GANTOR

GAN tweeT generatOR

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Introduction

Goal: Develop a GAN capable of generating novel context-specific text that is both coherent and semantically accurate.

- Current machine learning approaches to generating text and dialogue rely on existing examples.
- RNNs synthesize sentences from words or characters that were previously generated.
- GANs are cool!
Dataset

- Considerations:
  - Complexity of the textual context
  - Size of the elements
  - Errors and incoherence tend to accumulate as the sequence length increases

- Dataset: Tweets
  - A small upper-bound on length
  - Easily available
  - Interesting features of the text - handles, hashtags, urls
  - Potentially small feature set
**Training Data**

- **Data:** 200,000+ tweets
  - Scraped using **Tweepy**
  - Included Clinton and Trump data from assignment

- **Preparation:**
  - Unicode has a large domain
  - Simplified with **Unidecode**
  - ~100 characters: ASCII, 16 emojis, and a stop character.

- **GAN Input:**
  - Tokenized into individual characters
  - Computationally cheaper than words
Generative Adversarial Networks (GANs)

- Two competing neural networks - generator and discriminator
- Generator creates samples from the same distribution as training data
- Discriminator classifies samples as either fake or real
- Both trained simultaneously to ultimately generate samples that hopefully mimic actual data
LSTM for Generator and Discriminator

Utilizing a long short-term memory network (LSTM) for both the generator and discriminator.
GAN Structure
How to pre train

- Two unconnected models
- Generator:
  - Fed in characters, label=next character
- Discriminator:
  - Completely separate
  - Fed in characters
    - Real tweets=real tweets
    - Fake tweets=randomly swap n% of words
Sample Tweets

- step 2400.0: '      '
- step 2500.0: '      '
- step 2600.0: '      '
- step 2700.0: 'e      '
- step 2800.0: '      '
- step 2900.0: 'a a    '
- step 3000.0: 'e e    '
Sample Tweets

- step 3800.0: ' a    he
- step 3900.0: ' e
- step 4000.0: 'de  ee  a    e                  <U+26D4>'
- step 4100.0: ' e  a    h    a    a    a    e    a    '
- step 4200.0: 'ke    e
- step 4300.0: 'da    ea    h    o    oe    a    a    a    e    a    e    '
- step 4400.0: 'ka    e    e    <U+26D4>'
- step 4500.0: 'k      :                          <U+26D4>'
- step 4600.0: 'e    e  a    e    e    h    h    h    e                          <U+26D4>'
- step 4700.0: 'koe    e    e    he    h                          /    <U+26D4>'
- step 4800.0: 'eeeselen  hBaarleral han  hBaanaenteAeonhBnrartshsaneennhmeo ndeennehhaal hnd toe cShanhehhetteehhr hourhoen. ..https://t.co/hhe9a9iieQ<U+26D4>'
- step 4900.0: 'knsFerd:oo:: Teenn tn toenn hn Trenn  hhttps://t.co/sQzzzz99Qi<U+26D4>'
Sample Tweets

- step 10700.0: "Beemestnent:n: Trease rattleck ahes hete afr hhe 'sle the mest aoeeitr aart aenn ah tvtt and tege aete aou aotl tver seat hhe...<U+26D4>"
- step 10800.0: ' hheuiock haygnhoon https://t.co/Caaaahahaa<U+26D4>'
- step 10900.0: 'Banteentarn: Tene aolleoour sart ds snderture aoel tour semn https://t.co/aamaaXeent<U+26D4>,'
- step 11000.0: 'Blithene Tedtni the slturl treye tThenen tnar hon tethd on hn thday hn thlnen h?] https://t.co/iNhaFV8hgu<U+26D4>'
- step 11100.0: 'SIAPOFFICIAL: PhENLOUT Yem ao l eserted tetb us tnard hhe caser on tiVEEEN hou oASAPpopteen hoine 17 POP SONTA PAS N hHA...<U+26D4>,'
- step 11200.0: 'Seemenl: Tnctnema iast ne iacert ent hn nial hhenp tTest gsointer th nsersentionson test ce https://t.co/asKswttnnf<U+26D4>,'
- step 11300.0: ' t hash Stne i Bnloantn c Shll SactiAoent Shmlr Maangeng AantiAeranatics hstuithasfere An ha SEh ..9 ..https://t.co/aasphaaaaan<U+26D4>,'
- step 11400.0: 'nl inpm le hn tel t sot n hhaold he aaew ed afen i h\nnlo hnsaaend d th seir etint hoa tast th se ame hxter.en ..https://t.co/aatCaatsns<U+26D4>,'
- step 11500.0: "SiNTERINE: mhets the mest acdel n soat h've ever seen https://t.co/RRErbCHLY7<U+26D4>"
Future Directions

- Filter re-tweets
  - The most coherent generated tweets came from overfitting duplicated tweets
- Seed the generator
  - Most character level generators use seed text to start the generator
- Larger dataset and longer training
- Attention layer
  - More expensive but allows for a more powerful discriminator
- Convolutional discriminator

[https://github.com/adbailey4/textGAN](https://github.com/adbailey4/textGAN)
Thank You!

Questions?