**CMPE 590 SP.TOP. IN CMPE: MACHINE TRANSLATION** 28.03.2017

**MIDTERM**

1. (a) Explain what is meant by the term *controlled language*. What are the advantages of using a controlled language in the context of machine translation?

(b) Consider the English source text below, which will be translated to some target language. What modifications would you make to the source text in order to try to improve the quality of the target text?

*Passengers will beyond a shadow of a doubt be afforded a higher degree of personal safety (not to mention peace of mind!) when they find themselves riding in vehicles which have built in front and back anti-lock braking systems provided by the manufacturer to prevent accidents that may be caused by skidding on such things as black ice or oil spills.*

1. Suppose that we have a corpus of three pairs of sentences:

*harika kitap – wonderful book*

*açık kitap – open book*

*açık kapı penceresi – open door window*

We execute IBM Model 1 on the corpus. Show step by step how the translation probabilities are learnt. Show all the data structures used by the algorithm and the values in these structures as the algorithm proceeds. It is sufficient to execute the algorithm for two iterations.

1. Consider the following Turkish-English sentence pair:

*Kafka en iyi yazarlardan biridir*

*Kafka is one of the best authors*

Supose that the English->Turkish (on the left) and Turkish->English (on the right) word alignments are as follows:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Kafka | en | iyi | yazarlardan | biridir |  |  | Kafka | en | iyi | yazarlardan | biridir |
| Kafka | X |  |  |  |  |  | Kafka | X |  |  |  |  |
| is |  |  |  |  |  |  | is |  |  | X |  | X |
| one |  |  |  |  | X |  | one |  |  |  |  | X |
| of |  |  |  |  |  |  | of |  |  |  | X |  |
| the |  |  |  |  |  |  | the |  |  |  | X |  |
| best |  |  | X |  |  |  | best |  |  | X |  |  |
| authors |  |  |  | X |  |  | authors |  |  |  | X |  |

We want to extract the corresponding phrases in this sentence pair. First, combine these two tables with the method covered in the lectures (the method in between intersection and union). Then, apply the phrase extraction method covered in the lectures for building the phrase translation table. Show all the phrase pairs extracted.

(Explain briefly how both of the methods work.)

*(continued on next page)*

1. Suppose that we translate the following Turkish sentence to English using a phrase-based translation system:

*Ben okula gidiyorum*

Consider the standard model that has three components (phrase translation model, reordering model, language model). Show three possible translations of this sentence to English. One of the translations should be the correct one (to the sentence “*I go to school*” with correct phrases and ordering), one should be to the same words {*I*, *go*, *to*, *school*} with incorrect phrases/ordering, and one should be any other (maybe nonsense) translation.

First, form the necessary probability tables. You can fill in the tables with any meaningful data that you like. Then calculate *exactly* the probabilities of the alternative three translations. Then show which is the best one.

*Note*: This is a phrase-based system. Your translations should include some phrases.

*Notes:*

* Questions 1:15 points, 2,4:30 points, 3:25 points
* Time: 2:00 hours
* Close notes/books

ne olur kim olduğunu bilsem pia’nın

ellerini bir tutsam ölsem

böyle uzak uzak seslenmese

ben bir şehre geldiğim vakit

o başka bir şehre gitmese

otelleri bomboş bulmasam

içlenip buzlu bir kadeh gibi

buğulanıp buğulanıp durmasam

ne olur sabaha karşı rıhtımda

çocuklar pia’yı görseler

bana haber salsalar bilsem

içimi büsbütün yıldız basar

bir hançer gibi çıkıp giderdim

ben bir şehre geldiğim vakit

o başka bir şehre gitmese

singapur yolunda demeseler

bana bunu yapmasalar yorgunum

üstelik parasızım pasaportsuzum

ne olur sabaha karşı rıhtımda

seslendiğini duysam pia’nın

sırtında yoksul bir yağmurluk

çocuk gözleri büyük büyük

üşümüş ürpermiş soluk

ellerini tutabilsem pia’nın

ölsem eksiksiz ölürdüm