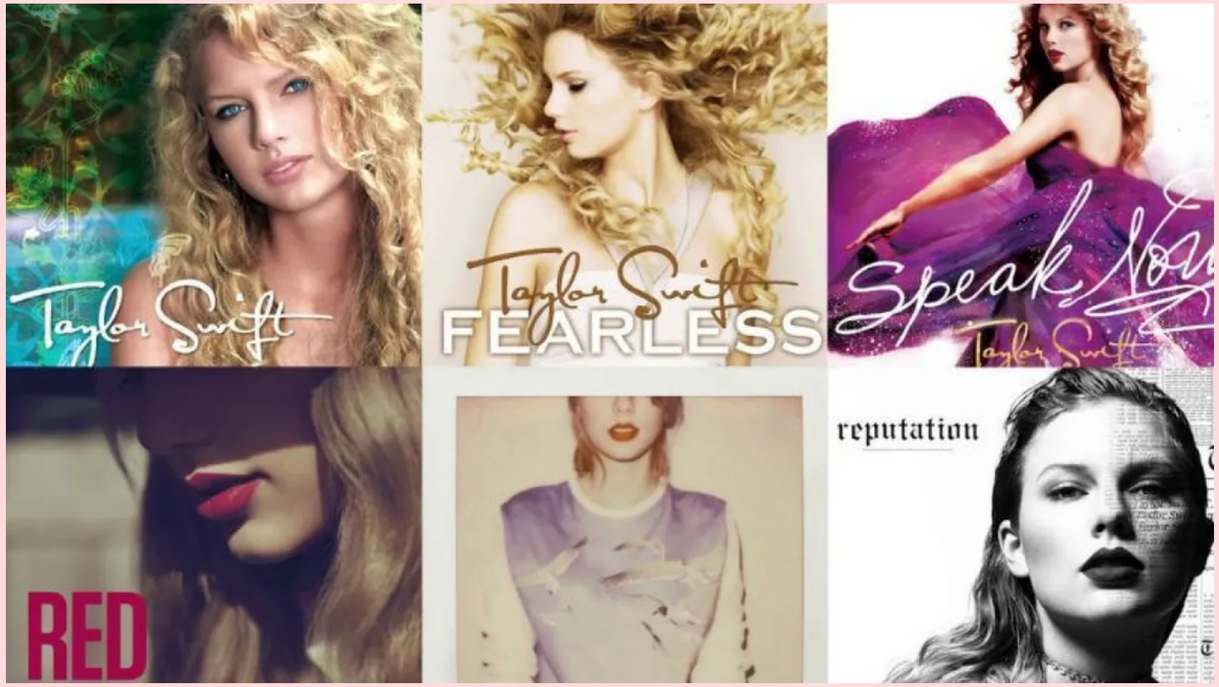
Generador de Letras de Taylor Swift

Análisis y generación de texto basado en canciones mediante modelos de aprendizaje automático

Introducción

En este proyecto, exploraremos la generación de texto basada en las letras de canciones de Taylor Swift
Se busca capturar las características en la composición de las letras ya existentes, para crear un generador de texto que pueda componer nuevas letras inspiradas en su obra.

Datos usados



Letras de canciones de Taylor Swift hasta el álbum Reputation.

Variables del dataset:

- Artista, álbum, título de la canción, número de pista, letra, línea, año.

Procesamiento de datos

Convertimos todo el contenido en minúsculas.
Creamos dos diccionarios, uno para convertir caracteres a enteros, el otro para convertir enteros de nuevo a caracteres.

```
print('Total Characters : ' , n_chars) #caracteres en lyricsText.txt
print('Total Vocab : ', n_vocab) #caracteres únicos
```

```
Total Characters :  173698
Total Vocab :  58
```

Datos usados

artist	album	track_title	track_n	lyric	line	year
Taylor Swift	Taylor Swift	Picture To Burn	2	As far as I'm concerned you're	46	2006
Taylor Swift	Taylor Swift	Picture To Burn	2	Just another picture to burn	47	2006
Taylor Swift	Taylor Swift	Picture To Burn	2	Burn, burn, burn, baby, burn	48	2006
Taylor Swift	Taylor Swift	Picture To Burn	2	You're just another picture to burn	49	2006
Taylor Swift	Taylor Swift	Picture To Burn	2	Baby, burn	50	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	Drew looks at me	1	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	I fake a smile so he won't see	2	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	That I want and I'm needing	3	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	Everything that we should be	4	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	I'll bet she's beautiful, that girl he talks about	5	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	And she's got everything that I have to live without	6	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	Drew talks to me	7	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	I laugh 'cause it's so damn funny	8	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	That I can't even see	9	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	Anyone when he's with me	10	2006
Taylor Swift	Taylor Swift	Teardrops On My Guitar	3	He says he's so in love, he's finally got it right	11	2006

Dataset:
Taylor Swift Song Lyrics from all the albums (2018)

Herramientas utilizadas

Uso de Python como lenguaje de programación y diversas bibliotecas, como pandas, keras y tensorflow.

Uso de LSTM (Long Short Term Memory), una variante de las redes neuronales recurrentes que permite modelar y aprender patrones en secuencias de datos.

Entrenamiento del modelo

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                 Output Shape              Param #
=================================================================
 cu_dnnlstm (CuDNNLSTM)       (None, 100, 256)          265216

 cu_dnnlstm_1 (CuDNNLSTM)     (None, 100, 256)          526336

 cu_dnnlstm_2 (CuDNNLSTM)     (None, 100, 256)          526336

 cu_dnnlstm_3 (CuDNNLSTM)     (None, 100, 256)          526336

 flatten (Flatten)            (None, 25600)             0

 dense (Dense)                (None, 58)                1484858

 activation (Activation)      (None, 58)                0

=================================================================
Total params: 3,329,082
Trainable params: 3,329,082
Non-trainable params: 0
_________________________________________________________________
```

- Uso de 4 capas y cada una tiene 256 nodos.
- Uso de CuDNNLSTM.
- El modelo es de tipo secuencial,
- se basa en el procesamiento de datos secuenciales, donde la ordenación de los elementos es fundamental. Se entrena para predecir el siguiente elemento de una secuencia dada la secuencia anterior.

Entrenamiento del modelo

```
Train on 138878 samples, validate on 34720 samples
Epoch 1/30
138878/138878 [==============================] - 186s 1ms/step - loss: 2.8300 - val_loss: 2.7864

Epoch 00001: loss improved from 3.00537 to 2.82996, saving model to Weights-LSTM-improvement-001-2.82996-bigger.hdf5
Epoch 2/30
138878/138878 [==============================] - 186s 1ms/step - loss: 2.6424 - val_loss: 2.6723

Epoch 00002: loss improved from 2.82996 to 2.64236, saving model to Weights-LSTM-improvement-002-2.64236-bigger.hdf5
Epoch 3/30
138878/138878 [==============================] - 186s 1ms/step - loss: 2.3721 - val_loss: 2.5978

Epoch 00003: loss improved from 2.64236 to 2.37208, saving model to Weights-LSTM-improvement-003-2.37208-bigger.hdf5
Epoch 4/30
138878/138878 [==============================] - 186s 1ms/step - loss: 1.9650 - val_loss: 2.6343

Epoch 00004: loss improved from 2.37208 to 1.96500, saving model to Weights-LSTM-improvement-004-1.96500-bigger.hdf5
Epoch 5/30
138878/138878 [==============================] - 186s 1ms/step - loss: 1.5298 - val_loss: 2.6932

Epoch 00005: loss improved from 1.96500 to 1.52981, saving model to Weights-LSTM-improvement-005-1.52981-bigger.hdf5
Epoch 6/30
138878/138878 [==============================] - 186s 1ms/step - loss: 1.1555 - val_loss: 2.8772

Epoch 00006: loss improved from 1.52981 to 1.15551, saving model to Weights-LSTM-improvement-006-1.15551-bigger.hdf5
Epoch 7/30
138878/138878 [==============================] - 186s 1ms/step - loss: 0.8443 - val_loss: 3.1771

Epoch 00007: loss improved from 1.15551 to 0.84430, saving model to Weights-LSTM-improvement-007-0.84430-bigger.hdf5
Epoch 8/30
```

Entrenamiento del modelo

Uso de LST para generar texto que se asemeje al estilo de Taylor Swift.
Sin embargo, el modelo no estaba completamente bien entrenado. Identificamos la falta de procesamiento adicional en los datos y la posibilidad de utilizar otro tipo de entrenamiento, como 'textgenrnn'".

```
Seed :
"  once, i've been waiting, waiting
ooh whoa, ooh whoa
and all at once, you are the one, i have been w "

eu h mool shoea
a eir, bo ly lean on the sast
is tigm's the noen uo doy, fo shey stant tas you fot you
i spaye
somethppel' cua
iy yas tn mu, io' me
ohehip in the uorlirs tiines ho a ban't teit dven aester
mnweiny you'd be pe k bet thing
oe eowt the light i
Done
```

Conclusiones

Se logró generar texto basado en las letras de Taylor Swift. Sin embargo, debido a las limitaciones mencionadas previamente, los resultados no alcanzaron el nivel deseado.
Concluimos que el modelo requería más procesamiento y un entrenamiento más riguroso para obtener resultados óptimos.

Referencias

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