NLP | תרגיל 5

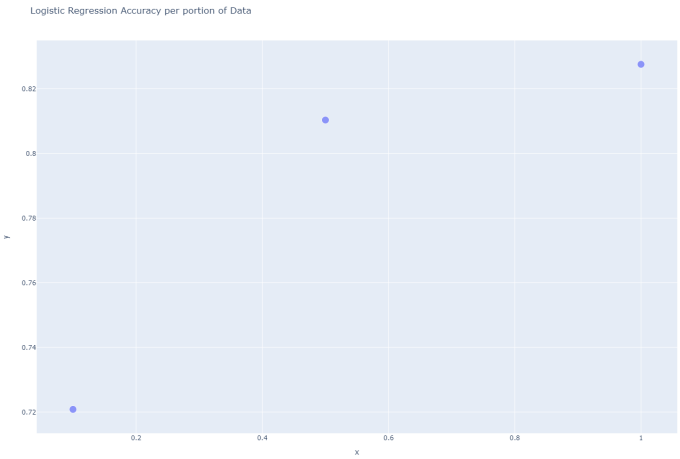
26 בינואר 2023

שאלה 1

The accuracies we got for logistic regression:

```
Logistic regression results:
Portion: 0.1
0.7208222811671088
Portion: 0.5
0.8103448275862069
Portion: 1.0
0.8275862068965517
```

Plotting the logistic regression accuracies:

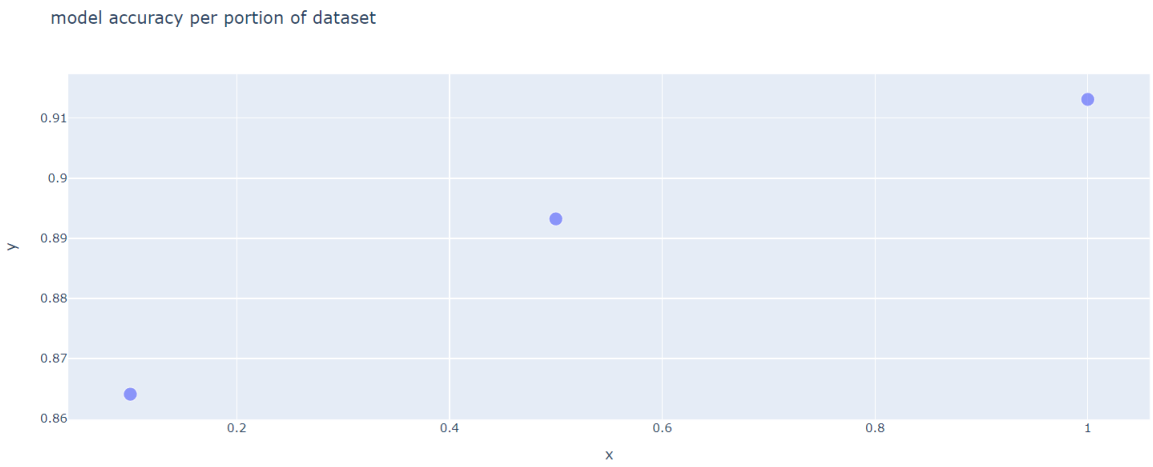


שאלה 2

The accuracies we got:

```
Portion: 0.1
0.8640583554376657
Portion: 0.5
0.8932360742705571
Portion: 1.0
0.9131299734748011
```

Plotting the accuracies:



שאלה 3

gotten accuracy:

```
Zero-shot result:
0.7712201591511937
```

שאלה 4

Our finetuned pretrained distilroberta transformer model achieved the highest accuracy of 0.91 when training it on the whole dataset (portion = 1)

In the linearRegression baseline model the range of variation of the accuracy was the widest starting at 0.72 up to 0.82. We note that our transformer model was the least sensitive. This seems right as it is already pertained.The higher accuracy of the transformer model may also explain the lower sensitivity to the portions of the data.

The zero shot model (in our case the cross-encoder/MiniLM2) is very flexible; We were able to classify text with a decent 0.72 accuracy (after 5 epochs) on classes the model wasn't trained on.That is, Zero-shot models are able to classify new classes without any training examples. Thus If we see fit to add a category we are able to do so without having to preprocess the data as in the cases of supervised learning not will we have to change the learning process. In general, such models are very useful in scenarios where there is a scarcity of labeled data or in multi-task learning where models need to be trained on multiple tasks with different classes.

However we noticed that fine-tuning on a mere 10% of the data allows a considerable increase in performance. This brings us to note that the zero shot model although flexible, can be too generalized for domain oriented tasks. Some kind of semantic transfer seems to be needed from the target domain to allow the model to be more robust at handling the complex relationships between the classes.

Other than performance, the Zero-Shot model seems less interpretable than supervised models (which can make it more challenging to understand why the model is making certain decisions).
Further, there is an implicit assumption one makes when working with Zero-shot models; the target classes must have attributes and relationships that are well defined. When there is limited information about the target classes the model may underperform.
Lastly the Zero-shot model may be computationally more expensive than other models as it needs to perform more calculations as it hasn't been trained on the target classes. Note that for heavy supervised learning tasks it might be the inverse.