CS155 Project 3 grading rubric

***Notes:***

***(1) The blue text represent deductions.***

***(2) The breakdown of points can be shown to the students after the competition ends***

### 1. Preprocessing (15 points)

* Preprocessing the data (10 points)
* Explanation of preprocessing (5 points)

### 2. Unsupervised Learning (10 points)

* HMM Model (6 points)
  + Either Baum-Welch from Set 6, Off-the-Shelf package, or own implementation.
  + Deduct 5 points if model does not work
* Explanation about HMM Methods Used (4 points)

### 3. Poem Generation, Part 1: Hidden Markov Models (20 points)

* Program for writing sonnet using HMM (10 points)
  + Deduct 3 points if they did not deal with categorical features (i.e., features whose values are discrete categories, such as “cat”, “dog”, “fish”, and “rabbit”)
    - Note: if they acknowledged the presence of categorical features, but chose not to deal with them for some justifiable reasons, no penalties. (*“Time constraint” is not a justifiable reason.*)
  + Deduct 1 points if they did not deal with missing values (i.e., “-1” in the data)
    - Note: if they acknowledged the presence of missing values, but chose not to deal with them for some justifiable reasons, no penalties.
  + Deduct 2 points if they used non-tree methods (neural networks, SVM, logistic regression, etc.), but did not perform feature scaling.
  + Award them extra points (at most 2) if they tried to combine some features into new features to address nonlinearity in the data
  + Award them extra points (at most 2) if they tried to deal with class imbalance (such as via up/down-sampling, or via weights)
* Explanation (10 points)
  + Needs to have description for algorithm for generating 14-line sonnet (5 points)
  + Commentary on quality of generating poems in this manner (5 points)
    - How accurate is the rhyme, rythym, and syllable count, compared to what a sonnet should be? Do your poems make any sense? Do they retain Shakespeare’s original voice? How does training with different numbers of hidden states affect the poems generated (in a qualitative manner)? For the good qualities that you describe, also discuss how you think the HMM was able to capture these qualities.
  + Deduct 2 points if there is not a good description of the HMM sonnet generating model.
  + Deduct 4 points if the HMM model is not explained.
  + Deduct 3 points if their commentary does not hit all of the needed points.

### 4. Poem Generation, Part 2: Recurrent Neural Networks (20 points)

* Construction of a RNN using Keras or another package (8 points)
  + Deduct 6 points if they didn’t create a character-based LSTM model.
  + Deduct 3 points if they didn’t use categorical cross-entropy as the minimizer.
  + Deduct 3 points if their training data doesn’t consist of sequences of fixed length.
  + Deduct 2 points if they are not drawing softmax samples from the training model.
* Generation of Poem using RNN (6 points)
  + Student must include generated poems using temperatures of 1.5, 0.75, and 0.25 with the following initial 40-character seed: “shall i compare thee to a summer’s day?\n”, and comment on their differences.
  + Deduct 2 points for each missing poem.
  + Deduct 2 points if they do not use the fixed seed.
  + Deduct 3 points if there is no commentary on their differences.
* Description/Explanation of RNN (6 points)
  + Student must answer the prompts from the set: Explain in detail what model you implemented and using what packages. What parameters did you tune? Comment on the poems that your model produced. Does the LSTM successfully learn sentence structure and/or sonnet structure? How does an LSTM compare in poem quality to the HMM?
  + Deduct 3 points if their explanations are insufficient/lacking.
  + Deduct 3 points if the RNN model is not explained.

### 5. Additional Goals (20 points)

* Explanation of the improvements they made (5 points)
  + Students must talk about the extra improvements you made to your poem generation algorithm.
    - What problems were you trying to fix? How did you go about attempting to fix them? Why did you think that what you tried would work? Did your method succeed in making the sonnet more like a sonnet? If not, why do you think what you tried didn’t work? What tradeoffs do you see in quality and creativity when you make these changes?
  + Deduct 3 points if their explanations are insufficient/lacking.
* Improvements made (up to 15 points)
  + Each achieved additional goal is worth 5 points.
  + Each attempted-but-unsuccessful additional goal is worth 4 points.
  + Deduct 3 points if there is no commentary on their differences.
  + Deduct 2 points PER GOAL if there is no explanation.
  + 1 Bonus point per additional goal that is creative (up to TA interpretation, but should not be on the given list of ideas from the set)

### 6. Visualization and Interpretation (15 points)

* For at least 5 hidden states, students must provide give a list of the top 10 words that associate with this hidden state and state any common features among these groups (10 points total, 2 points per hidden state)
  + Deduct 2 points for each missing list per hidden state.
* Further visualization (5 points)
  + Visualization of the learned transitions between states (3 points). The visualization may be done in various ways.
  + Interpretation/explanations/observations about the state transitions based on the visualizations. (3 points).
    - As stated in the set, students should explain their interpretation of how a Hidden Markov Model learns patterns in Shakespeare’s texts. They should briefly elaborate on the methods you used to analyze the model.
  + Deduct 3 points for missing visualization.
  + Deduct 3 points for missing explanation.
  + Deduct 2 points for incomplete explanation.

### 7. Deductions for Incomplete Deliverables

* Deduct 5 points for missing Piazza post for their generated poem.