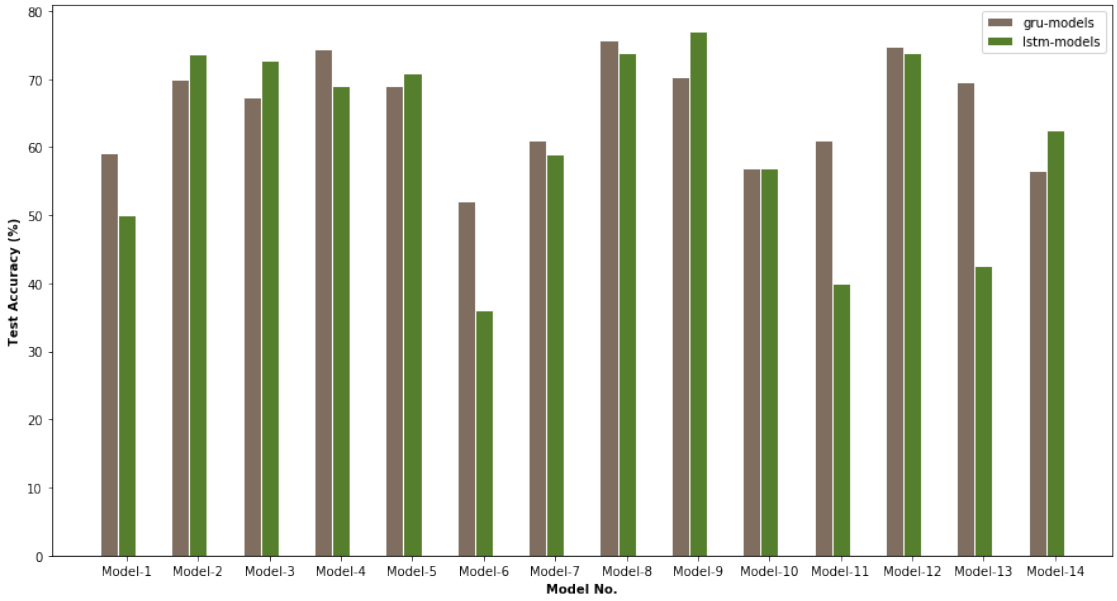
```
14
14
```

In [6]:
```
x_axis_8 = []
iterations_model_8 = 560
for iter_no in range(1,iterations_model_8+1):
    if iter_no%25 == 0:
        x_axis_8.append(iter_no)

x_axis_9 = []
iterations_model_9 = 1880
for iter_no in range(1,iterations_model_9+1):
    if iter_no%25 == 0:
        x_axis_9.append(iter_no)
```

In [ ]:

In [7]:
```
# set width of bar
barWidth = 0.25

# set height of bar
bars1 = gru_models_test_acc_list
bars2 = lstm_models_test_acc_list

# Set position of bar on X axis
r1 = np.arange(len(bars1))
r2 = [x + barWidth for x in r1]

plt.figure(figsize=(15,8))
# Make the plot
plt.bar(r1, bars1, color='#7f6d5f', width=barWidth, edgecolor='white', label='gru-model
plt.bar(r2, bars2, color='#557f2d', width=barWidth, edgecolor='white', label='lstm-mode

objects = []
for i in range(0,len(gru_models_test_acc_list)):
    object_name = "Model-"+str(i+1)
    objects.append(object_name)

# Add xticks on the middle of the group bars
plt.xlabel('Model No.', fontweight='bold')
plt.ylabel('Test Accuracy (%)', fontweight='bold')
plt.xticks([r + barWidth for r in range(len(bars1))], objects)
```

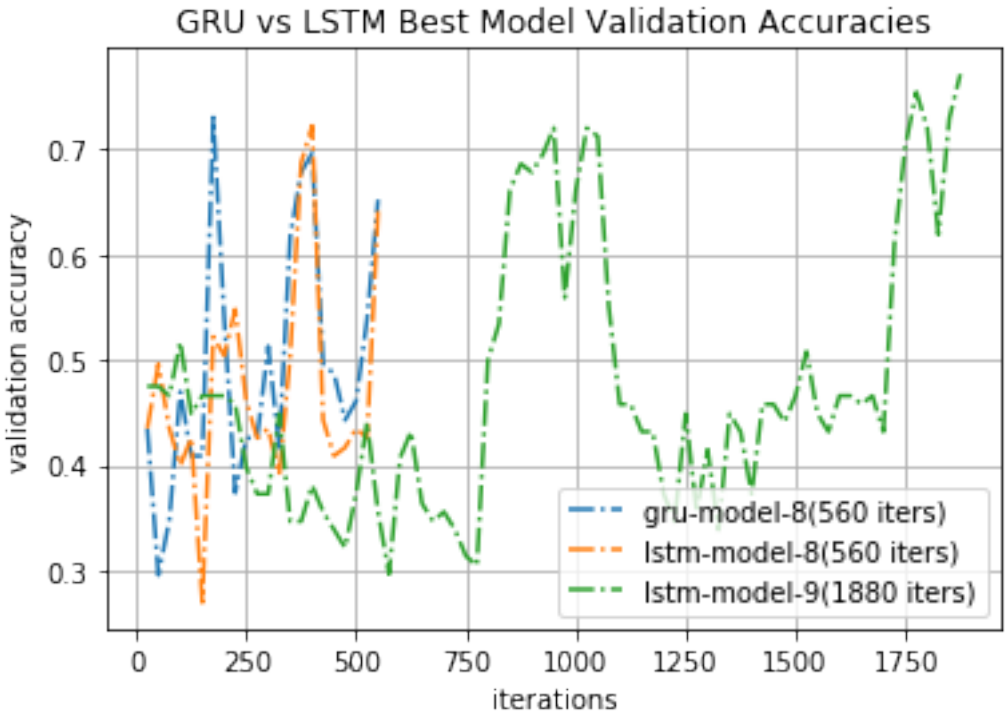
```
        # Create legend & Show graphic
        plt.legend()
        plt.savefig('images\compare_image_1_gru_vs_lstm_test_acc.png', bbox_inches='tight')
        plt.show()
```



In [ ]:

In [8]:
```
        smoothing_factor = 200
        linestyle='-.'
        marker = ''
        markersize = 3

        #plt.figure(figsize=(30,15))
        plt.title('GRU vs LSTM Best Model Validation Accuracies')
        plt.xlabel('iterations')
        plt.ylabel('validation accuracy')

        x = x_axis_8
        y = gru_model_8_val_acc
        plt.plot(x, y, marker=marker, markersize=markersize, linestyle=linestyle, label='gru-m

        y = lstm_model_8_val_acc
        plt.plot(x, y, marker=marker, markersize=markersize, linestyle=linestyle, label='lstm-

        x = x_axis_9
        y = lstm_model_9_val_acc
```

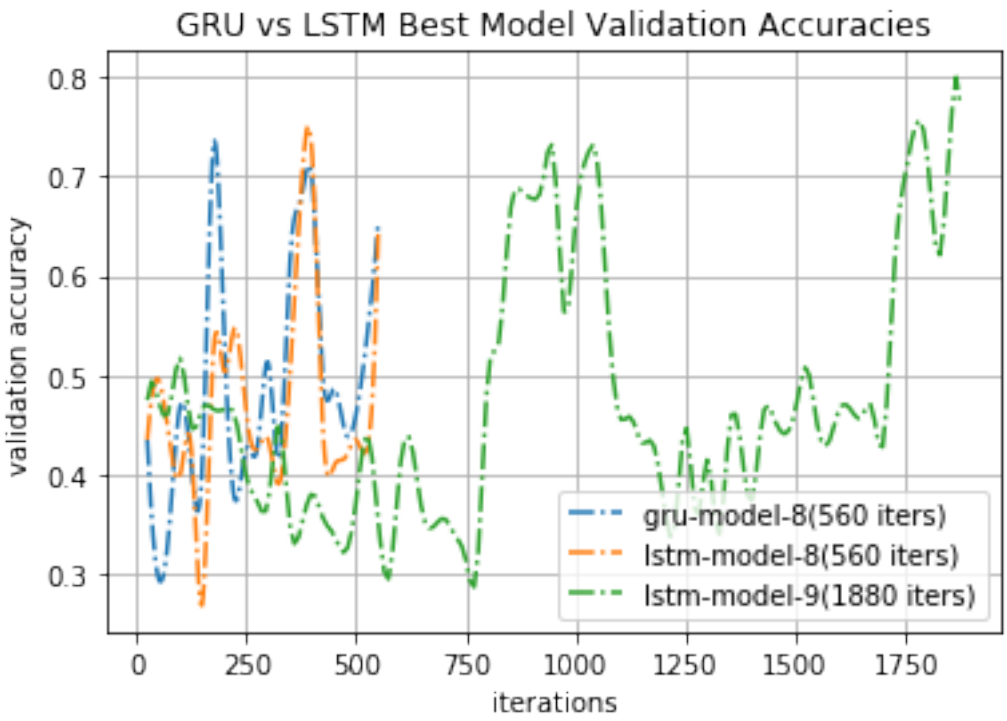
```
plt.plot(x, y, marker=marker, markersize=markersize, linestyle=linestyle, label='lstm-m

plt.grid(True)
plt.legend()
#plt.savefig('images\compare_image_2_gru_vs_lstm_best_models_val_acc.png', bbox_inches=
plt.show()
```



In [9]:
```
smoothing_factor = 200
linestyle='-.'
marker = ''
markersize = 3

#plt.figure(figsize=(30,15))
plt.title('GRU vs LSTM Best Model Validation Accuracies')
plt.xlabel('iterations')
plt.ylabel('validation accuracy')

x = x_axis_8
y = gru_model_8_val_acc
x_sm = np.array(x)
y_sm = np.array(y)
x_smooth = np.linspace(x_sm.min(), x_sm.max(), smoothing_factor)
y_smooth = spline(x, y, x_smooth)
plt.plot(x_smooth, y_smooth, marker=marker, markersize=markersize, linestyle=linestyle
```

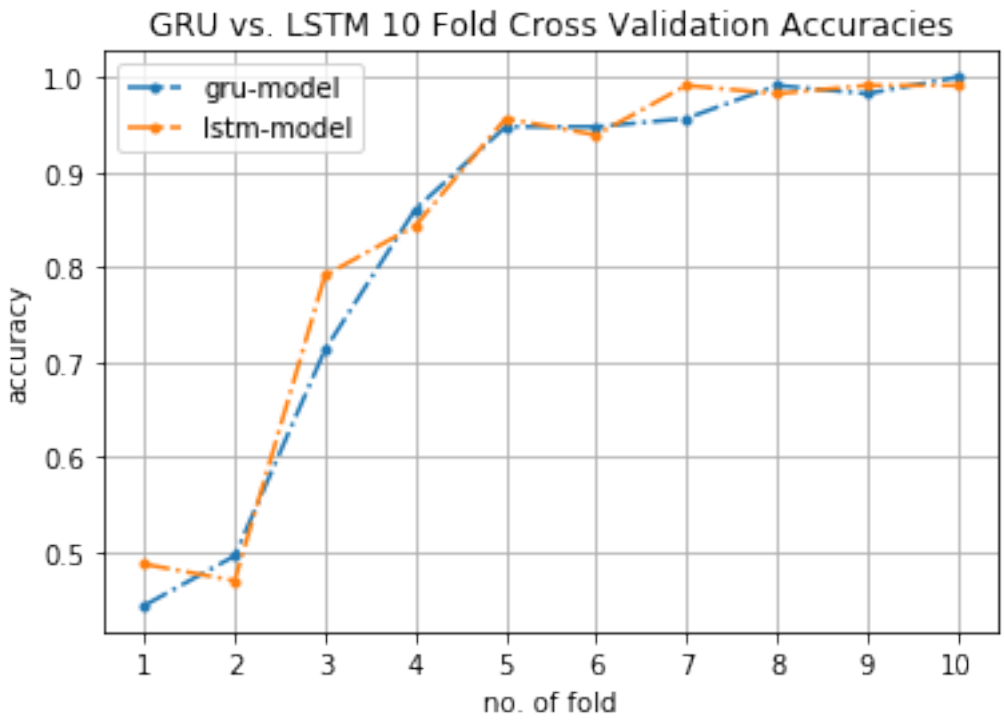
```
        y = lstm_model_8_val_acc
        x_sm = np.array(x)
        y_sm = np.array(y)
        x_smooth = np.linspace(x_sm.min(), x_sm.max(), smoothing_factor)
        y_smooth = spline(x, y, x_smooth)
        plt.plot(x_smooth, y_smooth, marker=marker, markersize=markersize, linestyle=linestyle

        x = x_axis_9
        y = lstm_model_9_val_acc
        x_sm = np.array(x)
        y_sm = np.array(y)
        x_smooth = np.linspace(x_sm.min(), x_sm.max(), smoothing_factor)
        y_smooth = spline(x, y, x_smooth)
        plt.plot(x_smooth, y_smooth, marker=marker, markersize=markersize, linestyle=linestyle

        plt.grid(True)
        plt.legend()
        plt.savefig('images\compare_image_2_gru_vs_lstm_best_models_val_acc.png', bbox_inches=
        plt.show()
```

```
c:\python36\lib\site-packages\ipykernel_launcher.py:16: DeprecationWarning: `spline` is deprec
spline is deprecated in scipy 0.19.0, use Bspline class instead.
  app.launch_new_instance()
c:\python36\lib\site-packages\ipykernel_launcher.py:23: DeprecationWarning: `spline` is deprec
spline is deprecated in scipy 0.19.0, use Bspline class instead.
c:\python36\lib\site-packages\ipykernel_launcher.py:31: DeprecationWarning: `spline` is deprec
spline is deprecated in scipy 0.19.0, use Bspline class instead.
```



In [ ]:

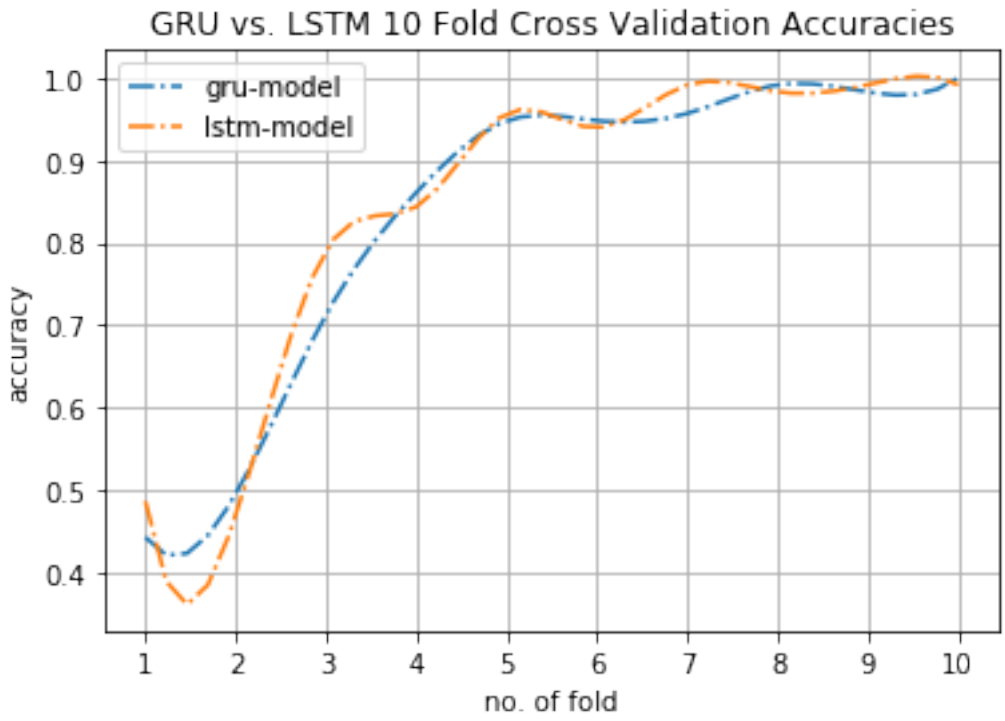
In [10]:
```
linestyle='-.'

#plt.figure(figsize=(30,15))
plt.title('GRU vs. LSTM 10 Fold Cross Validation Accuracies')
plt.xlabel('no. of fold')
plt.ylabel('accuracy')

x = [i for i in range (1,len(gru_10_fold_cross_val_folds_acc_list)+1)]
plt.xticks(x)

y = gru_10_fold_cross_val_folds_acc_list
plt.plot(x, y, marker='o', markersize=3, linestyle=linestyle, label='gru-model')

y = lstm_10_fold_cross_val_folds_acc_list
plt.plot(x, y, marker='o', markersize=3, linestyle=linestyle, label='lstm-model')

plt.grid(True)
plt.legend()
#plt.savefig('images\compare_image_1_gru_vs_lstm_10_fold_cross_validation.png', bbox_
plt.show()
```



In [11]:
```
smoothing_factor = 40
linestyle='-.'

#plt.figure(figsize=(30,15))
plt.title('GRU vs. LSTM 10 Fold Cross Validation Accuracies')
plt.xlabel('no. of fold')
plt.ylabel('accuracy')

x = [i for i in range (1,len(gru_10_fold_cross_val_folds_acc_list)+1)]
plt.xticks(x)

y = gru_10_fold_cross_val_folds_acc_list
x_sm = np.array(x)
y_sm = np.array(y)
x_smooth = np.linspace(x_sm.min(), x_sm.max(), smoothing_factor)
y_smooth = spline(x, y, x_smooth)
plt.plot(x_smooth, y_smooth, marker='', markersize=2, linestyle=linestyle, label='gru

y = lstm_10_fold_cross_val_folds_acc_list
x_sm = np.array(x)
y_sm = np.array(y)
x_smooth = np.linspace(x_sm.min(), x_sm.max(), smoothing_factor)
y_smooth = spline(x, y, x_smooth)
plt.plot(x_smooth, y_smooth, marker='', markersize=2, linestyle=linestyle, label='lstm
```

```
        plt.grid(True)
        plt.legend()
        plt.savefig('images\compare_image_3_gru_vs_lstm_10_fold_cross_validation.png', bbox_i
        plt.show()
```

```
c:\python36\lib\site-packages\ipykernel_launcher.py:16: DeprecationWarning: `spline` is deprec
spline is deprecated in scipy 0.19.0, use Bspline class instead.
  app.launch_new_instance()
c:\python36\lib\site-packages\ipykernel_launcher.py:23: DeprecationWarning: `spline` is deprec
spline is deprecated in scipy 0.19.0, use Bspline class instead.
```



In [ ]: