List of assessment questions

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Natural Language Processing

Lecture Slides

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Things to keep in mind

NLPR is about modelling of NLP problems

It is **NOT** a software engineering exercise.

So, the focus of the assessment is about how well you can model NLP problems and come with machine learning algorithms to solve these

So marking will focus on:

- How well you have understood the underlying concepts/models?
- How the solutions you have proposed is motivated by theory as opposed to being heuristics?
- How have you done your evaluation? I am not looking for large-scale evaluation as there is no time for this.
- What improvements beyond the obvious you have come up with? This is necessary if you are aiming for a distinction.
- So, assessments that implement a well known method from a paper without addressing the points above will receive minimal marks.

Plagiarism

- There will be zero tolerance to plagiarism. University regulations will be followed.
- If you copy any code or material from elsewhere please cite appropriately.
- Make clear what you have changed from existing published work

1. Deep Learning for QA

The aim of this task is to take advantage of current developments in deep learning and apply this to a question-answering (QA) task. There are plenty of references in ACL and the web on utilising word embeddings for building QA systems. However, to get full marks,

you will need to demonstrate what additional steps you have taken beyond what has already been published.

e.g. Definition questions, List questions

Key challenges:

- Understand current papers in kernel based QA.
- Understand current papers in embeddings.
- Understand key limitations when applied to the very specific Question type being studied.
- Demonstrate its effectiveness on a small dataset.

2. Aspect Based Sentiment Analysis

Aspects are specific features of a product. For example lens, flash etc. can be seen as aspects of a camera. For aspect based sentiment analysis, one needs to extract both the sentiment and the aspect. The aim is to develop a deep learning based pipeline for aspect based sentiment analysis. Evaluation can be done using the SemEval 2016 ABSA (Aspect based sentiment analysis) task dataset.

Key challenges:

- Understand current papers in sentiment analysis and especially those that employ kernels.
- Understand how aspects can be learnt.
- Develop an embedding based method for aspect based sentiment analysis.
- Demonstrate its effectiveness on the SemEval 2016 Aspect Based Sentiment Analysis (ABSA) task.

3. Mixture models for Morphology learning

Implement a finite/infinite mixture model for morphology learning. Extend the approach developed for morphology learning in the lectures to cover multiple segmentations.

Key challenges

- Understand finite/infinite mixture models from a mathematical perspective
- Understand current work in morphology learning
- Develop mixture model for morphology learning. You can build upon the approach developed in the lectures or develop your own approach.
- Extend the approach to cover multiple segmentations
- Test it using MorphoChallenge dataset for English and Turkish.

4. Deep Learning for Morphology learning

The aim of the current work is to develop a neural network model for morphology learning. There are very few works in this area. Pointers to relevant current work will be provided.

Key challenges

- Understand existing work on character level representation (e.g. character n-grams) used within NLP
- Understand current work in morphology learning.
- Understand current work on deep learning applied to morphology learning.
- Develop a deep learning pipeline for morphology learning.
- Extend the approach to cover multiple segmentations.
- Test it using the MorphoChallenge datasets for English and Turkish.

5. Distant supervision for relation extraction

Relation extraction using weak supervision in the form of distant supervision is a popular technique for aligning knowledge bases with text. It is also a popular method for relation extraction. The purpose of the project is to evaluate current developments in the field and suggest improvements.

Key challenges

- Understand distant supervision as a framework for weak supervision
- Understand current work in relation extraction using distant supervision
- Understand current work in knowledge base population
- Implement an existing model
- Suggest an improvement

6. Evaluating and extending existing methods for sentence representations

Current sentence representations such as BERT and Tree constrained relation networks generate sentence level representations that are better suited for textual entailment tasks such as FEVER and SQuaD datasets. The aim in this task is to critically evaluate these embeddings and use in a pipeline for a specific entailment task.

Key challenges

- Critically understand existing sentence representation methods
- Understand existing entailment datasets
- Develop a simple pipeline for textual entailment tasks using an existing sentence representations eg. BERT
- Evaluate on a dataset e.g. FEVER

7. Discrete embeddings for knowledge base population

Discrete embeddings have the advantage that they are hashable and can be used as memory addresses. The aim of this task is to develop a simple knowledge base completion system that employs discrete embeddings for the entities and relations.

Key challenges

- Understand existing methods for learning discrete embeddings
- Understand existing knowledge base completion methods
- Implement a knowledge base completion method using a discrete embedding
- Test it on existing knowlege base completion