Introduction to Deep Learning M2177.0043 May 13, 2018

Due on May 20, 2017

Seoul National University

Homework 4

INSTRUCTIONS

- The homework is due at 9:00am on May 20, 2017. Anything that is received after that time will be considered to be late and we do not receive late homeworks. We do however ignore your lowest homework grade.
- Homeworks need to be submitted electronically on ETL. Only PDF generated from LaTex is accepted.
- Make sure you prepare the answers to each question separately. This helps us dispatch the problems to different graders.
- Collaboration on solving the homework is allowed. Discussions are encouraged but you should think about the problems on your own.
- If you do collaborate with someone or use a book or website, you are expected to write up your solution independently. That is, close the book and all of your notes before starting to write up your solution.

1 VAE [85 points]

1. In this homework, we will build and experiment with VAEs. It's best to use the Azure cloud in order to not waste time waiting for the experiments to run.
2. Go to the Azure portal https://portal.azure.com and find out the ip address for your instance.
3. ssh into the instance on a terminal, create a directory, and copy the hw4 over there.
4. You'll implement functionalities in `VAE.ipynb` file. **To submit your results from Q1, run `collectSubmissions.sh` script. This will produce a file called `hw4_results.zip`. Please submit this file on ETL.**
5. Note, you need to change the notebook kernel to **Python3** for all notebook files.
6. Remember to **STOP** the Azure instance when you're done.

2 KL divergence between two multivariate Gaussians [15 points]

Derived the closed form expression for the KL divergence between two multivariate Gaussian distributions $D_{KL}(p, q)$ where each distribution is parameterized by (μ_1, Σ_1) and (μ_2, Σ_2) respectively.