Project 3: Variational auto-encoders

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In this project you will work with a neural extension of IBM model 1. You will learn how to marginalise discrete latent variables and you will also employ a continuous latent variable.

For the continuous case you will work with a variational auto-encoder formulation.

1 Tasks

T1 We have prepared a notebook with theoretical background. You should read it carefully and answer a few questions.

We have prepared a notebook with a tensorflow implementation of neural IBM 1. Your job is to extend that basic model.

T2 Neural IBM 1 with additional French context (Section 2.1 of the notebook). You complete this task by showing us a plot of likelihood (training/dev) and AER (dev/test) per epoch.

T3 Neural IBM 1 with collocations (Section 2.2 of the notebook). You complete this task by showing us a plot of likelihood (training/dev) and AER (dev/test) per epoch.

T4 Neural IBM 1 with latent gate (Section 2.3 of the notebook). You complete this task by showing us a plot of likelihood (training/dev) and AER (dev/test) per epoch.

Note that You are free to use a framework other than tensorflow, but then our support may be limited by your choice. You can also use pre-defined layers (e.g. MLPs, Embedding layers, etc.) and optimisers (e.g. SGD, Adagrad, Adam), but note that you still need to answer theoretical questions about some of these.

2   Report

Instead of a report, we expect a link to a github repository containing one notebook for each task.

3   Assessment

Task 1 is worth 4 points. Tasks 2, 3 and 4 are worth 2 points each.