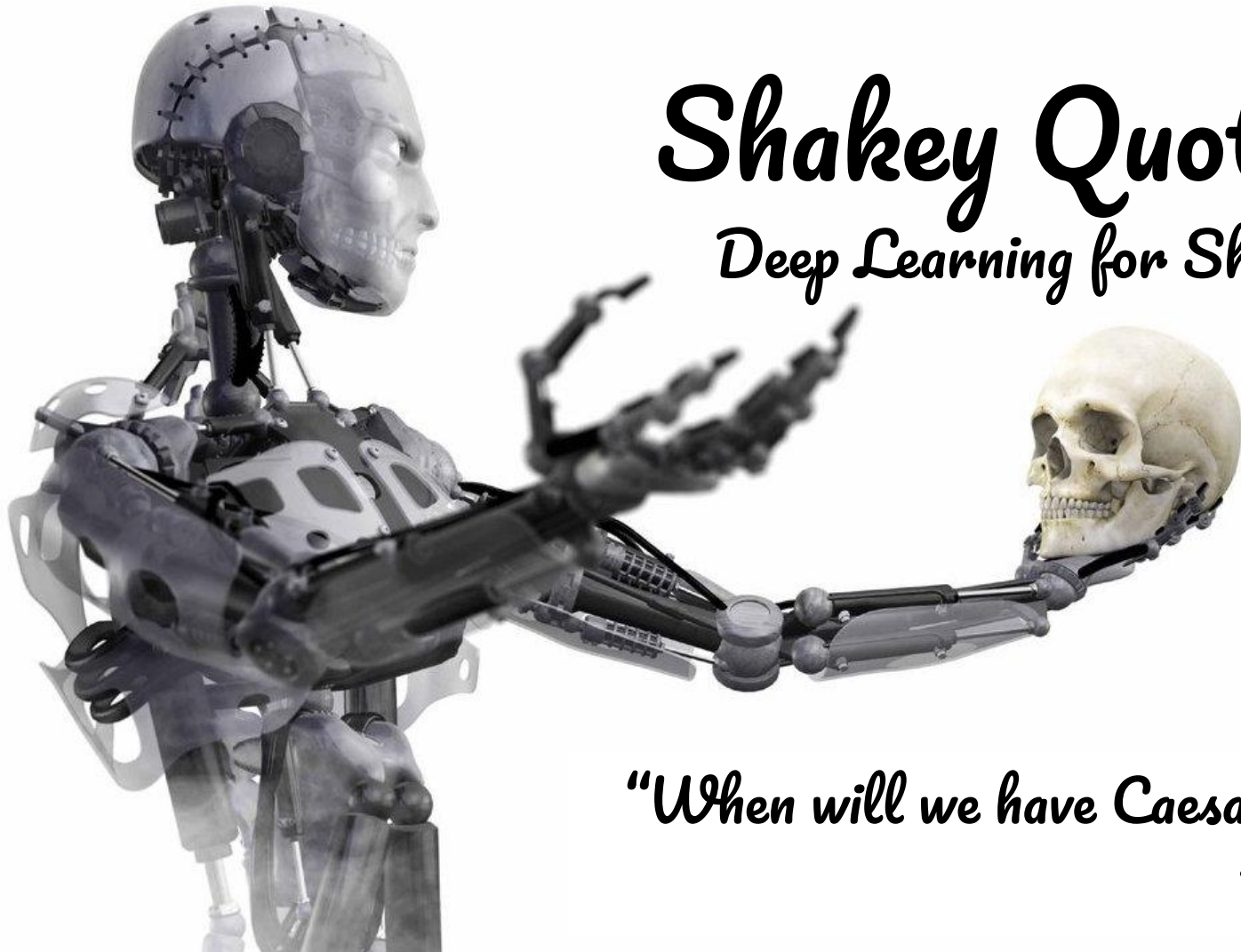


# Shakey Quotes

*Deep Learning for Shakespeare*



*"When will we have Caesar in Rome?"  
- ShakesBot*

# Our Team

- Jeremy Fisher
- Malini Chatterjee
- Mike Sample
- Murugesan Nagarajan
- Rajanish Rajagopalan
- William Hackett

# Our Idea: ShakeyQuotes

- Create a Generative Language Model using a Recurrent Neural Network (Python, Numpy, and Theano\*)
- Train Recurrent Neural Networks (RNN) on Shakespeare's Tragedies and Comedies (separately)
- RNN Generate a legible quote that resembles Shakespeare
- Perform sentiment analysis

- 1) Clean Shakespeare's corpus
- 2) Segregate into tragedies and comedies
- 3) Vectorize and Tokenize

- 1) Train the RNN
- 2) After the model is trained, generate a quote
- 3) Handle the grammar

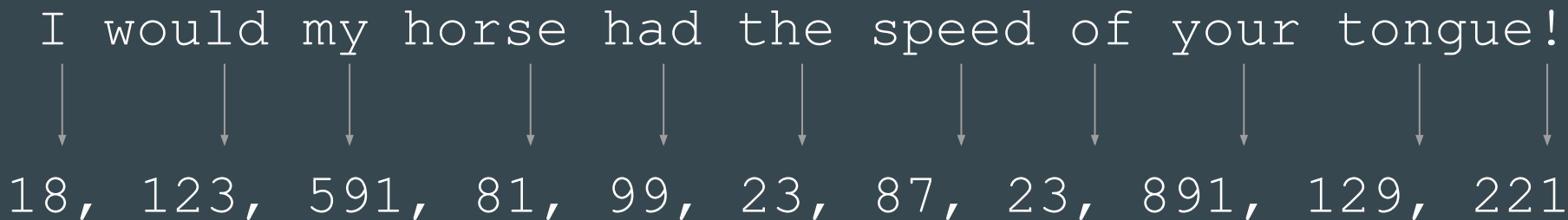
- 1) Web-app creation for presenting the ShakesBot
- 2) Post-generation analysis: Sentiment analysis

\*Theano is a library to perform operations on a GPU

# Training the RNN

- Sentences, including punctuation and words, are **tokenized** and **vectorized**

I would my horse had the speed of your tongue!



18, 123, 591, 81, 99, 23, 87, 23, 891, 129, 221

- RNN churns through these sentence vectors and **learns how to predict the next token in a series.**

# Manipulating the Output

- Quotes are generated by providing a random seed token and having RNN predict the next token, and the next token, and so on
- English grammar is imposed on each line by
  - Removing consecutive punctuation marks
  - Removing space preceding punctuation marks
  - Concluding each line after no fewer than seven words
- The lines are assembled into a passage
  - Where the final line must end must with {‘,’?’,’!’}

# The Experience with Our Generative Model

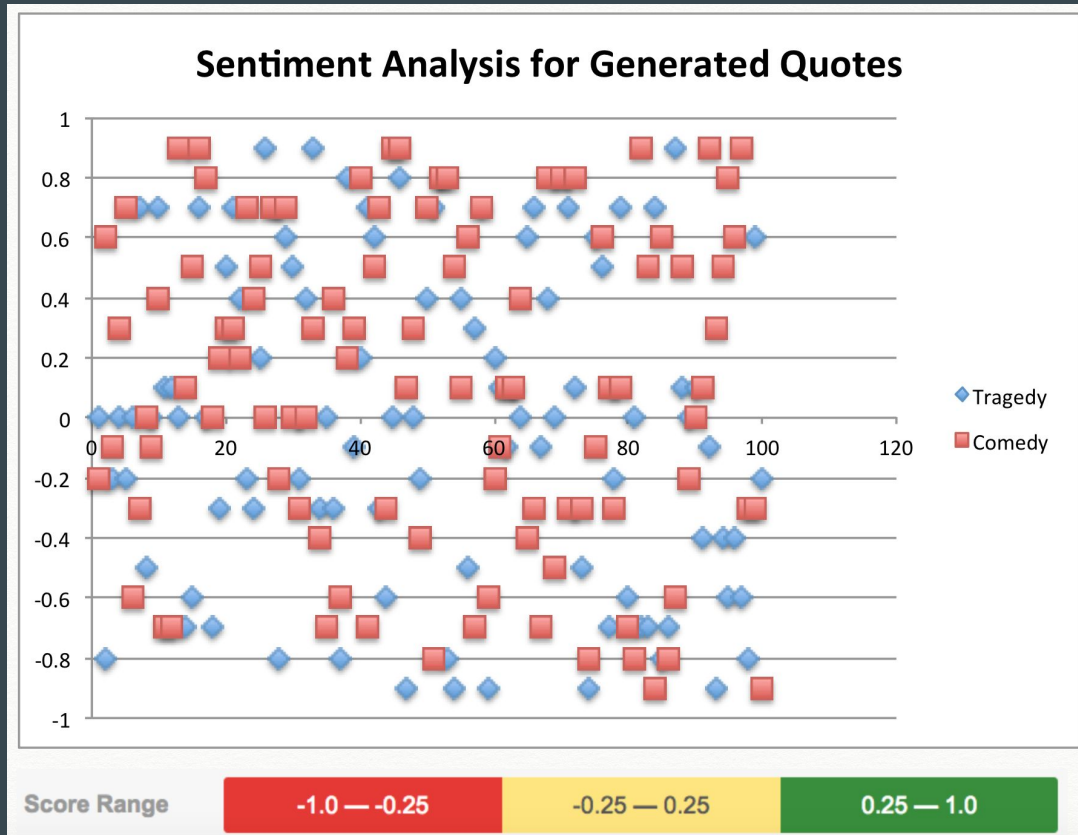
- Interesting Statistics
  - 96+ hours to train the Tragedy RNN and the Comedy RNN (collectively)
  - 77,597 Shakespeare Lines from 27 Plays
  - Vocabulary size 5000
- Observations from the output
  - When *Caesar* was mentioned, it added *Rome* and *Death*. When Mark was mentioned, it added Antony
  - Grammar became considerably more correct over the course of training

# Sentiment Analysis

- Evaluated 200 Generated Quotes
- Neutral sentiment with No real difference found between Tragedy and Comedy
- Utilized Google Natural Language API  
(<https://cloud.google.com/natural-language/>)
- All Quotes average Score: 0.056 (sd = 0.542)
  - Tragedy average Score: -0.001 (sd = 0.542)
  - Comedy average Score: 0.113 (sd = 0.539)



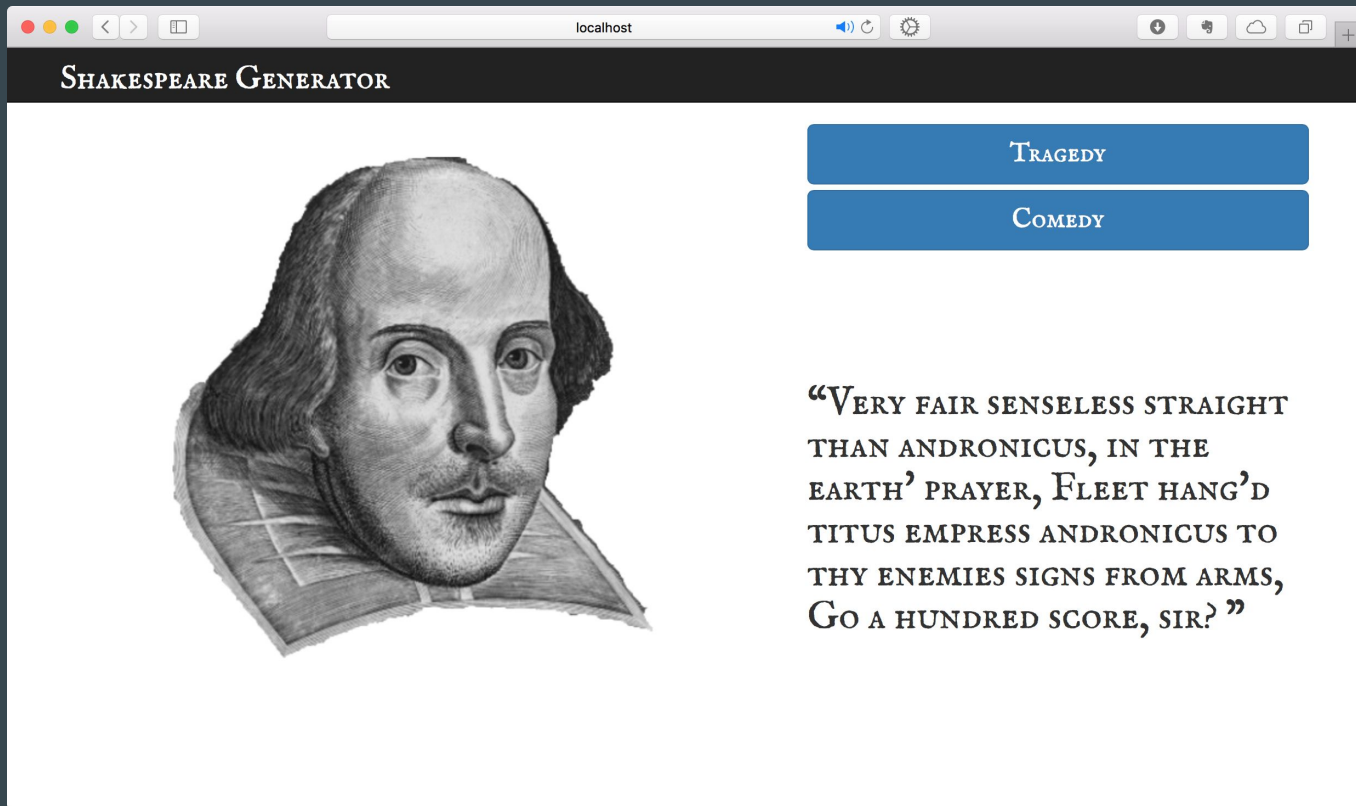
# Sentiment Analysis





# Front End App

<http://363efd88.ngrok.io>



# Our Favorite Tragedy Quotes

- “No, bassianus by your stinking cup with 'em, if him to us so delight!”
- “When you will have Caesar in Rome?”
- “Madam, you know from the watch of life to Rome imprison, Reckon, both soon my sharp beams!”
- “She has it made his feast, Of expense with his grief The oppress of the earth too.”
- “Macbeth herd, grave, heartily, Burn him with dire goths: with Andronicus, patch which were harm, Burns rogue, sirrah-- the empress gods keep thy way Speak a shame of conqueror comes deed”
- “Your several view by tears on you: Stand hither, thousand fingers, good sweet, Why let is help, do the fair man’s desires, Oh, Lucius, she dies.”
- “Hear thee: adieu: I have no nice of one earth, By thy sword on him safe and little, O wrongs, done, awful killing detested pleasure!”
- “Good Juliet, fold with the knot of the day. Burn this is as we are thus breathless.”

# Our Favorite Comedy Quotes

- “This is not with this accidents humour The heavens of them forget the shin of my heart, She is my mother, sir.”
- “Bitter stand to the way have our money, Let tickle quench us as his language For you, no speak so.”
- “For the jewel pleaseth to suffer: O Goddess, good my lord, From my lives sovereign, my friend.”
- “Mine wit, but avoid her only too, as I by him in your Song you then recovered some sport, Art bound on my heart and sot?”
- “I hope so much tender a life Well met, in a lines bear her the law, now there God, Sir Toby, nor a upright marry .”

# Tensor Flow Solution

