Programming Assignment - 2 [07/02/2022]
CSL7340

Instructions:

1. **Total marks - 25 marks = 20 marks (code and report) + 5 marks (video).**
2. **Module -1 deadline:- 28-02-2022 05:00 PM,**
3. **Module-2 and 3: deadline: 15-03-2022 05:00 PM.**
4. Separate submission links will be created accordingly.
5. **ANY ONE MEMBER OF THE GROUP CAN SUBMIT. No need for other people to submit.**
6. **All libraries, tools are allowed.**
7. Submit a **.zip** file containing all the working codes (.py files and .pdf file). The zip file should be named in the format <RollNo1_RollNo2_RollNo3_NLU_A1>.zip.
   [Do not include model weights and data in the zip file]
8. Submit a **.pdf** report which should contain:
   a. A detailed description of what all you have done,
   b. A description of what else could be done to improve results - challenges faced
   c. Links to the Google-Colab files (if any),
   d. Clearly mention the contribution of each group member.
9. Create one video presentation of **max 5 min,** assuming you are presenting the results to the restaurant owner or product manufacturer - prepare a presentation on the key insights - Share your observations about what is influencing the ratings most along with justification **(faces should be clearly visible)**. [**Video upload assignment will be shared - don't add the video to .zip**]
10. **Copying from the Internet and/or your classmates is strictly prohibited. Any team found guilty will be awarded a suitable penalty as per IIT rules.**

Dataset:

1. **Here is the link to the data for module-1**
2. **Here is the link to the data for module-2.**

Module - 1 (Aspect Based Sentiment Analysis):(12)

Tasks: To train classifiers to detect aspects and their sentiments from a review sentence.

To solve this problem you have to complete two sub-tasks

a. Aspect detection and classification from a sentence
b. Sentiment classification for the aspects in the sentence

For example - given a sentence - “I loved the pizza there but the room was full of smoke” - the output should be (aspect - food, sentiment - positive) and (aspect - ambience, sentiment - negative).
Each sentence in the dataset has ground truth associated in the form of aspects and sentiments. You can choose custom train-val-test splits on the datasets you have chosen, please report your choices accordingly in the report.

Task details 8

1. Developing models -
    a. LSTM based model for aspect detection and aspect wise sentiment classification.
    b. A BERT based model for the same
2. Report all the hyperparameters used to train the model, e.g. epochs, learning rate, hidden representation size etc.
3. Report the training-validation loss/accuracy plots.
4. Compare results of accuracy from the two models – overall as well as aspect level, resource requirements (quality of results after a fixed amount of training) [i.e., both quantitative and qualitative results, varying epochs/data/hyperparameters etc. report the one you have varied]
   You have to save the best model so that you could use it for module-2
5. We have a held-out test set (same format as the train dataset, without aspects) at our end. We will share this test set one day before the submission deadline. You have to run your models on this held out test set, predict aspects and their sentiments, and **create the output in the same format as train dataset.** Name the output files as result_[model].xml

Module - 2 (Predictive Model to predict ratings):(8)

Tasks: For this module - you have to use the second dataset.
This dataset contains review texts along with numeric ratings given by the user. It doesn’t have aspects marked. 4

1. Use the best model (from 1(a) and 1(b)), to determine the aspects and their sentiments from each review.
2. Develop a predictive model to predict the ratings based on aspects and sentiments.

For e.g. let total aspects be n, your model from the module - 1 will predict the sentiments for aspects. For the aspects not present, you can assume that they are neutral. You can thus create an n-dimensional vector of aspects for each review and use these vectors as features to predict ratings.

3. Discuss the problem setup you have followed along with the evaluation.
4. Develop a second model for predicting ratings directly using the text. You can use LSTM, BERT or any other model for the purpose. 2
5. You can choose custom train-val-test splits from the datasets. (Note - This is a big dataset and you may not be able to use all of it. Choose judiciously.)
6. Report the training-validation loss/metric plots.
7. Compare the performance of models developed in steps 2 and 4.
8. Bonus - any additional modelling tasks for improving performance

Module 3 - Video preparation

Imagine you are presenting your findings as a data scientist to the restaurant management. What are your key findings? What are your recommendations to improve or emphasize? How did you come to these conclusions? Back up with data from analysis.