

○ 소스코드

```
import tensorflow as tf
import numpy as np

tf.set_random_seed(777)

tf.reset_default_graph()

sample = " if you want you"
idx2char = list(set(sample))
char2idx = {c:i for i, c in enumerate(idx2char)}

dic_size = len(char2idx)
hidden_size = len(char2idx)
num_classes = len(char2idx)
batch_size = 1
sequence_length = len(sample) - 1
learning_rate = 0.1

## data
sample_idx = [char2idx[c] for c in sample]
x_data = [sample_idx[:-1]]
y_data = [sample_idx[1:]]

X= tf.placeholder(tf.int32,[None, sequence_length])
Y= tf.placeholder(tf.int32,[None, sequence_length])

x_one_hot = tf.one_hot(X,num_classes)
cell = tf.contrib.rnn.BasicRNNCell(num_units=hidden_size)
initial_state = cell.zero_state(batch_size, tf.float32)
outputs, _states= tf.nn.dynamic_rnn(cell, x_one_hot,
initial_state=initial_state,dtype=tf.float32)

## FC layer
x_for_fc = tf.reshape(outputs,[-1,hidden_size])
outputs=tf.contrib.layers.fully_connected(x_for_fc, num_classes, activation_fn=None)

outputs= tf.reshape(outputs,[batch_size, sequence_length, num_classes])

weights= tf.ones([batch_size, sequence_length])
```

```

sequence_loss = tf.contrib.seq2seq.sequence_loss(logits=outputs, targets=Y,
weights=weights)
loss = tf.reduce_mean(sequence_loss)
train = tf.train.AdamOptimizer(learning_rate=learning_rate).minimize(loss)

prediction = tf.argmax(outputs, axis=2)

with tf.Session() as sess:
    sess.run(tf.global_variables_initializer())
    for i in range(50):
        l, _ = sess.run([loss,train],feed_dict = {X:x_data, Y:y_data})
        result = sess.run(prediction, feed_dict = {X:x_data})

        result_str= [idx2char[c] for c in np.squeeze(result)]

        print(i, "loss:", l, "prediction:","".join(result_str))

```

○ 코드 설명

if you want you에서 마지막 한글자를 제거한 문장을 input으로 넣어 다음글자를 예측하는 RNN구조입니다.

이 때, LSTM을 사용하지않고 BasicRNNCell을 사용하였습니다. 따라서, 첫 번째 글자와 마지막 글자 사이의 관계가 흐려지는 결과를 얻을 것입니다.

하지만, 상당히 짧은 문장이기 때문에 문제가 없었습니다. 그러므로 다른 긴 문장을 삽입해보았습니다. 마크트웨인의 문장을 가져와 예측해보았는데, 약 2배의 epoch만에 예측이 제대로 출력되었습니다.

이번에는 더 긴문장을 넣어 예측하게 해보았습니다.

‘it overturns our intellectual understanding that different interpretations of events and different opinions about them are highly likely, so that we return to seeing the world from our own point of view even after acknowledging differing positions’
위와같은 문장을 넣었더니 60여번만에 재현해냈습니다.

○ 결과

1. if you want you

```
0 loss: 2.4510257 prediction: o o uwonf oou
1 loss: 1.870876 prediction: yo oou ono oou
2 loss: 1.5343312 prediction: yo you want you
3 loss: 1.1098434 prediction: yt you want you
4 loss: 0.80043054 prediction: yt you want you
5 loss: 0.5877751 prediction: yf you want you
6 loss: 0.42788056 prediction: wf you want you
7 loss: 0.30461708 prediction: wf you want you
8 loss: 0.2161472 prediction: if you want you
9 loss: 0.15731873 prediction: if you want you
10 loss: 0.11884625 prediction: if you want you
```

2. Part of the secret of success in life is to eat what you like and let the food fight it out inside

```
0 loss: 3.0358148 prediction: toe ie e e e itn i eeiinn iee ene e e e i i iee ene iie e ii ii ie i ie
1 loss: 2.500786 prediction: toh lo io li li of lo o it o if of lie lo lo lo if lo lo e
2 loss: 2.2114947 prediction: tot oo te te ot e te ot tt tt t et eet o oete tt ot o tt ot ot oo ot t
3 loss: 2.1780276 prediction: art oo so oitte oi sectt iit lic an so t ti t o licesat oic oh saic lices ai so on so
4 loss: 1.9511037 prediction: art af s as stg lict aitag iic in s iat itt ic sice in iic tst ass aoc icsod in
5 loss: 1.985849 prediction: are ifelitt rt og ss oess ou sidesag ligtat itt iog iice ar iit ait si iodeactd if in i
6 loss: 1.8876595 prediction: are ifelhd as e litte fe on like ineledear iitt lod iike ird iet aot aoffarodea on lfe in d
7 loss: 1.7497482 prediction: are ofelhd le fe of le tt on like in lhfelt lhtt loe lite lnd let lut ioff lidet on lfe on f
8 loss: 1.507095 prediction: are ou thd te fe of th tt on like on lhfe t fhht loe like on let lut iof litet on lu on f
9 loss: 1.3837218 prediction: are ou tha te fe of th te on leke on lhfe t yhat yoe like on let tht fof lifet ou lu in fe
10 loss: 1.221598 prediction: are ou the teteet ou thcte on iike in siftat yhat yoe iike and let aht foo fotht on yu in fe
11 loss: 1.1161652 prediction: art ou the aecrtt of thcte on iike in softat what soe iike and let aht foo fotht on iu in oe
12 loss: 1.0295506 prediction: art ou the iecret oo tucce on iike in sostat shat woe iike and lia aht food loht in iu in de
13 loss: 0.93583804 prediction: art iu the aecrtt of tuccts in like in sifeat what wou iike and lec ahttfoot licht it iu in de
14 loss: 0.84988266 prediction: art if the aecret of tuccts in lice in lifeat shat wou iike and lec ahe food licht it lu in de
15 loss: 0.7589777 prediction: art of the aecret of tuccts in lice in siseat shat wou lige and lec ahe food licht it lu in de
16 loss: 0.66533816 prediction: art of the tecret of tuccts on lige in lifeat what you like and le the food fight it lu in de
17 loss: 0.5735497 prediction: art of the secret of tuccts on lige is tofeat yhat you tike and le tht food fight it lu in de
18 loss: 0.4982315 prediction: art of the tecret of tuccts in lige is tofeat yhat you lige and let thesfood fight it ou in de
19 loss: 0.4428176 prediction: art of the secret of tuccts on life is tufeat yhat you life and let thesfood fight it out in ide
20 loss: 0.39581134 prediction: art of the secret of tuccts on life is tufeat yhat you life and let thesfood fight it out inside
21 loss: 0.35004675 prediction: art of the secret of succe s on life is to eat yhat you like and let the food fitht it out on ide
22 loss: 0.2805337 prediction: art of the secret of success in like is to eat what you like and let the food fitht it out inside
23 loss: 0.23283273 prediction: art of the secret of success in life is to eat what you like and let the food fight it out inside
```

3. it overturns our intellectual understanding that different interpretations of events and different opinions about them are highly likely, so that we return to seeing the world from our own point of view even after acknowledging differing positions

```
60 loss: 0.034444265 prediction: t overturns our intellectual understanding that different onterpretations of events and different op
inions about them are highly likely, so that we return to seeing the world from our own point of view even after acknowledging differ
ing positions
61 loss: 0.03954345 prediction: t overturns our intellectual understanding dhat different interpretations of events and different opi
nions about them are highly likely, so that we virurn to seeing the worll from our own point of view even after acknowledging differi
ng positions
```